

5-1991

Criminal Discovery, Scientific Evidence, and DNA

Paul C. Giannelli

Follow this and additional works at: <https://scholarship.law.vanderbilt.edu/vlr>



Part of the [Criminal Law Commons](#), and the [Evidence Commons](#)

Recommended Citation

Paul C. Giannelli, *Criminal Discovery, Scientific Evidence, and DNA*, 44 *Vanderbilt Law Review* 791 (1991)
Available at: <https://scholarship.law.vanderbilt.edu/vlr/vol44/iss4/2>

This Article is brought to you for free and open access by Scholarship@Vanderbilt Law. It has been accepted for inclusion in *Vanderbilt Law Review* by an authorized editor of Scholarship@Vanderbilt Law. For more information, please contact mark.j.williams@vanderbilt.edu.

Criminal Discovery, Scientific Evidence, and DNA

Paul C. Giannelli*

I. INTRODUCTION	792
II. PRELIMINARY CONSIDERATIONS	794
A. <i>Reliability of Scientific Proof</i>	795
B. <i>Admissibility and the Adversary Process</i>	797
C. <i>Pretrial Discovery</i>	798
III. NOTICE	800
IV. SCIENTIFIC REPORTS	803
A. <i>Procedures Employed</i>	804
B. <i>Conclusions Reached</i>	804
C. <i>Qualifications</i>	805
D. <i>Bases of Opinion and Number of Analysts</i>	806
E. <i>Types of Reports</i>	808
F. <i>Other Issues</i>	808
V. RELATED DOCUMENTS	809
A. <i>Bench Notes</i>	809
B. <i>Graphs</i>	811
C. <i>Statistical and Novel Evidence</i>	812
1. <i>Fiber Analysis</i>	812
2. <i>Neutron Activation Analysis</i>	812
3. <i>DNA Evidence</i>	814
VI. THE RIGHT TO TEST AND RETEST EVIDENCE	816
VII. DUTY TO PRESERVE	819
VIII. CONCLUSION	821
A. <i>Proposed Amendments</i>	821
B. <i>Rationale</i>	823

* Albert J. Weatherhead III and Richard W. Weatherhead Professor of Law, Case Western Reserve University. J.D., University of Virginia, 1970; LL.M., University of Virginia, 1975; M.S. in Forensic Science, George Washington University, 1973. I want to thank Barry Scheck, whose questions and insights caused me to write this Article, and James Wooley for sharing an opposing viewpoint. I also want to thank David Magee and Katherine Friedell for their research and editorial assistance.

I. INTRODUCTION

"At bottom the case against Claus von Bülow was a scientific case. It would have to be refuted by scientific evidence,"¹ wrote Alan Dershowitz. The von Bülow case is not alone. Many recent notorious criminal trials involved scientific proof. For example, the prosecution offered hypnotically refreshed testimony and bite mark evidence in the Ted Bundy case.² Fiber evidence proved critical in the trial of Wayne Williams for the murder of two of the thirty young black males killed in Atlanta in the late 1970s.³ Other illustrations include the pathology and serology testimony in the Jean Harris trial,⁴ the forensic analysis of physical evidence in the Jeffrey MacDonald "Green Beret Doctor" case,⁵ and the ballistics, shoeprint, and fingerprint evidence in the "Night Stalker" serial murder prosecution.⁶ Indeed, reliance on scientific proof has become so common that its absence in a particular case is noteworthy. A news account of the "Central Park Jogger" case commented that "[a]mong the defense's strongest points in attacking the prosecution's case was the surprising absence of physical evidence—no

1. A. DERSHOWITZ, REVERSAL OF FORTUNE: INSIDE THE VON BÜLOW CASE 105 (1986); see also *State v. von Bülow*, 475 A.2d 995 (R.I.), cert. denied, 469 U.S. 875 (1984).

2. See *Bundy v. State*, 471 So. 2d 9, 18-19 (Fla. 1985); *Bundy v. State*, 455 So. 2d 330, 342-43 (Fla. 1984); see also R. LARSEN, BUNDY: THE DELIBERATE STRANGER (1986); S. MICHAUD & H. AYNES-WORTH, THE ONLY LIVING WITNESS (1983).

3. See *Williams v. State*, 251 Ga. 749, 312 S.E.2d 40 (1983); see also Deadman, *Fiber Evidence and the Wayne Williams Trial (Conclusion)*, 53 F.B.I. LAW ENFORCEMENT BULL. 10 (May 1984) [hereinafter Deadman, *Fiber Evidence*]; Deadman, *Fiber Evidence and the Wayne Williams Trial (pt 1)*, 53 F.B.I. LAW ENFORCEMENT BULL. 12 (Mar. 1984) [hereinafter Deadman, *Wayne Williams Trial*].

4. See *People v. Harris*, 84 A.D.2d 63, 445 N.Y.S.2d 520 (1981), aff'd, 57 N.Y.2d 335, 442 N.E.2d 1205, 456 N.Y.S.2d 694 (1982), cert. denied, 460 U.S. 1047 (1983). Eight pathologists testified and 20% of the trial was devoted to cutaneous histology. See Ackerman, *The Physician As Expert Witness: Is Peer Review Needed?*, 1 GENERICS 37, 52 (Dec. 1985) (stating that "[t]he role of cutaneous histology in the trial of Jean Harris and its implications for medicine and the law in America should be of concern to the community of physicians"); Beach, *Mr. Wizard Comes to Court*, TIME, Mar. 1, 1982, at 90 (reporting that "[a]t the trial of Jean Harris last year [the expert] tried to persuade the jury—unsuccessfully—that blood marks jibed with Harris's claim that the shooting of Dr. Herman Tarnower occurred accidentally during a struggle"); see also S. ALEXANDER, VERY MUCH A LADY: THE UNTOLD STORY OF JEAN HARRIS AND DR. HERMAN TARNOWER (1983); J. DAVID, SCARSDALE MURDER (1981).

5. MacDonald was convicted of killing his wife and two children. His story became the subject of a book and movie. See J. MCGINNISS, FATAL VISION 264 (1983) (explaining that "[t]he physical evidence . . . had from the start been at the core of the case against MacDonald"); see also *United States v. MacDonald*, 779 F.2d 962 (4th Cir. 1985), cert. denied, 479 U.S. 813 (1986); *United States v. MacDonald*, 456 U.S. 1 (1982); *United States v. MacDonald*, 688 F.2d 224 (4th Cir. 1982), cert. denied, 459 U.S. 1103 (1983); *United States v. MacDonald*, 640 F. Supp. 286 (D.N.C. 1985); *United States v. MacDonald*, 607 F. Supp. 1183 (D.N.C. 1985).

6. See Harris, *Night Stalker Convicted of 13 Murders*, U.P.I., Sept. 21, 1989. The recent high-publicity murder trial of Robert Golub on Long Island included DNA, bite mark, fingerprint, and hair analysis evidence. N.Y. Times, Mar. 29, 1990, at B2, col. 4. One newspaper headline read: *In L.I. Murder Case, Focus Turns to Science*, N.Y. Times, Mar. 26, 1990, at 24.

weapons, no blood stains, no strands of hair, no pieces of skin, no footprints link any of the teenagers to the crimes."⁷

Even the popular press has written on the subject. The *New York Times* relates that the importance of expert testimony "is growing as technological advances enable courts to dispose of cases by using scientific tools."⁸ *Time* reports that "forensic science is growing so fast that even the most sophisticated researchers cannot keep up."⁹

This development raises a number of issues for the legal system. The standard for admitting novel scientific evidence, such as Deoxyribonucleic Acid (DNA), continues to vex the courts.¹⁰ The admissibility of laboratory reports in criminal prosecutions is unresolved.¹¹ The contours of an indigent accused's right to defense experts still is being explored.¹² The expansion of the bases of expert testimony in Federal Rule of Evidence 703 (Rule 703) remains controversial.¹³

One issue that appears to be settled is the need for pretrial discovery of scientific evidence. Virtually all jurisdictions track Federal Criminal Rule 16 (Rule 16) and make reports of scientific tests discoverable.¹⁴

7. Sherman, *Technology, Emotion Key in Jogger Case*, NAT'L L.J., Aug. 20, 1990, at 8; see also N.Y. Times, Aug. 20, 1990, at B4 (reporting that "[t]he youths claimed not to have penetrated the jogger, and there was no clear physical proof that they had").

8. Jenkins, *Experts' Day in Court*, N.Y. Times, Dec. 11, 1983 (Magazine), at 98, 100.

9. Beach, *supra* note 4, at 90; see also Cherry, *Their Blood Cried out for Vengeance*, SCI. DIG. 60 (May 1981) (stating that by "[u]sing a host of new techniques, forensic scientists are now able to crack cases once considered unsolvable").

10. See Black, *A Unified Theory of Scientific Evidence*, 56 FORDHAM L. REV. 595, 597 (1988); Giannelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, A Half-Century Later*, 80 COLUM. L. REV. 1197, 1198-99 (1980).

11. Compare *United States v. Baker*, 855 F.2d 1353, 1359 (8th Cir. 1988) (finding lab reports of drug analysis admissible under Federal Rules), *cert. denied*, 490 U.S. 1069 (1989) with Giannelli, *The Admissibility of Laboratory Reports in Criminal Trials: The Reliability of Scientific Proof*, 49 OHIO ST. L.J. 671 (1988) (arguing that lab reports should be inadmissible).

12. The United States Supreme Court first recognized an indigent's right to defense experts in *Ake v. Oklahoma*, 470 U.S. 68 (1985). The exact dimensions of the right, however, have not been mapped out. See *Volson v. Blackburn*, 794 F.2d 173, 176 (5th Cir. 1986) (stating that the "*Ake* decision fails to establish a bright line test for determining when a defendant has demonstrated that sanity at the time of the offense will be a significant factor at the time of trial"); Note, *Expert Services and the Indigent Criminal Defendant: The Constitutional Mandate of Ake v. Oklahoma*, 84 MICH. L. REV. 1326 (1986).

13. See Carlson, *Getting a Grip on Experts*, 16 LITIGATION 36 (Summer 1990); Imwinkelried, *The "Bases" of Expert Testimony: The Syllogistic Structure of Scientific Testimony*, 67 N.C.L. REV. 1 (1988).

14. FED. R. CRIM. P. 16(a)(1)(D) provides:

Upon request of a defendant the government shall permit the defendant to inspect and copy or photograph any results or reports of physical or mental examinations, and of scientific tests or experiments, or copies thereof, which are within the possession, custody, or control of the government, the existence of which is known, or by the exercise of due diligence may become known, to the attorney for the government, and which are material to the preparation of the defense or are intended for use by the government as evidence in chief at the trial.

Id.; see also P. GIANNELLI & E. IMWINKELRIED, *SCIENTIFIC EVIDENCE* 91 & n.23 (1986) (listing state jurisdictions).

The leading texts on criminal procedure give the subject scant attention, apparently assuming that the current discovery rules are adequate.¹⁵ Indeed, one commentator noted that the limited litigation over Rule 16 "no doubt reflects the general recognition of the necessity to afford the defense discovery of the results and reports of medical examinations and scientific tests and of the longstanding and widespread practice of many prosecutors of making such information available on request."¹⁶

Recent cases, including those involving DNA evidence, however, demonstrate the gross inadequacy of the current discovery rules. Rule 16 does not even guarantee defendants the most fundamental form of discovery—notice that a prosecution expert is going to testify against them at trial. When discovery is provided in the form of scientific reports, it is insufficient for adequate trial preparation. In addition, some courts still refuse to recognize an accused's right to test independently the state's evidence. Moreover, instead of voluntary disclosure, vigorous opposition to discovery often has been the prosecutorial response.

Part II of this Article explores more fully the need for pretrial discovery. Parts III through VII then examine the deficiencies of the current discovery rules in the areas of notice, scientific reports, related documents, and evidence testing. The Conclusion sets out proposals for reform.

II. PRELIMINARY CONSIDERATIONS

Some background information on the use of scientific evidence in criminal cases is helpful to elucidate particular deficiencies in the current discovery rules. As noted above, resort to scientific methods of proof is increasing.¹⁷ In addition, the impact of this type of evidence is substantial. One researcher reported that approximately twenty-five percent of the jurors in trials involving scientific evidence stated that they would have delivered a verdict of not guilty instead of guilty if the evidence had not been introduced.¹⁸

15. See 2 W. LAFAYE & J. ISRAEL, *CRIMINAL PROCEDURE* § 19.3 (1984); J. MOORE, W. TAGGART & J. WICKER, 8 *MOORE'S FEDERAL PRACTICE* ¶ 16.05[2] (1990); 2 C. WRIGHT, *FEDERAL PRACTICE AND PROCEDURE* § 254 (2d ed. 1982). The Author's treatment of the subject suffered from the same assumption. See P. GIANNELLI & E. IMWINKELRIED, *supra* note 14, ch. 3.

16. Reznick, *Pretrial Discovery in the Federal Courts*, in 1 *CRIMINAL DEFENSE TECHNIQUES* 10-31 (1990).

17. Judge Jack Weinstein has commented: "Hardly a case of importance is tried today in the federal courts without the involvement of a number of expert witnesses." Weinstein, *Improving Expert Testimony*, 20 *U. RICH. L. REV.* 473, 473 (1986).

18. See Peterson, Ryan, Houlden & Mihajlovic, *The Use and Effects of Forensic Science in the Adjudication of Felony Cases*, 32 *J. FORENSIC SCI.* 1730, 1748 (1987); see also M. SAKS & R. VAN

A. *Reliability of Scientific Proof*

Previous articles have discussed the reliability of scientific proof,¹⁹ therefore, it is necessary to highlight only a few points here. As illustrated by several fingerprint cases, even the most basic techniques are subject to error. In *Imbler v. Craven*,²⁰ for example, the prosecution expert failed to observe an exculpatory fingerprint in a murder case in which the death penalty was imposed. In another murder case, *State v. Caldwell*,²¹ the court observed that the expert's fingerprint testimony "was damning—and it was false."²²

These cases do not represent isolated mistakes. Proficiency test results of many common laboratory examinations are alarming. One of the authors of a major proficiency test acknowledged that "a disturbingly high percentage" of routine laboratory tests are not performed competently.²³ Seventy-one percent of the crime 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.²⁴ Similarly, a review of five handwriting comparison proficiency tests showed that the document examiners at best were correct 57% of the time and were incorrect 43% of the time.²⁵ Moreover, a limited, but nevertheless revealing, survey of lawyers and scientists associated with the American Academy of Forensic Sciences identified competency as the most significant ethical problem in forensic science.²⁶ Other problems considered significant include the failure of experts to express both the strengths and weaknesses of

DUIZEND, THE USE OF SCIENTIFIC EVIDENCE IN LITIGATION 5-6 (1983) (relating that "[75 percent] of the respondents to a 1974 survey of 1,363 judges and lawyers . . . throughout the United States stated that they believed judges accord scientific evidence more credibility than other evidence, and 70 percent believed that juries also find scientific evidence more credible").

19. See generally Giannelli, *supra* note 10; Giannelli, *supra* note 11.

20. 298 F. Supp. 795 (C.D. Cal. 1969), *aff'd*, 424 F.2d 631 (9th Cir.), *cert. denied*, 400 U.S. 865 (1970).

21. 322 N.W.2d 574 (Minn. 1982).

22. *Id.* at 586; see also Starrs, *A Miscue in Fingerprint Identification: Causes and Concerns*, 12 J. POLICE SCI. & ADMIN. 287 (1984).

23. *Symposium on Science and the Rules of Legal Procedure*, 101 F.R.D. 599, 645 (1984) (remarks of Professor Joseph Peterson) [hereinafter *Symposium on Science*]. For a more detailed discussion of proficiency testing, see Giannelli, *supra* note 11, at 688-92; Saks, *Prevalence and Impact of Ethical Problems in Forensic Science*, 34 J. FORENSIC SCI. 772, 775-78 (1989) (reviewing proficiency testing results and concluding that "[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").

24. J. PETERSON, E. FABRICANT & K. FIELD, *CRIME LABORATORY PROFICIENCY TESTING RESEARCH PROGRAM* 251 (Law Enforcement Assistance Administration Oct. 1978).

25. Risinger, Denbeaux & Saks, *Exorcism of Ignorance As a Proxy for Rational Knowledge: The Lessons of Handwriting Identification "Expertise,"* 137 U. PA. L. REV. 731, 747-48 (1989).

26. Peterson & Murdock, *Forensic Sciences Ethics: Developing an Integrated System of Support and Enforcement*, 34 J. FORENSIC SCI. 749, 751 (1989).

their data, testimony that exceeds the limits of the data, and the failure to remain objective in the evaluation of evidence and the delivery of testimony.²⁷

More important, institutional and systemic problems exist. Certification standards for analysts and quality assurance programs for crime laboratories generally are not required.²⁸ One scholar has commented, "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."²⁹

DNA evidence, the most recent weapon in the prosecutor's arsenal, is no exception. Heralded as "foolproof,"³⁰ "revolutionary,"³¹ and the "single greatest advance in the 'search for truth'. . . since the advent of cross-examination,"³² many courts have found DNA evidence reliable and admissible.³³ Despite this judicial acceptance and favorable publicity, however, problems have surfaced. Cellmark, one of the commercial laboratories conducting DNA analysis, admittedly made a false identification in a proficiency test.³⁴ In *People v. Castro*³⁵ the prosecution's

27. *Id.* at 752.

28. One commentator stated: "Crime laboratories are unique among publicly supported scientific operations in that few participate in external quality assurance programs." Peterson, *The Crime Lab*, in THINKING ABOUT POLICE 184, 196 (C. Klockars ed. 1983). Voluntary proficiency testing programs and voluntary crime laboratory accreditation programs are becoming more common. Peterson & Murdock, *supra* note 26, at 752-53.

29. Lander, *DNA Fingerprinting on Trial*, 339 NATURE 501, 505 (1989).

30. *DNA Prints: A Foolproof Crime Test*, TIME, Jan. 26, 1987, at 66.

31. Toufexis, *Convicted by Their Genes: A New Forensic Test Is Revolutionizing Criminal Procedure*, TIME, Oct. 31, 1988, at 74.

32. *People v. Wesley*, 140 Misc. 2d 306, 308, 533 N.Y.S.2d 643, 644 (Albany County Ct. 1988).

33. See, e.g., *United States v. Yee*, No. 3:89CR0720 (N.D. Ohio Oct. 26, 1990) (LEXIS, Genfed library, Dist file); *United States v. Jakobetz*, 747 F. Supp. 250 (D. Vt. 1990); *Perry v. State*, (Ala. Crim. App. 1990) (LEXIS, States library, Ala file); *Andrews v. State*, 533 So. 2d 841 (Fla. Dist. Ct. App. 1988); *Caldwell v. State*, 260 Ga. 278, 393 S.E.2d 436 (1990); *People v. Thomas*, 137 Ill. 2d 500, 561 N.E.2d 57 (1990); *Cobey v. State*, 80 Md. App. 31, 559 A.2d 391, *cert. denied*, 317 Md. 542, 565 A.2d 670 (1989); *State v. Pennington*, 327 N.C. 89, 393 S.E.2d 847 (1990); *State v. Ford*, 392 S.E.2d 781 (S.C. 1990); *Kelly v. State*, 792 S.W.2d 579 (Tex. Ct. App. 1990); *Glover v. State*, 787 S.W.2d 544 (Tex. Ct. App. 1990); *Spencer v. Commonwealth*, 238 Va. 275, 384 S.E.2d 775 (1989), *cert. denied*, 110 S. Ct. 759 (1990); *State v. Woodall*, 385 S.E.2d 253 (W. Va. 1989).

"First introduced into U.S. criminal proceedings in 1986, forensic DNA analysis has since been admitted into evidence in at least 185 cases by 38 States and the U.S. military as of January 1, 1990." OFFICE OF TECHNOLOGY ASSESSMENT, GENETIC WITNESS: FORENSIC USES OF DNA TESTS 14 (1990) [hereinafter OTA GENETIC WITNESS]. *But see United States v. Two Bulls*, 918 F.2d 56 (8th Cir. 1990) (case was remanded to determine whether FBI laboratory DNA procedures were conducted properly).

34. *State v. Schwartz*, 447 N.W.2d 422, 426 (Minn. 1989) (writing that "[w]e are troubled by the fact that Cellmark admitted having 'falsely identified two samples as coming from the same subject' during a proficiency test performed by the California Association of Crime Laboratory Directors (CACLD) [, and that] [o]ut of 44 total samples, Cellmark made one incorrect match, which was considered too high an error rate by some experts").

own experts conceded that the DNA tests performed by Lifecodes, another laboratory, were "not scientifically reliable enough to support the assertion that the samples . . . do or do not match."³⁶ In another case, Cellmark and Lifecodes reached different conclusions after examining the same evidence.³⁷ Even the recent, and generally favorable, DNA report by the Office of Technology Assessment recognizes that "[s]erious questions are raised . . . about how best to ensure that any particular test result is reliable."³⁸

Despite these problems, scientific evidence offers a number of advantages over other types of proof, such as confessions and eyewitness identifications. Much of the expert evidence admitted at criminal trials is valid, and many crime laboratories, such as the Federal Bureau of Investigation (FBI) laboratory, are proficient. Scientific evidence, however, has not reached the stage at which it should be considered presumptively valid. As the Supreme Court has recognized, the role of the adversary system is to reveal and acknowledge the "shortcomings" of expert testimony.³⁹

B. Admissibility and the Adversary Process

At the same time that reliance on scientific evidence increased, the barriers to the admissibility of expert testimony were lowered. Many jurisdictions, for example, abandoned the conservative "general accept-

The OTA Report provides further details:

With respect to blind trials of forensic DNA testing in the United States, CACLD organized trials using case-simulated samples in 1987 and 1988. The three major commercial facilities then performing forensic DNA analysis participated in each trial. In the first trial, out of 50 samples, 2 firms each declared 1 false match that could have resulted in the conviction of an innocent person. The errors apparently arose from sample handling problems. The third company declared no false matches. In the second trial, one company again reported an incorrect match.

OTA GENETIC WITNESS, *supra* note 33, at 79-80 (footnotes omitted).

35. 144 Misc. 2d 956, 545 N.Y.S.2d 985 (Sup. Ct. 1989).

36. Lander, *supra* note 29, at 504.

37. Starrs, *The Fallibility of Forensic DNA Testing: Of Proficiency in Public and Private Laboratories* (pt. 1), 14 Sci. SLEUTHING REV. 10 (Spring 1990) (reporting that "Cellmark shortly determined that Lifecodes had made a significant measurement mistake in sizing the bands on the autorads" (discussing *People v. Irons*, an Erie, Illinois murder case)); *see also* Starrs, *The Fallibility of Forensic DNA Testing: Of Proficiency in Public and Private Laboratories* (pt. 2), 14 Sci. SLEUTHING REV. 12 (Fall 1990) (discussing two cases in which FBI analysts mistranscribed population frequencies statistics in reporting DNA results).

38. OTA GENETIC WITNESS, *supra* note 33, at 83. The report goes on to identify several issues: "These questions focus on data interpretation, how to minimize realistic human error, and the appropriate level of monitoring to ensure quality. Such questions, which stem from actual court cases, underscore the need to develop both technical and operational standards now." *Id.*

39. *See Barefoot v. Estelle*, 463 U.S. 880, 899 (1983) (rejecting a constitutional challenge to the admissibility of expert psychiatric testimony of future dangerousness in capital cases).

ance" test espoused in *Frye v. United States*⁴⁰ for determining the admissibility of novel scientific proof.⁴¹ Similarly, the Federal Rules of Evidence encourage the expanded use of expert testimony.⁴² Rule 703, in particular, permits an expert to base an opinion on data not admitted at trial if the data is of a type reasonably relied on by experts in the field. Both Rule 703 and the less restrictive relevancy approach that has been substituted for the *Frye* test depend on advance disclosure.⁴³

Once expert testimony is admitted at trial, the defense typically attacks the testimony through cross-examination and by the presentation of defense experts. Successful cross-examination of an expert, however, is a formidable undertaking. Attorneys rarely are as knowledgeable as the expert.⁴⁴ The effectiveness of cross-examination depends, in large measure, on thorough preparation. Similarly, the presentation of defense experts requires advance planning—in short, adequate pretrial discovery.

C. Pretrial Discovery

There is little dispute that pretrial discovery is necessary when using expert and scientific evidence.⁴⁵ In this context at least, the traditional arguments against criminal discovery lose whatever force they otherwise might have. Opponents have argued that criminal discovery

40. 293 F. 1013 (D.C. Cir. 1923).

41. See, e.g., *United States v. Downing*, 753 F.2d 1224, 1241 (3d Cir. 1985); *United States v. Williams*, 583 F.2d 1194, 1198 (2d Cir. 1978), cert. denied, 439 U.S. 1117 (1979); *United States v. Gipson*, 24 M.J. 246, 251 (C.M.A. 1987); *Santiago v. State*, 510 A.2d 488, 489 (Del. 1987); *State v. Wheeler*, 496 A.2d 1382, 1388 (R.I. 1985); see also P. GIANNELLI & E. IMWINKELRIED, *supra* note 14, at 14 n.56 (listing cases rejecting *Frye*).

42. FED. R. EVID. 703; see also Berger, *United States v. Scop: The Common-Law Approach to an Expert's Opinion About a Witness's Credibility Still Does Not Work*, 55 BROOKLYN L. REV. 559, 559 (1989) (explaining that "Rules 702 through 705 sought to sweep away the restrictive dogma that curtailed expert proof"); Graham, *Expert Witness Testimony and the Federal Rules of Evidence: Insuring the Adequate Assurance of Trustworthiness*, 1986 U. ILL. L. REV. 43 (asserting that "[t]en years after the revolution in expert witness testimony, the legal community has not yet fully appreciated the true impact of the new approach and attitude of the Federal Rules of Evidence on trial practice").

43. See FED. R. EVID. 705 advisory committee note (emphasizing the importance of discovery); Giannelli, *supra* note 10, at 1245 (arguing that "[p]rovisions for notice, full discovery, the opportunity to re-examine evidence, and the appointment of defense experts are critical components of the relevancy approach").

44. *United States v. Wilson*, 361 F. Supp. 510, 513 (D. Md. 1973); see also Reznick, *The New Federal Rules of Criminal Procedure*, 54 GEO. L.J. 1276, 1278 (1966) (arguing that "expert witnesses are almost impossible to cross-examine and expert testimony almost impossible to rebut without intensive pretrial preparation").

45. The American Bar Association Standards comment that "[t]he need for full and fair disclosure is especially apparent with respect to scientific proof and the testimony of experts." ABA STANDARDS RELATING TO DISCOVERY AND PROCEDURE BEFORE TRIAL 66 (Approved Draft 1970) [hereinafter ABA STANDARDS].

will encourage perjury, will lead to the intimidation of witnesses, and because of the fifth amendment, will be a one-way exchange.⁴⁶ The first argument fails because scientific and expert evidence is virtually impossible to distort or misuse even though it is disclosed in advance of the trial.⁴⁷ Additionally, there is no proof that experts have been intimidated, probably because the expert's evidence could be retested or another expert could testify about the examination.⁴⁸ Finally, the self-incrimination clause as currently interpreted by the Supreme Court presents little impediment to the prosecution's discovery of scientific proof.⁴⁹

Extensive defense discovery of scientific evidence also eliminates due process concerns.⁵⁰ As the Supreme Court has noted, due process "speak[s] to the balance of forces between the accused and his accuser."⁵¹ Over three hundred crime laboratories operate in this country, eighty percent of which are under the control of the police,⁵² and most laboratories examine only evidence submitted by law enforcement agencies.⁵³ In contrast, criminal defendants, who typically are indigent, do

46. See 2 C. WRIGHT, *supra* note 15, § 252, at 36-37.

47. See ABA STANDARDS, *supra* note 45, at 67.

48. See 2 W. LAFAVE & J. ISRAEL, *supra* note 15, § 19.3, at 732 (taking the position that "[o]nce the report is prepared, the scientific expert's position is not readily influenced, and therefore disclosure presents little danger of prompting perjury or intimidation").

49. For a discussion of the fifth amendment issues concerning prosecutorial discovery, see *infra* note 205 and accompanying text.

50. According to the Supreme Court, "[t]here is no general constitutional right to discovery in a criminal case." *Weatherford v. Bursey*, 429 U.S. 545, 559 (1977). The Court, however, has recognized a limited due process right to the disclosure of exculpatory and material evidence under certain circumstances. See, e.g., *United States v. Bagley*, 473 U.S. 667 (1985); *Brady v. Maryland*, 373 U.S. 83 (1963).

In *Pennsylvania v. Ritchie*, 480 U.S. 39 (1987), a plurality of the Court reaffirmed this position. In a concurring opinion, Justice Blackmun, who cast the deciding vote, indicated that the confrontation clause as well as due process applied to criminal discovery. Justice Blackmun stated: "In my view, there might well be a confrontation violation if, as here, a defendant is denied pre-trial access to information that would make possible effective cross-examination of a crucial prosecution witness." *Id.* at 61-62 (Blackmun, J., concurring). Justices Brennan and Marshall agreed with this analysis, while Justices Stevens and Scalia dissented on procedural grounds.

51. *Wardius v. Oregon*, 412 U.S. 470, 474 (1973); see also *Lassiter v. Department of Social Servs.*, 452 U.S. 18, 28 (1981) (stating that the "adversary system presupposes [that] accurate and just results are most likely to be obtained through the equal contest of opposed interests"); *Ross v. Moffitt*, 417 U.S. 600, 609 (1974) (explaining that "[d]ue process' emphasizes fairness between the State and the individual dealing with the State").

52. Peterson, Mihajlovic & Bedrosian, *The Capabilities, Uses, and Effects of the Nation's Criminalistics Laboratories*, 30 J. FORENSIC SCI. 10, 11 (1985) (stating that "[s]eventy-nine percent of all [257 out of 319] laboratories responding to our survey are located within law enforcement/public safety agencies").

53. *Id.* at 13 (explaining that "[f]ifty-seven percent . . . would only examine evidence submitted by law enforcement officials"); see also FEDERAL BUREAU OF INVESTIGATION, HANDBOOK OF FORENSIC SCIENCE 7 (rev. ed. 1984) (stating that FBI lab services are available only to duly constituted state, county, and municipal law enforcement agencies).

not have access to such resources. Thus, it is unsurprising that a commentator predicted that the disparity of investigative resources between the defense and the prosecution "is likely to have its maximum impact in the presentation of evidence which must be analyzed and developed in the laboratory or hospital."⁵⁴

In summary, while a substantial number of errors continue to be made in forensic examinations, resort to scientific proof has increased. The evidentiary rules on expert testimony also have been relaxed. Thus, the argument for pretrial discovery in this context is powerful, and the arguments against discovery are virtually nonexistent.

III. NOTICE

The most basic discovery need concerning scientific evidence is advance knowledge that an expert will testify at trial. Many jurisdictions, including the federal courts, do not require the prosecution to provide a list of witnesses that it intends to call at trial;⁵⁵ nor are discovery depositions generally permitted in criminal cases.⁵⁶ Nevertheless, statutes and rules typically allow discovery of scientific reports, and the existence of such a report provides notice that an expert may be called to testify. The problem, however, is that the absence of a report does not necessarily mean that a prosecution expert will *not* testify. A rather simple reason explains this result: nothing in Rule 16 requires that a report be made, or if one is made, that it be written, even if a scientific test is performed.⁵⁷

54. Reznick, *supra* note 44, at 1278; *see also* State v. Cook, 43 N.J. 560, 567, 206 A.2d 359, 363 (1965) (arguing that pretrial discovery "lessen[s] the imbalance which may result from the State's early and complete investigation in contrast to [the defendant's] . . . late and limited investigation").

55. *See* United States v. Holland, 884 F.2d 354, 357 (8th Cir. 1989) (holding that Rule 16 does not require disclosure of prospective witnesses, including experts), *cert. denied*, 110 S. Ct. 552 (1989); United States v. Taylor, 707 F. Supp. 696, 702-03 (S.D.N.Y. 1989) (ruling that a witness list, including expert witnesses, is not discoverable). In 1974 Congress rejected a proposed rule to require discovery of witness lists. 2 W. LAFAVE & J. ISRAEL, *supra* note 15, § 19.3, at 493.

56. Most jurisdictions allow depositions only to preserve the testimony of witnesses who may be unavailable for trial. *See, e.g.*, FED. R. CRIM. P. 15(a); COLO. R. CRIM. P. 15(a); IDAHO CODE § 19-3102 (1987); KY. R. CRIM. P. 7.10. A few jurisdictions, however, do permit discovery depositions. *See, e.g.*, ALASKA R. CRIM. P. 15(a); FLA. R. CRIM. P. 3.220(d); IND. CODE ANN. § 35-37-4-3 (West 1986); VT. R. CRIM. P. 15(a).

57. As a matter of practice most crime laboratories prepare reports. One commentator has written:

An additional practice of some laboratories merits discussion. This practice is that of examiners not writing results in official report form unless they are informed by the prosecutor that the case is going to trial. The principal justification for this procedure is the high volume of cases to be analyzed and the time required to prepare written case reports. The argument is made, "What is the point in taking the time to prepare an official report if the case may be dismissed or may result in a guilty plea?" To allow the prosecutor discretion over what laboratory examinations appear in report form puts the defendant at a distinct

Oral reports are not discoverable under Rule 16. As a result, the defendant in *United States v. Shue*⁵⁸ was not entitled to the verbal report of an FBI photographic expert who compared pictures of Shue with those of a bank robber. Unbeknown to the defense, the expert made the comparison the night before he testified. Similarly, a police officer in *United States v. Johnson*⁵⁹ testified as an emergency medical technician without notice to the defense. Although the defense argued that the testimony was highly prejudicial because it contradicted an important aspect of the defense case, the Eleventh Circuit merely noted that there is no right to a witness list and that Rule 16 was not implicated because "no . . . reports were made in th[e] case."⁶⁰

The Wayne Williams prosecution provides another illustration.⁶¹ The trial turned on fiber evidence, which constituted an "essential part" of the case according to the FBI expert who testified for the prosecution.⁶² This evidence was critical for two reasons: It connected Williams with the crime scenes of the two homicides for which he was charged; and perhaps more important, it connected him with ten other murders, evidence of which was introduced as "other acts" evidence. One of the prosecution's three fiber experts was Barry Gaudette, who worked for the Royal Canadian Mounted Police. He examined fiber and hair samples for eleven days and then testified from personal notes. Gaudette, however, had not prepared a written report. Thus, the Georgia Supreme Court ruled that the defense was not entitled to discovery.⁶³ The dissent replied:

By allowing an expert to forgo delivery of a full written report and to later testify orally where, as here, he had ample time to prepare such a written report and conducted tests too complex to remember unaided, we permit ever more egregious injustice and violation of the intent [of the discovery statute], which is to put into the defendant's hands these reports with sufficient time before trial to enable him to check and challenge their content.⁶⁴

disadvantage.

Peterson, *Ethical Issues in the Collection, Examination, and Use of Physical Evidence*, in *FORENSIC SCIENCE* 35, 41 (G. Davies ed. 1986).

58. 766 F.2d 1122, 1135 (7th Cir. 1985), *cert. denied*, 484 U.S. 956 (1987).

59. 713 F.2d 654 (11th Cir. 1983), *cert. denied*, 456 U.S. 1030 (1984).

60. 713 F.2d at 659; *see also* *United States v. Messerlian*, 832 F.2d 778, 795 (3d Cir. 1987) (noting but not deciding the issue of whether oral reports are discoverable under Rule 16), *cert. denied*, 485 U.S. 988 (1988); *United States v. Glaze*, 643 F.2d 549, 552 (8th Cir. 1981) (the unwritten results of a field test for drugs were not disclosed).

61. *See Williams v. State*, 251 Ga. 749, 312 S.E.2d 40 (1983).

62. Deadman, *Wayne Williams Trial*, *supra* note 3, at 13.

63. *Williams*, 251 Ga. at 753, 312 S.E.2d at 50; *see also* *Law v. State*, 251 Ga. 525, 528, 307 S.E.2d 904, 906-07 (1983) (stating that the discovery statute applies only to written, not oral, reports).

64. *Williams*, 251 Ga. at 827, 312 S.E.2d at 100 (Smith, J., dissenting). Judge Smith also dissented in another case that raised the issue. He stated:

Significantly, another major issue on appeal was an ineffective assistance of counsel claim for failure to challenge more vigorously the reliability of the fiber analysis.⁶⁵ This allegation is not surprising. Scientific evidence generally, and the fiber evidence in *Williams* especially, present enormously difficult problems for defense counsel. While not a panacea, extensive discovery would reduce significantly these difficulties by giving defense counsel the information needed for adequate preparation.

When Rule 16(a)(1)(D) was drafted in 1966, most scientific evidence consisted of autopsy reports and crime laboratory reports for the examination of drugs, fingerprints, firearms identifications, and handwriting.⁶⁶ Today experts have developed many new categories of scientific evidence. Examples include expert testimony on rape trauma syndrome,⁶⁷ child sexual abuse accommodation syndrome,⁶⁸ battered woman syndrome,⁶⁹ and bite mark comparisons.⁷⁰ Neither custom nor regulation requires these experts to write reports. Indeed, as the above

It is an insult to intelligent people to say that a scientific test was conducted from which absolutely no notes or records survive. Unless of course the omission was deliberate.

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.

Law, 251 Ga. at 530, 307 S.E.2d at 908 (Smith, J., dissenting).

65. The dissent in *Williams* wrote:

Related to the above ineffectiveness of defense counsel was their failure to challenge the scientific reliability of the principles and techniques used by the state's experts in conducting their fiber comparisons. . . . This challenge was crucial to an adequate defense to the fiber evidence, and its omission demonstrates inadequate preparation

Williams, 251 Ga. at 829, 312 S.E.2d at 101 (Smith, J., dissenting).

66. See Reznick, *supra* note 44, at 1278.

67. See, e.g., *United States v. Peel*, 29 M.J. 235, 241 (C.M.A. 1989), *cert. denied*, 110 S. Ct. 731 (1990); *State v. Gettier*, 438 N.W.2d 1, 4-6 (Iowa 1989); *People v. Taylor*, 75 N.Y.2d 277, 293, 552 N.E.2d 131, 138, 552 N.Y.S.2d 883, 890 (1990). See generally P. GIANNELLI & E. IMWINKELRIED, *supra* note 14, § 9.8.

68. See, e.g., *United States v. St. Pierre*, 812 F.2d 417, 419 (8th Cir. 1987); *State v. Hall*, 406 N.W.2d 503, 505 (Minn. 1987); *State v. Geyman*, 224 Mont. 194, 729 P.2d 475, 479 (1986); see also McCord, *Expert Psychological Testimony About Child Complainants in Sexual Abuse Prosecutions: A Foray into the Admissibility of Novel Psychological Evidence*, 77 J. CRIM. L. & CRIMINOLOGY 1 (1986).

69. See, e.g., *Commonwealth v. Craig*, 783 S.W.2d 387, 387-88 (Ky. 1990); *State v. Koss*, 49 Ohio St. 3d 213, 551 N.E.2d 970 (1990); Mo. ANN. STAT. § 563.033 (Vernon 1989 Supp.). See generally P. GIANNELLI & E. IMWINKELRIED, *supra* note 14, § 9.6.

70. See, e.g., *Handley v. State*, 515 So. 2d 121, 129-31 (Ala. Crim. App. 1987); *Commonwealth v. Cifizzari*, 397 Mass. 560, 569-72, 492 N.E.2d 357, 363-64 (1986); *People v. Marsh*, 177 Mich. App. 161, 167, 441 N.W.2d 33, 36 (1989). See generally P. GIANNELLI & E. IMWINKELRIED, *supra* note 14, ch. 13; Eads, *Adjudication by Ambush: Federal Prosecutors' Use of Non-scientific Experts in a System of Limited Discovery*, 67 N.C.L. REV. 577 (1989) (listing other types of "non-scientific" experts).

cases illustrate, the prosecution loses the element of surprise by preparing a report.⁷¹

Requiring the production of witness lists does not guarantee adequate notice of prospective expert witnesses. In *State v. Caulder*,⁷² a child sexual abuse case, the prosecution produced a witness list as required by a discovery rule.⁷³ The name of a social worker was on the list. The list did not reveal, however, that this witness would testify as an *expert* on child sexual abuse. At trial the defense counsel objected and moved for a continuance because he was not prepared to cross-examine an expert and needed time to find his own expert. On appeal, the court rejected his argument and observed that the district attorney needs only to provide the information required by statute. The court stated that because the statute does not mandate disclosure of the capacity in which a witness intends to testify or the content of the witness's testimony, defense counsel must investigate these matters independently.⁷⁴ This incomplete approach destroys, to a large extent, the underlying purpose of rules mandating discovery of witness lists.

IV. SCIENTIFIC REPORTS

Mere notice that an expert will testify, while critical to trial preparation, is insufficient. The opposing party needs to know both the substance of the expected testimony and the qualifications of the proposed expert. The current discovery rules on scientific reports provide for neither of these necessities. The typical laboratory report contains only a bare conclusion. It is not unusual for the report merely to "summarize[] the results of an unidentified test conducted by an anonymous technician."⁷⁵

71. A few discovery rules address these problems. See, e.g., ME. R. CRIM. P. 16(c)(4); MD. R. CRIM. P. CODE ANN. § 4-263(b)(4) (1990) (requiring the production of the "substance of any such oral [expert] report and conclusion"). The Maine rule provides:

If the expert witness whom the state intends to call in any proceeding has not prepared a report of examination or tests, the court may order that the expert prepare and the attorney for the state serve a report stating the subject matter on which the expert is expected to testify, the substance of the facts to which the expert is expected to testify and a summary of the expert's opinions and the grounds for each opinion.

ME. R. CRIM. P. 16(c)(4).

72. 75 Or. App. 457, 706 P.2d 1007, cert. denied, 300 Or. 451, 712 P.2d 110 (1985).

73. OR. REV. STAT. § 135.815(1) (1989).

74. *Caulder*, 75 Or. App. at 460, 706 P.2d at 1009; see also *Knoedler v. State*, 69 Md. App. 764, 768, 519 A.2d 811, 812 (1987) (holding that "[n]othing in these sections (or any other sections) of the [discovery] Rule requires the State to categorize its proposed witnesses as expert or non-expert").

75. *United States v. Bentley*, 875 F.2d 1114, 1123 (5th Cir. 1989) (Williams, C.J., dissenting) (concerning a hospital report on a urine test that revealed the presence of cannabinoids); see also *United States v. Davis*, 14 M.J. 847, 848 n.3 (A.C.M.R. 1982) (explaining that "most laboratory reports only state general conclusions").

A. Procedures Employed

Scientific reports rarely indicate the procedure used in the analysis. A laboratory report stating that a seized substance is "Heroin HCl"⁷⁶ is not very informative. Some types of evidence offer the analyst a choice among a variety of testing techniques. Drug tests range from preliminary screening examinations, such as color change and microcrystal tests, to extremely specific and sophisticated analysis, such as infrared spectrophotometry.⁷⁷ Different laboratories use different protocols, and some experts make positive identifications based only on preliminary screening tests.⁷⁸

DNA testing presents the same problems. Many laboratories performing DNA analysis use different procedures.⁷⁹ The FBI, Cellmark, and Lifecodes use RFLP analysis (restriction fragment length polymorphism), whereas Forensic Science Associates uses PCR (polymerase chain reaction), a markedly different test.⁸⁰ Moreover, the laboratories using RFLP use different restriction enzymes, different probes, different matching criteria, and different statistical data bases.⁸¹ Without this information, counsel cannot prepare adequately for trial. Not only is most of this information not discoverable under the present rules, these rules encourage the expert to provide as little information as possible.⁸²

B. Conclusions Reached

In addition to specifying the procedure used in the analysis, the report should set forth the expert's ultimate conclusions as well as specific test findings. With a scientific technique, such as drug testing, in which the test findings and ultimate conclusion are the same, a problem

76. *United States v. Parker*, 491 F.2d 517, 525 (8th Cir. 1973)(Bureau of Narcotics and Dangerous Drugs lab report), *cert. denied*, 416 U.S. 989 (1974).

77. See P. GIANNELLI & E. IMWINKELRIED, *supra* note 14, ch. 23 (drug identification); Stein, Laessig & Indriksons, *An Evaluation of Drug Testing Procedures Used by Forensic Laboratories and the Qualifications of Their Analysts*, 1973 WIS. L. REV. 727, 728.

78. One source reports: "On the basis of a test that shows only that the compound in question is a member of a sizable class, some forensic chemists are prepared to take the stand and state their opinion that the substance is methamphetamine (or THC, or cocaine, or whatever)." M. SAKS & R. VAN DUIZEND, *supra* note 18, at 7-8.

79. See Thompson & Ford, *DNA Typing: Acceptance and Weight of the New Genetic Identification Tests*, 75 VA. L. REV. 45, 48-51 (1989).

80. *Id.*

81. *Id.*

82. In the words of one authority: "Many criminal defense attorneys suspect that the unusual brevity of reports by FBI fingerprint or handwriting experts (*e.g.*, often one or two short sentences) may be partially explained by the fact that defense counsel is entitled to copies of them prior to trial." Allis, *Limitations on Prosecutorial Discovery of the Defense Case in Federal Courts: The Shield of Confidentiality*, 50 S. CAL. L. REV. 461, 475 n.51 (1977).

does not arise. In other procedures, however, the expert must extrapolate from the findings. In *Pierce v. State*,⁸³ for example, the prosecution expert conducted serological tests on body fluids in a rape case. Her report, which was turned over to the defense, contained specific test results but not her conclusion—that the rapist was a nonsecretor. On appeal, the court ruled that the report was sufficient. The court explained that “[a]n expert’s opinion of the conclusions which can be drawn from test results in a particular case in no way alters the actual facts of the case. Accordingly, the ultimate opinion of the expert is not necessary for either the preparation or the presentation of the defense.”⁸⁴

This statement represents both bad science and bad law. Between twenty and twenty-five percent of the population are nonsecretors;⁸⁵ therefore, determining that the rapist and the defendant both fell into this category was relevant to prove identity.⁸⁶ The defense attorney needed to know both the specific test results and the conclusions drawn from them to represent the accused effectively.

C. Qualifications

Background information about the expert also should be included in the report. One court has determined that “[c]ertainly, the identity of a particular expert witness would not be of significance.”⁸⁷ To the contrary, the credentials of the expert should be provided for two reasons. First, knowledge of the expert’s qualifications will help attorneys to prepare for cross-examination, to decide whether to retain their own expert, and to determine whether independent testing is desirable. Second, a surprising number of expert witnesses have lied about their credentials.⁸⁸ In one case an FBI serologist testified that he had a master’s

83. 786 P.2d 1255 (Okla. Crim. App. 1990).

84. *Id.* at 1263; *see also* *United States v. Cole*, 707 F. Supp. 999, 1004 (N.D. Ill. 1989) (ruling that Rule 16 entitles the accused to the lab report but not to a “comprehensive preview of the government’s [expert] opinion testimony”).

85. *See* P. GIANNELLI & E. IMWINKELRIED, *supra* note 14, § 17-8 at 578 (stating that a secretor is a person whose genetic markers are secreted into body fluids other than blood—for example, saliva and semen).

86. *Pierce*, 786 P.2d at 1258. The court stated that the expert “was able to determine that the rapist was either a blood type O or a non-secretor. She testified that Appellant was classified as a non-secretor.” *Id.*

87. *United States v. Holland*, 884 F.2d 354, 357 (8th Cir.), *cert. denied*, 110 S. Ct. 552 (1989); *see also* *United States v. Krohn*, 558 F.2d 390, 394 (8th Cir.), *cert. denied*, 434 U.S. 868 (1977).

88. *E.g.*, *Maddox v. Lord*, 818 F.2d 1058, 1062 (2d Cir. 1987) (a serologist testified falsely about academic credentials); *Kline v. State*, 444 So. 2d 1102 (Fla. Dist. Ct. App. 1984) (a psychologist testifying in the Ted Bundy trial was convicted of perjury for claiming he had a doctorate); *People v. Alfano*, 95 Ill. App. 3d 1026, 1028-29, 420 N.E.2d 1114, 1116 (1983) (an arson expert testified falsely about his academic credentials); *State v. Elder*, 199 Kan. 607, 433 P.2d 462 (1967)

degree in science when, in fact, he never had received a graduate degree.⁸⁹ In another case a court vacated the death penalty after discovering that a prosecution expert, who had testified in many previous cases, had lied about her professional qualifications. The expert had failed to complete the necessary educational requirements to become a laboratory technician.⁹⁰ Perhaps the most striking illustration is provided by a firearms expert who took some of the credit for "the development of penicillin, the 'Pap' smear, and to top it all off, the atomic bomb."⁹¹ Professor James Starrs, who has explored this issue in detail, has proposed discovery as the remedy for this type of fraud.⁹²

Outright misrepresentation is not the only problem. Misleading statements probably are more common. In the Cincinnati obscenity trial of the Contemporary Arts Center and its director, Dennis Barrie, for displaying some of Robert Mapplethorpe's photographs,⁹³ the prosecution's only expert witness testified that she had been employed by the Cleveland Museum of Art from 1976 through 1978, working on "great works of art for young people."⁹⁴ The Cleveland Museum of Art is a world-renowned institution, a fact that an Ohio jury might know. Accordingly, a degree of prestige accompanies this type of employment experience. When questioned after the verdict, however, a Cleveland Museum spokesman painted a somewhat different picture. He stated:

We virtually went back through all the payroll records we have. . . . There is no record of her being an employee. We do know she helped in the production of a slide tape video for a musical presentation she helped co-produce here for a few children's classes in the early 1970s.⁹⁵

D. Bases of Opinion and Number of Analysts

The expert's report also should identify all the analysts and technicians involved in the testing. At one trial an expert testified that he had

(a lab technician was convicted of perjury for misrepresenting his educational background); State v. DeFronzo, 59 Ohio Misc. 113, 116, 394 N.E.2d 1027, 1030 (C.P. Lucas County 1978) (a lab analyst pleaded guilty to eight counts of falsification for misstating his academic credentials); see also Saks, *supra* note 23, at 772 (listing other cases); Annotation, *Perjury or Willfully False Testimony of Expert Witness As Basis for New Trial on Ground of Newly Discovered Evidence*, 38 A.L.R.3d 812 (1971).

89. Doepel v. United States, 434 A.2d 449, 460 (D.C.), *cert. denied*, 454 U.S. 1037 (1981).

90. Commonwealth v. Mount, 435 Pa. 419, 422, 257 A.2d 578, 579 (1969).

91. Starrs, *Mountebanks Among Forensic Scientists*, in 2 FORENSIC SCIENCE HANDBOOK 1, 7, 20-29 (R. Saferstein ed. 1988).

92. *Id.* at 31.

93. See *City of Cincinnati v. Contemporary Arts Center*, 56 Ohio Misc. 2d 9, 264 N.E.2d 758 (Lakewood Mun. Ct. 1990); Wall St. J., Oct. 8, 1990, at B1, col. 4.

94. Guenther, *Witness Never on Payroll: Museum Denies It Employed Her*, Cleveland Plain Dealer, Oct. 6, 1990, at A12, col. 1.

95. *Id.*

performed all the electrophoresis testing in the case without any assistance.⁹⁶ Posttrial disclosure of additional documents revealed the participation of other analysts and a discrepancy in results.⁹⁷ Similarly, in *Reardon v. Manson*⁹⁸ a toxicologist testified based on tests performed by a chemist. He worked at a laboratory staffed by three doctorate-level toxicologists and twenty-four chemists with lower credentials. With an annual volume of twenty thousand tests, the toxicologists had an average of "only a few minutes per day to attend to any given test."⁹⁹ Can this limited involvement support testimony about the findings? Maybe not, but the evidence rules permit it.

Rule 703 allows an expert to base his opinion on data that has not been admitted at trial, provided that the data is reasonably relied on by experts in the field. Rule 705 permits the expert to give an opinion without first disclosing the underlying basis for that opinion. These rules are justified because the opposing party, if it so desired, could attack the basis of the opinion on cross-examination. The federal drafters acknowledged that the viability of this justification "assumes that the cross-examiner has the advance knowledge which is essential for effective cross-examination. . . . Rule 26(b)(4) of the Rules of Civil Procedure, as revised, provides for substantial discovery in this area"¹⁰⁰ Inexplicably, the drafters failed to cite Federal Criminal Rule 16, which does not provide for substantial discovery.

Constitutional challenges to Rule 703, for the most part, have failed. In *Reardon* the Second Circuit found nothing wrong with the toxicologist's testimony. The court held that an expert's reliance on work conducted by others is not necessarily a violation of the confrontation clause if the expert "is available for questioning concerning the nature and reasonableness of his reliance."¹⁰¹ Significantly, the court added that the expert's reliance is legitimate particularly when defendants have access to the underlying sources of information by subpoena or otherwise.¹⁰² The discovery rules, however, do not provide this access. Thus, counsel cannot question the reasonableness of the reliance if unaware of it, and disclosure at trial comes too late.

96. Bretz, *Scientific Evidence and the Frye Rule: The Case for a Cautious Approach*, 4 COOLEY L. REV. 506, 519 (1987) (describing the facts of *People v. Young*, 425 Mich. 470, 391 N.W.2d 270 (1986)).

97. *Id.*

98. 806 F.2d 39 (2d Cir. 1986), *cert. denied*, 481 U.S. 1020 (1987).

99. M. SAKS & R. VAN DUIZEND, *supra* note 18, at 49 (discussing *Reardon*, 806 F.2d at 42).

100. FED. R. EVID. 705 advisory committee note; *see also* *Smith v. Ford Motor Co.*, 626 F.2d 784, 791-94 (10th Cir. 1980) (emphasizing the importance of discovery and Federal Rule 703), *cert. denied*, 450 U.S. 918 (1981).

101. *Reardon*, 806 F.2d at 42; *see also* *United States v. Smith*, 869 F.2d 348, 355 (7th Cir. 1989) (holding that "[t]he confrontation clause . . . does not forbid reliance at trial by experts upon material prepared by others").

102. *Reardon*, 806 F.2d at 42.

E. Types of Reports

A discovery rule on scientific evidence should entail disclosure of all scientific reports. Rule 16 requires production only of reports by experts that the prosecution intends to call at trial, or reports that are material to the preparation of the defense. Consequently, if the prosecution receives an expert's report but does not intend to call that expert to the stand—the most intriguing situation from a defense perspective—the report is discoverable only if it is “material.” The problem lies not with the materiality standard, but rather with the person who first applies that standard. Leaving the initial decision to the prosecutor to determine “materiality” is fraught with unnecessary risks, which often will lead to nondisclosure and needless litigation.

An analogous problem is triggered under *Brady v. Maryland*¹⁰³ by a due process tenet that requires the prosecution to furnish all material and exculpatory evidence to the defense. In *United States v. Huff*¹⁰⁴ an inconclusive handwriting report was deemed to be “not exculpatory, but merely not inculpatory.” Similarly, in *Norris v. Slayton*¹⁰⁵ a report showing that hair from a rape defendant was not found at the scene of the crime was characterized as a “neutral” report. There is no valid reason for the prosecution to withhold such reports, and the defense is far better equipped to determine materiality. As one court has commented, “evidence such as this may, because of its neutrality, tend to be favorable to the accused.”¹⁰⁶ The American Bar Association Standards and rules in other jurisdictions do not limit discovery to “material” reports.¹⁰⁷

F. Other Issues

Two other aspects of the present rules deserve mention. First, discovery of scientific reports should be mandatory, as they are under Rule 16.¹⁰⁸ A number of jurisdictions make this type of discovery discretion-

103. 373 U.S. 83 (1963).

104. 473 F.2d 1350, 1354 (7th Cir.), *cert. denied*, 412 U.S. 907 (1973).

105. 540 F.2d 1241, 1243-44 (4th Cir. 1974).

106. *Patler v. Slayton*, 503 F.2d 472, 479 (4th Cir. 1974) (concerning an FBI lab report on shoeprint, soil sample, hair sample, murder weapon, and clothing).

107. 2 ABA STANDARDS RELATING TO THE ADMINISTRATION OF CRIMINAL JUSTICE Standard 11-2.1(a)(iv) (1986 Supp.) [hereinafter 2 ABA STANDARDS] (requiring production of “any reports or statements made by experts in connection with the particular case”); MD. R. CRIM. P. CODE ANN. § 4-263(b)(4) (1990) (covering “all written reports or statements made in connection with the action by each expert consulted by the State”).

108. Production of scientific reports under Rule 16 was made mandatory in 1975. FED. R. CRIM. P. 16 advisory committee note (1975).

ary.¹⁰⁹ Second, oral as well as written reports should be discoverable.¹¹⁰ This requirement prevents the lack of notice problems discussed in the preceding section.

V. RELATED DOCUMENTS

A. Bench Notes¹¹¹

Rule 16(a)(1)(D) covers only "results or reports." Courts have used this language to limit defense discovery. For example, in the leading case of *United States v. Iglesias*¹¹² the prosecution produced only a laboratory report stating that the substance analyzed was "54.9% pure heroin."¹¹³ The defense sought production of additional materials—log notes, protocols, and other internal documents. Although the prosecution conceded that this material was relevant, it opposed discovery on the ground that these documents were not a "result or report." The Ninth Circuit agreed, even though recognizing the possibility that the requested materials would enable Iglesias to prepare a more effective defense.¹¹⁴

The majority opinion justified its conclusion on two grounds. First, the majority believed that the actual laboratory report adequately provided a basis for cross-examining the prosecution expert.¹¹⁵ As discussed earlier, this conclusion is highly questionable. The dissent noted that the "one line summary submitted . . . describes only the chemist's conclusion and certainly not a detailed description of the testing."¹¹⁶ Second, the majority concluded that log notes, unlike a final laboratory report, "are much more likely to be distorted and misused."¹¹⁷ The court, however, offered no further explanation, and it is difficult to discern just how log notes could be misused.

The need to review bench notes is important in some cases. In *People v. Young*¹¹⁸ bench notes obtained after the trial showed that the

109. *E.g.*, ARK. STAT. ANN. § 43-2011.2(a)(2) (1986); IDAHO CODE § 19-1309(1)(b) (1987); KY. R. CRIM. P. 7.24(1)(b); NEV. R. CRIM. P. 174.235(2) (1987); WYO. R. CRIM. P. 18(a)(2).

110. *See supra* note 71 (discussing the Maine and Maryland discovery rules).

111. Bench notes as used in this Article refer to notes taken by the analyst during examination of evidence. They include findings, calculations, and so forth.

112. 881 F.2d 1519 (9th Cir. 1989), *cert. denied*, 110 S. Ct. 1154 (1990).

113. 881 F.2d at 1521.

114. *Id.* at 1523-24; *see also* *United States v. Berry*, 636 F.2d 1075, 1082 (5th Cir. 1981) (holding that a DEA chemist's work notes were not discoverable); *Spencer v. Commonwealth*, 238 Va. 295, 303-04, 384 S.E.2d 785, 791 (1989) (holding that a DNA expert's work notes were not discoverable), *cert. denied*, 110 S. Ct. 1171 (1990).

115. *Iglesias*, 881 F.2d at 1524.

116. *Id.* (Boochever, J., dissenting in part).

117. *Id.*

118. 425 Mich. 470, 391 N.W.2d 270 (1986).

prosecution expert, despite his testimony, was not the only analyst who had worked on the electrophoretic testing of blood stains.¹¹⁹ In addition, a discrepancy appeared in the notes, but not in the final laboratory report:

At the [posttrial] hearing it was established that on June 5, 1978, an electrophoretic run . . . indicated an EsD type of 1 for the bloodstain taken from the porch of the victim's home. This result was followed by a question mark and the stain was retested on June 6, 1978. At the later testing, the same stain showed an EsD type of 2-1. Without retesting a third time, [the analyst] only reported the latter result. Defendant's blood, tested on July 7, 1978, was an EsD type 2-1.¹²⁰

The bench notes issue arises primarily because the laboratory reports themselves are so deficient. Much of the material in the bench notes should be incorporated into the report itself.¹²¹ Furthermore, if comprehensive reports were required, experts like the FBI hair analyst in *Delaware v. Fensterer*¹²² would not have to testify about their inability to remember what method they had used in reaching their conclusions.

The prosecution's reasons for resisting discovery in *Iglesias* are also perplexing.¹²³ The question is one that permeates this entire area of law. Pretrial disclosure of the results of a reliable test often would eliminate that issue at trial and might even trigger plea bargaining negotiations.¹²⁴

119. The bench notes were produced after trial as a result of a freedom of information filing. Bretz, *supra* note 96, at 519.

120. *Id.* (quoting Appellant's Supplemental Brief on Appeal 50, *People v. Young*, 425 Mich. 470, 391 N.W.2d 270 (1986)).

121. Most crime lab reports are simply not "scientific." Professor Anna Harrison of Mount Holyoke College, during a symposium on discovery, remarked:

Then the information you are receiving *is not scientific information*. For a report from a crime laboratory to be deemed *competent*, I think most scientists would require it to contain a minimum of three elements: (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.

Symposium on Science, supra note 23, at 632 (emphasis added).

122. 474 U.S. 15 (1985). The analyst testified that hair found at a murder scene had been forcibly removed. There were three methods available to make this determination, but he could not remember which method he had used. *Id.* at 16-17. The United States Supreme Court ruled that this lack of memory did not violate Fensterer's right of confrontation. *Id.* at 18. Nevertheless, on remand, the Delaware Supreme Court held the expert's opinion inadmissible on state evidentiary grounds. *Fensterer v. State*, 509 A.2d 1106, 1109-10 (Del. 1986).

123. "In fact it is difficult to understand the government's reluctance to furnish the information sought in this case." *Iglesias*, 881 F.2d at 1526 (Boochever, J., dissenting in part).

124. The Louisiana Court of Appeals took a different approach when faced with a discovery request for notes, diagrams, printouts, and other records. According to the court: "Fundamental fairness and due process require that the defense be given the opportunity, prior to trial, to examine the basis from which an expert reaches his conclusion." *State v. Burgess*, 482 So. 2d 651, 653

B. Graphs

Bench notes are not the only type of laboratory document that has been sought and denied. As noted above, Wayne Williams was prosecuted for the deaths of two of thirty young black men who died in Atlanta.¹²⁵ Fiber analysis was the key to the prosecution's case. One part of the analysis employed a microspectrophotometer, an instrument designed to measure the color of microscopic material such as fibers.¹²⁶ The spectrophotometer produces a graph, and graphs of fiber taken from Williams's car and bedroom were compared with graphs of fiber taken from the victims.¹²⁷

The defense requested production of the graphs, but the Georgia Supreme Court ruled against discovery because the graphs were not "scientific reports" under the discovery statute.¹²⁸ Here again, there is no justification for withholding this type of information. The interpretation of the graphs formed the basis for the expert's testimony. The court recognized this connection, but paradoxically used it as a reason to deny discovery. The court concluded:

After examining Dr. Peterson's testimony, it is clear that the graphs appellant sought to exclude [as a discovery violation] did not contain the conclusions of Dr. Peterson, but instead had to be interpreted by him in order to attain significance. For this reason, we conclude that the graphs were not 'scientific reports' and were not discoverable¹²⁹

Nevertheless, thirteen graphs were admitted at trial as prosecution exhibits.

Much of the instrumentation used in forensic analyses produces graphs or similar printouts¹³⁰—for example, chromatographs, spectrographs, and polygraphs. The expert's opinion is based on the interpretation of the graph, and often another expert can evaluate the validity of the findings by reviewing the graph. These graphs should be discoverable.

(La. Ct. App. 1986); *see also* *People v. Slowe*, 125 Misc. 2d 591, 479 N.Y.S.2d 962 (Tompkins County Ct. 1984) (holding that discovery includes lab notes and checklists formalized by protocol or routine); 2 ABA STANDARDS, *supra* note 107, Standard 11-23 (stating that "[r]ough notes" may be discoverable where relevant "to an assessment (1) of the appropriateness of the testing methods selected, (2) of the competence of the tester, (3) of the care in the execution of the test, or (4) of some other factor bearing on the credibility of the expert's results").

125. *See supra* note 3 and accompanying text.

126. *See* P. GIANNELLI & E. IMWINKELRIED, *supra* note 14, at 1049 (discussing the use of microscopic photometry in fiber analysis).

127. *Williams v. State*, 251 Ga. 749, 754, 312 S.E.2d 40, 51 (1983).

128. *Id.*

129. *Id.*

130. *See generally* P. GIANNELLI & E. IMWINKELRIED, *supra* note 14, ch. 24 (discussing instrumental analysis).

C. Statistical and Novel Evidence

1. Fiber Analysis

The *Williams* case raises a far more serious discovery problem than just the failure to produce the graphs. The probative force of the fiber evidence depended on its uniqueness. As the FBI expert, Harold Deadman, wrote in an article published after the trial, "To convey the unusual nature of the Williams residential carpet, an attempt was made to develop a numerical probability—*something never before done* in connection with textile materials used as evidence in a criminal trial."¹³¹

At trial Deadman testified that there was a 1 in 7792 chance of randomly selecting this type of bedroom carpet in Atlanta. Not satisfied with this figure, the prosecutor added some of his own assumptions and argued that there was only a "one in one hundred fifty million" probability that any other Atlanta household had the same type of bedroom and automobile floorboard carpets.¹³² In order to determine the validity of these figures, the defense needed access to the underlying background studies and assumptions about carpet distribution in Atlanta. The dissenting opinion, attacking the validity of this evidence, stated that "Deadman's mathematical calculations were particularly worthless, in light of the fact that they were in several instances based not only upon hearsay evidence but also upon his own unproven assumptions."¹³³ The rules, however, create no prosecutorial duty to notify the defense before trial of this novel use of statistical evidence.

2. Neutron Activation Analysis

United States v. Stifel,¹³⁴ a leading case on the admissibility of neutron activation analysis (NAA), presents another discovery illustration. NAA is a quantitative and qualitative method for determining the elemental composition of substances. The prosecution charged Stifel with murdering his former girlfriend's fiancé by sending a bomb through the mail. Crucial prosecution evidence included activation analysis performed on bomb debris—vinyl tape, a metal cap, a cardboard mailing tube, and a paper-gummed label—and similar items obtained from Stifel's place of employment. The prosecution expert, James Scott, testified that the label and cardboard tube were "of the

131. Deadman, *Fiber Evidence*, *supra* note 3, at 13 (emphasis added).

132. *Williams*, 251 Ga. at 824, 312 S.E.2d at 98 (Smith, J., dissenting).

133. *Id.* at 825, 312 S.E.2d at 99 (Smith, J., dissenting); *see also* Deadman, *Fiber Evidence*, *supra* note 3, at 13 (setting forth assumptions underlying the probability determinations).

134. 433 F.2d 431 (6th Cir. 1970), *cert. denied*, 401 U.S. 994 (1971).

same type and same manufacture."¹³⁵ Scott also testified that the metal cap and tape were "of the same manufacture" and from the "same batch"—one day's manufacturing production.¹³⁶ The Sixth Circuit upheld the admissibility of the NAA evidence.¹³⁷

If NAA is used for comparative purposes, as it was in *Stifel*, the matching of certain elements, both qualitatively and quantitatively, in two samples becomes relevant only if the detected distribution of the elements differs from samples in the general population. Any similarity between tape recovered from the crime scene and *Stifel's* job is not probative if most tape is similarly composed. Consequently, additional data is necessary to evaluate the significance of the NAA results.¹³⁸ In short, establishing the relevance of NAA evidence, like the fiber evidence in *Williams*, requires the use of statistical probabilities.¹³⁹ The background studies are critical, and testimony about "matches" and "common origin" is often misleading.¹⁴⁰

The defense's main attack in *Stifel* appears to have focused on the general acceptance of NAA, rather than on the significance of the data produced by this procedure. One commentator has criticized this strategy for its broad-based attack on the scientific validity of NAA and has made the following recommendation:

A better defense strategy probably would have been to stipulate to the elemental composition measurement. The jury could then have focused its attention on what apparently should have been the primary issue, namely, the invalidity of the expert's claims that "within a reasonable scientific certainty" the items measured were of the same manufacture and that he had identified the metal cap and vinyl tape fragments to within one day's production batch. No comprehensive background studies have been published on any of the materials involved in this case. The expert was an employee of the Post Office Department Inspection Service and the case involved the United States as a party. The Sixth Circuit opinion does not say whether the expert attempted to substantiate his claims with purported background studies carried out in government laboratories, but the available evidence indicates that such studies should in any event be regarded with suspicion.¹⁴¹

This "better defense strategy," however, would have depended on prior

135. 433 F.2d at 436.

136. *Id.*

137. *Id.* at 441.

138. Comment, *The Evidentiary Uses of Neutron Activation Analysis*, 59 CALIF. L. REV. 997, 1014 (1971). The author explained: "In neither of these cases is the NAA evidence sufficient in itself; additional data are needed to evaluate the significance of the chemical analyses done by neutron activation techniques [T]he analysis . . . depends on the existence of sufficient background information" *Id.*

139. See Broun & Kelly, *Playing the Percentages and the Law of Evidence*, 1970 U. ILL. L.F. 23, 46-47; Tribe, *Trial by Mathematics: Precision and Ritual in the Legal Process*, 84 HARV. L. REV. 1329, 1342 n.40 (1971).

140. Comment, *supra* note 138, at 1024 (arguing that "few experts have used appropriate care in limiting their testimony").

141. *Id.* at 1070-71 (footnotes omitted).

notice that such evidence would be offered at trial and the right to review the background studies before the trial commenced. Neither requirement is guaranteed by Rule 16.

After his conviction, Stifel filed a request under the Freedom of Information Act (FOIA). The FOIA material revealed the existence of another suspect in the bombing and discrepancies about the background tests on the vinyl tape.¹⁴² Consequently, Stifel filed a postconviction petition, alleging a violation of the due process tenet of *Brady*. He argued that Scott, when cross-examined, failed to disclose that additional tests had been performed on the tape. Although the court disagreed that Scott had misrepresented the facts on this issue, it noted the misleading aspect of this information in granting relief: "[H]ad the defense known of the November 1968 tests performed by Scott on tape obtained from Plymouth Rubber Company, it could have used this evidence to further impeach the credibility of Scott's scientific methods."¹⁴³

3. DNA Evidence

DNA evidence also involves statistical proof as well as other complex issues. It is a novel, sophisticated technique, the validity of which has been attacked vigorously. One scientist has questioned the assumptions underlying the population genetics used in DNA analysis by asserting that "despite . . . fundamental uncertainties, forensic laboratories blithely cite breathtaking frequencies: a recent report based on the study of only four RFLPs announced that the chance of an alleged match occurring at random was 1 in 738,000,000,000,000."¹⁴⁴

The need for extensive discovery is self-evident.¹⁴⁵ One court as-

142. *United States v. Stifel*, 594 F. Supp. 1525, 1528, 1531-38 (N.D. Ohio 1984).

143. *Id.* at 1542-43.

144. Lander, *supra* note 29, at 501.

145. In *People v. Castro*, 144 Misc. 2d 956, 545 N.Y.S.2d 985 (Sup. Ct. 1989), the court wrote: The proponent, whether defense or prosecution, must give discovery to the adversary, which must include: 1) Copies of autorads, with the opportunity to examine the originals. 2) Copies of laboratory books. 3) Copies of quality control tests run on material utilized. 4) Copies of reports by the testing laboratory issued to proponent. 5) A written report by the testing laboratory setting forth the method used to declare a match or non-match, with actual size measurements, and mean or average size measurement, if applicable, together with standard deviation used. 6) A statement by the testing lab, setting forth the method used to calculate the allele frequency in the relevant population. 7) A copy of the data pool for each loci examined. 8) A certification by the testing lab that the same rule used to declare a match was used to determine the allele frequency in the population. 9) A statement setting forth observed contaminants, the reasons therefore, and tests performed to determine the origin and the results thereof. 10) If the sample is degraded, a statement setting forth the tests performed and the results thereof. 11) A statement setting forth any other observed defects or laboratory errors, the reasons therefore and the results thereof. 12) Chain of custody documents. *Id.* at 978-79, 545 N.Y.S.2d at 999.

serted that denying access to the opposing party of data relied on in DNA testing implicates fair trial and due process concerns.¹⁴⁶ Yet in *United States v. Yee*¹⁴⁷ federal prosecutors opposed discovery of DNA analysis performed by the FBI. The defense sought production of matching criteria, environmental insult studies, population data, and proficiency tests. The federal magistrate granted the motion, but based his decision on subdivision (C) of Rule 16, which permits discovery of documents and tangible objects that are material to the preparation of the defense. He ruled that "predicate materials" were discoverable under this provision.¹⁴⁸ The need for discovery was underscored by the lack of "extensive independent scientific assessment and replication of the reliability of the procedures that have been developed by the F.B.I."¹⁴⁹

The most troubling aspect of the case concerns the reason that the prosecution opposed discovery in the first place. They simply argued that these materials were not scientific reports under Rule 16(a)(1)(D).¹⁵⁰ They did not argue that the material was irrelevant or that it would not aid in the defense. Interestingly, the day after the discovery motion in *Yee* was argued, the FBI wrote a letter to the *New York Times*, promoting the validity of its DNA program. The letter stated:

The procedures employed in these tests have been carefully defined, based on extensive studies. Our procedures and test results have passed muster when subjected to close scrutiny in the scientific community and the courts. The F.B.I. has encouraged wide review of the forensic use of DNA technology through sponsorship of technical seminars and international symposiums and support to studies conducted by the Office of Technology Assessment and the National Academy of Sciences.¹⁵¹

It seems incongruous to trumpet the scientific reliability of DNA in the press and, at the same time, oppose discovery of DNA in the courtroom. The reason for the prosecutors' conduct, of course, is tactical, a motivation that is inherent in the adversary system. Thus, the fault lies not with the prosecutors, but with the rule.

146. See *State v. Schwartz*, 447 N.W.2d 422, 427 (Minn. 1989).

147. 129 F.R.D. 629 (N.D. Ohio 1990).

148. *Id.* at 635. This holding offers a way for the defense to avoid the narrow reading of Rule 16(a)(1)(D) concerning lab reports. See *United States v. Iglesias*, 881 F.2d 1519 (9th Cir. 1989), *cert. denied*, 110 S. Ct. 1154 (1990). Indeed, the dissent in *Iglesias* raised precisely this issue. 881 F.2d at 1527 (Boochever, J., dissenting); see also *supra* notes 112-17 and accompanying text.

149. *Yee*, 129 F.R.D. at 631.

150. *Id.* at 630.

151. *N.Y. Times*, Feb. 21, 1990, at A24, col. 4 (letter to the editor). John Hicks, Assistant Director, FBI Laboratory Division, wrote the letter to the editor in response to an article on DNA that appeared on January 29, 1990 and raised a number of issues concerning the reliability of DNA testing. The FBI letter was dated February 2, 1990. The *Yee* discovery hearing was held on February 1 in Toledo, Ohio. *Yee*, 129 F.R.D. at 632.

Cases like *Williams*, *Stifel*, and *Yee* illustrate the need for more thorough discovery of expert information. Statistically based and technologically complex, both NAA and DNA evidence require extensive pretrial preparation, which of necessity depends on advance and complete notice.¹⁵² Yet the rules do not require adequate discovery, and prosecutors will not always supply it voluntarily. Something is wrong with a system in which Orville Stifel obtained greater discovery under the FOIA after his trial than he could have received under Rule 16 prior to trial. Something is equally awry when Wayne Williams, sitting in a penitentiary cell, can read an article about the novel fiber evidence used to convict him, but he was not entitled to this same information when preparing to defend himself.

VI. THE RIGHT TO TEST AND RETEST EVIDENCE

Discovery should include the right to test and retest evidence previously analyzed by prosecution experts. This right is recognized explicitly in the discovery rules of some jurisdictions.¹⁵³ In other jurisdictions, the right to retest is implied from discovery rules that permit the inspection of tangible evidence,¹⁵⁴ such as Rule 16.¹⁵⁵ Nevertheless, recent cases still can be found that refuse to recognize an accused's right to retest. For example, in *Frias v. State*¹⁵⁶ the defense sought to analyze

152. Commentators have written on the jury's ability to deal with statistical evidence as well as the need for pretrial discovery in this context. Judge Weinstein has summarized several proposals to deal with statistical evidence, including disclosure of the underlying data and the names of the persons who compiled the data. See Weinstein, *supra* note 17, at 483-84; see also *MANUAL FOR COMPLEX LITIGATION*, SECOND §§ 21.481, 33.12 (1985); *THE EVOLVING ROLE OF STATISTICAL ASSESSMENTS AS EVIDENCE IN COURTS* 166-67 (S. Fienberg ed. 1989).

In a recent article, Professor Thompson outlined some of the problems associated with a jury's ability to understand statistical evidence. Thompson, *Are Juries Competent to Evaluate Statistical Evidence?*, 52 *LAW & CONTEMP. PROBS.* 9 (1989). Some of the jury's misconceptions can be cured through argument by counsel. This outcome is possible, however, only if counsel is adequately prepared to deal with this type of evidence.

153. See, e.g., FLA. R. CRIM. P. 3.220(a)(1); IOWA CODE ANN. § 813.2 (West 1979) (IOWA R. CRIM. P. 13(2)(b)(1)); LA. CODE CRIM. PROC. ANN. art. 718 (West 1981); N.C. GEN. STAT. § 15A-903(e) (1988); WIS. STAT. ANN. § 971.23(5) (West 1985).

154. See, e.g., *James v. Commonwealth*, 482 S.W.2d 92, 94 (Ky. 1972); *State v. Migliore*, 261 La. 722, 737, 260 So. 2d 682, 688 (1972); *State v. Cloutier*, 302 A.2d 84, 89 (Me. 1973); *State v. Gaddis*, 530 S.W.2d 64, 69 (Tenn. 1975).

155. See, e.g., *United States v. Vaughn*, 736 F.2d 665, 666 (11th Cir. 1984) (finding that "[d]efendants could have obtained their own analysis of the [cocaine] samples"), *cert. denied*, 490 U.S. 1065 (1989); *United States v. Gaultney*, 606 F.2d 540, 545 (5th Cir. 1979) (stating that "[i]n cases involving a controlled substance, courts have held a concomitant part of the examination or inspection to be the right of the accused to have an independent chemical analysis performed on the seized substance"), *rev'd on other grounds sub nom.* *Steagald v. United States*, 451 U.S. 204 (1981); *United States v. Sullivan*, 578 F.2d 121, 124 (5th Cir. 1978) (stating that the right of inspection "includes the right to have an expert examine the narcotics before trial").

156. 547 N.E.2d 809 (Ind. 1989), *cert. denied*, 110 S. Ct. 1954 (1990).

independently the cocaine exhibits used by the state at trial. The trial court refused, and the Indiana Supreme Court affirmed. The supreme court reasoned that the defense had the opportunity to cross-examine the expert, had access to the laboratory reports, and had raised no objection to the accuracy of the results.¹⁵⁷

This conclusion—that a person facing a substantial prison term for possession of a controlled substance does not have an unquestioned right to analyze that substance—cannot be justified.¹⁵⁸ The right to retest is so basic that some courts have declared it constitutionally based and a violation of fundamental fairness when denied.¹⁵⁹ Even a nonlawyer, one of the pathologists who testified in the Jean Harris trial, understood this point: “Should a defendant not be permitted, even encouraged, in the spirit of truth and fairness, to have other dermatopathologists examine those same fragments and offer their opinions about them?”¹⁶⁰

*Imbler v. Craven*¹⁶¹ demonstrates the value of retesting. At Imbler’s murder trial, a prosecution fingerprint expert testified that two partial fingerprints were found on a razor case that the killer had left at the scene. A positive identification could not be made because of the fragmentary nature of the prints. After the trial, a defense expert examined the razor case and discovered a third print that could be positively identified as not Imbler’s fingerprint.¹⁶² This troublesome case does not

157. 547 N.E.2d at 813. Other cases also have denied the right to retest because the defendant’s right to cross-examine the prosecution’s experts was deemed sufficient. See *People v. Anderson*, 88 Mich. App. 513, 516-17, 276 N.W.2d 924, 926 (1979); *People v. Bell*, 74 Mich. App. 270, 275, 253 N.W.2d 726, 729 (1977); *Commonwealth v. Dorsey*, 266 Pa. Super. 442, 451-52, 405 A.2d 516, 521 (1979).

158. Courts have the authority to control the circumstances under which the retest occurs. In *State v. Faraone*, 425 A.2d 523 (R.I. 1981), the court wrote:

A defendant who desires to analyze an article or substance should file a motion setting forth the circumstances of the proposed analysis, the identity of the expert who will conduct such analysis, his qualifications, and scientific background. The court may then, in its discretion, provide for appropriate safeguards, including, where necessary, the performance of such tests at the state laboratory under the supervision of the state’s analyst.

Id. at 526.

159. The Fifth Circuit stated that “fundamental fairness is violated when a criminal defendant . . . is denied the opportunity to have an expert of his choosing . . . examine a piece of critical evidence whose nature is subject to varying expert opinion.” *Barnard v. Henderson*, 514 F.2d 744, 746 (5th Cir. 1975); accord *White v. Maggio*, 556 F.2d 1352, 1357 (5th Cir. 1977); *Warren v. State*, 292 Ala. 71, 75, 288 So. 2d 826, 830 (1973); *McNutt v. Superior Court*, 133 Ariz. 7, 9, 648 P.2d 122, 124 (1982); *State v. Hanson*, 278 N.W.2d 198, 200 (S.D. 1979).

160. *Ackerman*, *supra* note 4, at 46.

161. 298 F. Supp. 795 (C.D. Cal. 1969), *aff’d*, 424 F.2d 631 (9th Cir.), *cert. denied*, 400 U.S. 865 (1970).

162. 298 F. Supp. at 809-10. After his release from prison, Imbler sued the prosecutor for unlawful prosecution. In *Imbler v. Pachtman*, 424 U.S. 409 (1976), the Supreme Court held that prosecutorial immunity precluded recovery.

stand alone. Other fingerprint cases,¹⁶³ as well as decisions involving other forensic techniques, highlight the importance of retesting. In 1989 an experienced firearms identification expert made an erroneous positive identification in a murder case. The error marked the third reported mistake by the Los Angeles Police Department crime laboratory.¹⁶⁴ An earlier mistake occurred in the prosecution of Sirhan Sirhan for the assassination of Robert Kennedy.¹⁶⁵ The number of DNA mistakes already reported further emphasizes the value of retesting in these cases.¹⁶⁶ Retesting also safeguards against deliberate misrepresentation—cases in which an analyst reports results of laboratory tests that never were conducted.¹⁶⁷

An absolute right to analyze evidence should be recognized in the discovery rules. This right should not be conditioned on a preliminary showing that a retest is critical¹⁶⁸ or will be favorable.¹⁶⁹ The defense, as in *Imbler*, cannot know if the results will be favorable until after a retest.

The right to retest in DNA cases may involve significant expense. Because most defendants are indigent, the state would have to bear the cost.¹⁷⁰ The issue of cost, however, is not new. NAA, also a complex and costly procedure, raised similar problems. In *Stifel* the Sixth Circuit

163. See, e.g., *State v. Caldwell*, 322 N.W.2d 574, 586 (Minn. 1982) (remarking that "[t]he fingerprint expert's testimony was damning—and it was false").

164. See Baker & Lieberman, *Faulty Ballistics in Deputy's Arrest: Eagerness to "Make" Gun Cited in LAPD Lab Error*, L.A. Times, May 22, 1989, at 1, col. 1; Freed, *LAPD Probing What Went Wrong with Ballistics Tests on Ross' Gun*, L.A. Times, May 16, 1989, at 26, col. 1; see also *In re Kirschke*, 53 Cal. App. 3d 405, 408, 125 Cal. Rptr. 680, 682 (1975) (finding that an expert "negligently presented false demonstrative evidence in support of his ballistics testimony"), cert. denied, 429 U.S. 820 (1976).

165. One commentator reported:

The examiners were unanimous in their findings that the identification testified to at the grand jury indictment and in the trial were misrepresented in that the purported identification of bullets lodged in victim Kennedy . . . with Sirhan's gun were non-existent. In both of these cases discovery and cross-examination were lacking.

Bradford, *Forensic Firearms Identification: Competence or Incompetence*, 5 FORUM 14 (Jul.-Aug. 1978); see also Bradford, *Problems of Ethics and Behavior in the Forensic Sciences*, 21 J. FORENSIC SCI. 763 (1976).

166. See *supra* notes 30-38 and accompanying text.

167. See *State v. Ruybal*, 408 A.2d 1284, 1285 (Me. 1979); *State v. DeFronzo*, 59 Ohio Misc. 113, 118, 394 N.E.2d 1027, 1031 (C.P. Lucas County 1978).

168. See *Gray v. Rowley*, 604 F.2d 382, 385 (5th Cir. 1979) (finding an examination of semen evidence not "critical"), cert. denied, 445 U.S. 944 (1980).

169. See *State v. Koennecke*, 274 Or. 169, 179, 545 P.2d 127, 133 (1976) (conditioning the right to test weapons on a preliminary showing that results will be favorable to the defendant).

170. See Comment, *DNA Printing: The Unexamined "Witness" in Criminal Trials*, 77 CALIF. L. REV. 665, 701 (1989) (proposing that "[i]ndigent defendants who can demonstrate a valid need for DNA printing services should receive them without cost"); Note, *The Dark Side of DNA Profiling: Unreliable Scientific Evidence Meets the Criminal Defendant*, 42 STAN. L. REV. 465, 523-24 (1990).

reasoned, however, that if the government deems it necessary to use such an expensive fact-finding procedure, then it must provide the defendant adequate time to conduct similar tests and pay for these tests if the defendant is indigent.¹⁷¹ The potential expense of defense testing is unclear. It is doubtful that defense counsel routinely would make requests for retesting once convinced of a procedure's reliability. Furthermore, retesting comes with a price tag. The prosecution could introduce evidence that samples had been turned over to the defense with the opportunity for defense retesting and then comment to the jury on the defense's failure to introduce the test results.

VII. DUTY TO PRESERVE

The right to test necessarily implicates a duty on the part of the state to preserve evidence for testing or retesting. A startling amount of evidence is lost or discarded. A review of the cases reveals that drugs, bullets, blood, urine, and trace metal detection results, as well as physical evidence of arson, rape, and homicide, have not been preserved for examination or retesting.¹⁷² Perhaps the most bizarre illustration occurred in *People v. Morgan*,¹⁷³ a case in which a severed fingertip was found at the scene of a homicide. Morgan, sans fingertip, seemed like a good suspect and was arrested. Unfortunately, the fingertip evidence could not be used, according to the Colorado Supreme Court, because "someone—the police haven't been able to determine who—threw the fingertip away."¹⁷⁴

The Supreme Court has reviewed the preservation issue twice. In its latest decision, *Arizona v. Youngblood*,¹⁷⁵ the police in a sexual assault case negligently failed to preserve semen samples from the victim's clothes and body.¹⁷⁶ According to the Court, failure to preserve

171. *United States v. Stifel*, 433 F.2d 431, 441 (6th Cir. 1970), *cert. denied*, 401 U.S. 994 (1971).

172. See P. GIANNELLI & E. IMWINKELRIED, *supra* note 14, at 108-09 (collecting cases).

173. 199 Colo. 237, 606 P.2d 1296 (1980).

174. Moya, *The Case of the Missing Fingertip*, NAT'L L.J., Dec. 21, 1981, at 11. The refrigerator where the evidence was stored apparently was not cold enough to prevent decay, and the police refused to move it to the refrigerator where they stored their "brown bag lunches."

175. 488 U.S. 51 (1988). The Court first discussed the issue in *California v. Trombetta*, 467 U.S. 479 (1984), in which the defendant challenged the State's failure to preserve an additional breath sample in a drunk driving case. The Court rejected the argument, holding that due process requires that the "evidence must both possess an exculpatory value that was apparent before the evidence was destroyed, and be of such a nature that the defendant would be unable to obtain comparable evidence by other reasonably available means." *Id.* at 489.

176. "[B]oth a criminologist for the State and an expert witness for respondent testified as to what might have been shown by tests performed on the samples shortly after they were gathered, or by later tests performed on the samples from the boy's clothing had the clothing been properly refrigerated." *Youngblood*, 488 U.S. at 54.

evidence is not unconstitutional unless the defendant can show that the police acted in bad faith.¹⁷⁷

Youngblood, however, does not answer the issue of whether discovery rules should address this problem. Several jurisdictions have rejected the bad faith test as a matter of state constitutional law. On remand in *Youngblood*, the Arizona court, applying the state due process clause, reversed. The court explained that the semen evidence in the case "is inherently evanescent, is virtually dispositive of guilt or innocence, and collecting the evidence places only a slight burden upon the state."¹⁷⁸ The Hawaii Supreme Court also found the bad faith test too restrictive because it precludes courts "in cases where no bad faith is shown, from inquiring into the favorableness of the evidence or the prejudice suffered by the defendant as a result of its loss."¹⁷⁹

Moreover, *Youngblood* did not raise the issue of retesting evidence that the prosecution already had examined and intended to introduce at trial; the semen never was tested properly in the first place.¹⁸⁰ A situation in which lost evidence might be exculpatory differs from one in which inculpatory evidence will be offered. A higher duty of care should be required in the latter situation.

Consumptive testing, the destruction of the evidence during analysis, is a frequently litigated problem of this type.¹⁸¹ Some courts have raised due process concerns, imposing on the state the duty to take precautionary measures to protect the defendant. In *People v. Gomez*,¹⁸² a case in which heroin residue was consumed during testing, the Colorado Supreme Court indicated that due process might demand that the state determine whether the defendant wants his expert to attend the testing procedures.¹⁸³ In a later case, *People v. Garries*,¹⁸⁴ the Colorado Su-

177. *Id.* at 58.

178. *State v. Youngblood*, 164 Ariz. 61, 65, 790 P.2d 759, 763 (1989) (footnote omitted) (quoting *Montano v. Superior Court*, 149 Ariz. 385, 389, 719 P.2d 271, 275 (1986)).

179. *State v. Matafeo*, 787 P.2d 671, 673 (Haw. 1990); see also Note, *The Role of Police Culpability in Leon and Youngblood*, 76 VA. L. REV. 1213 (1990).

180. The Court's decision in *Trombetta* also did not involve retesting. The defendant did not seek preservation of the breath samples actually tested by an intoxilyzer, but different samples taken at the same time.

181. See Annotation, *Consumption or Destruction of Physical Evidence Due to Testing or Analysis by Prosecution's Expert As Warranting Suppression of Evidence or Dismissal of Case Against Accused in State Court*, 40 A.L.R. 4TH 594 (1985).

182. 198 Colo. 105, 596 P.2d 1192 (1979), *cert. denied*, 455 U.S. 943 (1982).

183. 198 Colo. at 112, 596 P.2d at 1197.

184. 645 P.2d 1306 (Colo. 1982); see also *State v. Herrera*, 365 So. 2d 399, 401 (Fla. Dist. Ct. App. 1978) (better practice), *cert. denied*, 373 So. 2d 459 (Fla. 1979); *Commonwealth v. Gliniewicz*, 398 Mass. 744, 749, 500 N.E.2d 1324, 1327 (1986) (stating that "the defendants received no notice of the impending tests, and thus were not able to have their own expert present to observe and potentially to refute the subjective aspects of the [blood] testing"); *State v. Carlson*, 267 N.W.2d 170, 175 n.4 (Minn. 1978) (blood); *State v. Gaddis*, 530 S.W.2d 64, 69 (Tenn. 1975) (finding that

preme Court again suppressed evidence—this time blood-stains—because the stains were destroyed in testing. The state had neither photographed the test results nor provided the defense with the opportunity to have its own expert present during analysis.¹⁸⁵

Consumptive testing also should be addressed in discovery rules. An Ohio drug statute, for example, recognizes the defendant's right to test controlled substances. If a portion of the drug cannot be preserved, the accused has the right "to have his privately employed or court appointed analyst present at an analysis of the substance that is the basis of the alleged violation. . . ."¹⁸⁶ This right is equally important in DNA cases because consumptive testing is a real possibility.¹⁸⁷

The right to have an expert present is an important, but nevertheless narrow, right. It applies only when a sufficient quantity of the evidence would not remain after the initial testing. Furthermore, a discovery rule implies that an indictment has been handed down; thus, the right to have an expert present would not be applicable when testing is done in the early stages of an investigation when a suspect may not have been identified.

VIII. CONCLUSION

When Rule 16 was amended in 1966 to include discovery of scientific reports, it appeared adequate for the task at hand. Indeed, a commentator at the time wrote that the amendment assured that "to the extent that the government utilizes modern scientific techniques for crime detection, the findings will be available to the defendant."¹⁸⁸ Recent cases, however, have demonstrated the inaccuracy of this assessment.

A. Proposed Amendments

The current discovery rules should be amended to provide the following: (1) notice that an expert will testify; (2) the substance and basis of the expected testimony; and (3) the right to test and retest evidence. This is nothing more than what Federal Civil Rule 26 already permits

"good faith demands that no [drug] test or analysis be made except by agreement between the District Attorney and defense counsel, or until such time as defense counsel may arrange to have his own expert present at the test").

185. *Garries*, 645 P.2d at 1309-10.

186. OHIO REV. CODE ANN. § 2925.51(E) (Anderson 1987); see also MONT. CODE ANN. § 46-15-302(3)(a) (1981) (repealed 1985) (providing that "[i]f the evidence relates to scientific tests or experiments, the opposing party shall, if practicable, be permitted to be present during the tests and to inspect the results thereof").

187. See Note, *supra* note 170, at 524 (explaining that in the case of DNA profiling, the prosecution's testing often will consume the entire sample).

188. *Rezneck*, *supra* note 44, at 1278.

in civil litigation.¹⁸⁹

The first and third objectives are addressed easily. Notification can be accomplished by requiring disclosure of a list of expert witnesses. The right to retest can be stated explicitly in the discovery rule.

The second objective, disclosing the substance and basis of the expert's testimony, could be achieved in several different ways. Permitting discovery depositions is one solution. Although most jurisdictions presently do not sanction this type of criminal discovery,¹⁹⁰ the proposal is not as radical as it may appear. Many of the jurisdictions that do not recognize discovery depositions are among the thirty-four jurisdictions that have adopted the Federal Rules of Evidence. Rule 706, which governs the appointment of court-appointed experts, contains a deposition provision.¹⁹¹ This rule could be applied to all expert witnesses. At the very least, the trial court's authority to permit a deposition in a particular case should be recognized.

Specifying the required contents of laboratory reports in the discovery rule is another approach.¹⁹² The procedures employed, the specific findings, the ultimate conclusions, the bases for the opinion, and the qualifications of the expert all should be required. If a written report is not prepared, then the substance of any oral report should be produced.¹⁹³ Discovery also should extend to any related documents used or made by experts in reaching a conclusion. This requirement

189. See FED. R. CIV. P. 26(b)(4)(A)(i). Rule 26 provides in pertinent part:

A party may through interrogatories require any other party to identify each person whom the other party expects to call as an expert witness at trial, to state the subject matter on which the expert is expected to testify, and to state the substance of the facts and opinions to which the expert is expected to testify and a summary of the grounds for each opinion.

Id. Interestingly, a number of commentators have questioned whether Rule 26 is adequate in civil cases. See McLaughlin, *Discovery and Admissibility of Expert Testimony*, 63 NOTRE DAME L. REV. 760 (1988); Rothstein, *The Collision Between New Discovery Amendments and Expert Testimony Rules*, 14 LITIGATION 17 (Spring 1988).

190. See *supra* note 56 and accompanying text.

191. FED. R. EVID. 706(a) (requiring that "[a] witness so appointed shall advise the parties of the witness' findings, if any; the witness' deposition may be taken by any party").

192. One court has taken this position. In *United States v. Cadet*, 727 F.2d 1453 (9th Cir. 1984), the trial court ordered discovery of:

The reports of any scientific tests, examinations or experiments, or physical or mental examinations, or copies thereof, including, but not limited to: (1) a statement of all material or other information or sources considered by the examiner in arriving at an opinion, the methodology used, and the findings and conclusions of the examiner, (2) a resume and curriculum vitae of the examiner's qualifications, experience, subject matter of the examiner's testimony, and prior occasions of testimony as an expert, and (3) any worksheets, photographs, notes, or other things used to assist the examiner in reaching an opinion and recording the process or methodology of reaching an opinion.

Id. at 1459-60.

193. *E.g.*, MD. R. CRIM. P. CODE ANN. § 4-263(b)(4) (1991) (requiring the production of "the substance of any such oral report and conclusion").

should be supplemented by a right to propound interrogatories to an expert.¹⁹⁴ If this requirement were thought to be too burdensome, the number of interrogatories could be limited to twenty-five.¹⁹⁵ The prospect of interrogatories may encourage experts to write more complete reports.

These proposals are consistent with guidelines promulgated by the American Society of Crime Laboratory Directors,¹⁹⁶ which contain sections on casework documentation and reporting. Proper documentation requires a system of note keeping that records the basis for any findings, conclusions, and interpretations, and requires the retention of all notes, charts, photographs, or diagrams. The guidelines advise that "[t]he 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."¹⁹⁷ The guidelines require laboratory reports to include: (1) an accurate summary of important material appearing in the case notes; (2) interpretive information and examination results whenever possible; and (3) identification of the analyst or analysts and, if appropriate, the testing methodology.¹⁹⁸ Moreover, the adoption of the proposal would eliminate often-criticized reports that keep information at a minimal level to avoid disclosing any ammunition for cross-examination, that state findings with no accompanying interpretation, and that omit significant points from a report to "trap an unsuspecting cross-examiner."¹⁹⁹

B. Rationale

Fairness and reliability support these proposals. An accused should not have to defend against expert testimony without the means necessary to do so. Any other system is fundamentally unfair.

The reliability argument has two premises. First, full pretrial discovery of scientific evidence permits the defense to challenge its validity at trial through cross-examination or the presentation of defense experts. Second, requiring written and thorough documentation of laboratory tests ensures, to some extent, that proper procedures will be followed. Analysts will know that a comprehensive, permanent record of

194. See *State v. Rolls*, 389 A.2d 824, 830 n.5 (Me. 1978) (propounding interrogatories to an FBI expert who performed enzyme blood analysis).

195. See OHIO R. CIV. P. 33(A) (requiring that "[a] party shall not propound more than forty interrogatories to any other party without leave of court").

196. *ASCLD Guidelines for Forensic Laboratory Management Practices*, 14 CRIME LABORATORY DIG. 39 (Apr. 1987).

197. *Id.* at 43.

198. *Id.*

199. Lucas, *The Ethical Responsibilities of the Forensic Scientist: Exploring the Limits*, 34 J. FORENSIC SCI. 719, 724 (1989).

their work will be available to the opposing side. Currently, there are few checks on the analyst. Most crime laboratories are unregulated and do not participate in proficiency testing programs. Because crime laboratory personnel testify only in approximately ten percent of all the cases for which they examine evidence,²⁰⁰ the prospect of testifying at trial is an inadequate check on unreliable work. Moreover, in most of those cases no opposing expert testifies.²⁰¹ Thus, comprehensive written reports are a quality-control device.²⁰² An expert who changes or modifies his opinion would be required to change the report,²⁰³ as did the pathologist in the Jean Harris trial.²⁰⁴ He also would have to explain the change.

Finally, comprehensive discovery eliminates subsequent litigation over *Brady* issues; whether a particular test result is material or exculpatory no longer would be an issue. The defense would have an absolute right to know of the evidence prior to trial, and the risk that counsel

200. Peterson, *supra* note 57, at 45; see also Peterson, Mihajlovic & Bedrosian, *supra* note 54, at 15 (reporting that "on the average, crime laboratory examiners testified in 8% of drug cases (the percentage ranged from 0 to 86%) and 10% of criminalistics cases (the percentage ranged from 0 to 87%) where evidence was examined").

201. See H. KALVEN & H. ZEISEL, *THE AMERICAN JURY* 139 (1966). The authors wrote: "Again, the imbalance between prosecution and defense appears. In 22 percent of the cases the prosecution has the only expert witness, whereas in only 3 percent of the cases does the defense have such an advantage." *Id.*; see also *On the Theory and Practice of Voice Identification* 49 (National Academy of Sciences 1979) (noting that a "striking fact about the trials involving voicegram evidence to date is the very large proportion in which the only experts testifying were those called by the state").

202. Professor Joseph Peterson has remarked:

Only a small percentage of the cases in any jurisdiction go to trial, so the technicians or scientists in the crime laboratories seldom are called upon to justify their procedures or conclusions under rigorous cross-examination. I think the realization that their work will not be reviewed—either by an independent scientist or by opposing counsel and expert in court—decreases the care and completeness with which examiners process evidence.

Symposium on Science, supra note 23, at 643.

203. In the New York murder trial of Robert Golub, a bite mark expert made a positive identification at trial. His pretrial report, however, stated only that the defendant's teeth were "consistent" with the mark found on the victim. On cross-examination, the expert testified that "his report was not meant to be his final conclusion and that he continually re-evaluated his cases." *N.Y. Times*, Mar. 14, 1990, at B6, col. 5.

204. Dr. A. Bernard Ackerman reports:

Dr. Roh changed his opinion about the findings in the wound in the chest of Dr. Tarnower time after time:

March 21, 1980—Autopsy report. No palmar fragments in the wound in the skin of the chest, only "large amount of fresh hemorrhage" and "coagulation necrosis of collagen fibers."

Jan. 8, 1981—Addendum to the autopsy report. There were "three fragments of tissue in the bullet track in the subcutaneous tissue of the chest wound" and "these tiny fragments are . . . histologically consistent with stratum corneum, stratum lucidum, and portions of stratum granulosum of epidermis of skin."

Ackerman, *supra* note 4, at 51.

will render incompetent representation in a case involving scientific proof thereby is reduced.

One final comment should be made. Although this Article focuses on defense discovery, most of the same arguments apply to prosecution discovery. The only distinction would be to limit discovery to defense experts who will testify. This would exclude experts whom the defense consulted but did not intend to call as witnesses. Such a limitation would remove any possible self-incrimination, attorney-client privilege, right to counsel, or work product issues.²⁰⁵

205. The fifth amendment is not an obstacle for two reasons. First, if the defense expert intends to testify, discovery by the prosecutor merely accelerates the timing of disclosure. *See Williams v. Florida*, 399 U.S. 78, 85 (1970). Second, production by an expert or counsel, rather than the accused, does not implicate the fifth amendment. *See United States v. Nobles*, 422 U.S. 225, 233-34 (1975); *Gipson v. State*, 609 P.2d 1038, 1044 (Alaska 1980) (stating that compelled disclosure of firearm expert's report does not violate the fifth amendment). *See generally* P. GIANNELLI & E. IMWINKELRIED, *supra* note 14, at 3.8; 2 W. LAFAYE & J. ISRAEL, *supra* note 15, at 525-26; Mosteller, *Discovery Against the Defense: Tilting the Adversarial Balance*, 74 CALIF. L. REV. 1569, 1655-74 (1986); Imwinkelried, *The Applicability of the Attorney-Client Privilege to Non-Testifying Experts: Reestablishing the Boundaries Between the Attorney-Client Privilege and the Work Product Protection*, 68 WASH. U.L.Q. 19 (1990) (arguing that the attorney-client privilege should not apply to most experts).

In addition, case law supports the use of nontestimonial identification procedures on less than probable cause. Rules authorizing this practice should be adopted. *See* P. GIANNELLI & E. IMWINKELRIED, *supra* note 14, § 2-4(A)(2).

