

January 1991

Criminal Procedure - Match-Game 1990's: The Admissibility of DNA Profiling - State v. Pennington

W. Anthony Purcell

Follow this and additional works at: <http://scholarship.law.campbell.edu/clr>

 Part of the [Criminal Procedure Commons](#)

Recommended Citation

W. Anthony Purcell, *Criminal Procedure - Match-Game 1990's: The Admissibility of DNA Profiling - State v. Pennington*, 13 CAMPBELL L. REV. 209 (1991).

This Comment is brought to you for free and open access by Scholarly Repository @ Campbell University School of Law. It has been accepted for inclusion in Campbell Law Review by an authorized administrator of Scholarly Repository @ Campbell University School of Law.

COMMENTS

CRIMINAL PROCEDURE — MATCH-GAME 1990's: THE ADMISSIBILITY OF DNA PROFILING — *State v. Pennington*

INTRODUCTION

The mention of DNA¹ profile typing evokes thoughts of lab coats, beakers, and genetics. Experts are now describing it as “the most significant break through [sic] in resolving serious crime since fingerprinting was invented.”² It has been quoted as being a breakthrough that “could revolutionize law enforcement.”³ The development of this technique has enormous potential for use in medical science, forensic investigation, and the court room.⁴ Until 1987, this new technology had not been applied in the United States or elsewhere.⁵ Since its introduction, it has gained popularity at an exponential rate.⁶ However, “the small trickle of DNA typing cases that have reached the courts so far portends a massive flood of such cases in the near future.”⁷

North Carolina has been one of the few states to question whether its courts should admit expert testimony concerning DNA profiling. In *State v. Pennington*,⁸ the court held that evidence of DNA profiling is generally admissible. After finding this scientific

-
1. Deoxyribonucleic acid.
 2. Marshall, “*Genetic Fingerprints*” *May Catch Killer*, L.A. Times, Mar. 11, 1987, at 11, col. 4.
 3. Moss, *DNA—The New Fingerprints*, A.B.A.J., May 1, 1988, at 66.
 4. Kelly, Rankin & Wink, *Method and Application of DNA Fingerprinting: A Guide for the Non-Scientist*, 1987 CRIM. L. REV. 105, 105.
 5. *Id.*
 6. Hoeffel, *The Dark Side of DNA Profiling: Unreliable Scientific Evidence Meets the Criminal Defendant*, 42 STAN. L. REV. 465, 477 (1990) [hereinafter Hoeffel].
 7. Thompson & Ford, *DNA Typing: Acceptance and Weight of the New Genetic Identification Tests*, 75 VA. L. REV. 45, 46 (1989) [hereinafter Thompson & Ford].
 8. 327 N.C. 89, 393 S.E.2d 847 (1990).

method to be sufficiently reliable, the court admitted the evidence.⁹ The court left the door open for attack to relevancy or prejudice of such evidence by the defense, as well as other possible objections.¹⁰

This Note discusses the nature, history, and effect of DNA profiling and supports the *Pennington* court's holding as the correct approach. Although the court adopted the majority view, and most likely the correct view, this area of law still remains in a state of confusion.

THE CASE

Ronald Craig Pennington was charged and convicted of first-degree rape, first-degree sexual offense, first-degree arson, assault with a deadly weapon with intent to inflict serious injury and felonious breaking and entering.¹¹ The victim testified that on July 13, 1988, the defendant came to the front door of her home and they spoke through the screen door for approximately twenty minutes.¹²

The next morning the victim heard defendant's voice call out, "Hey, it's me," from the vicinity of her front door.¹³ Defendant then burst through the door and began choking her.¹⁴ Defendant proceeded to beat the victim with his fist and a hammer and pushed her into a bedroom.¹⁵ After tearing off her clothes, he threatened to kill her, and forced her to submit to vaginal intercourse four times.¹⁶ Defendant performed cunnilingus on the victim and then attempted anal intercourse.¹⁷ He struck the victim in the head with the hammer when he was unable to insert his penis into the victim's anus.¹⁸ After regaining consciousness, she awoke to find the defendant engaging in anal intercourse.¹⁹ Defendant struck the victim in the head several more times, then pulled the drapes off the windows and set them on fire.²⁰ The defendant told

9. *Id.* at 101, 393 S.E.2d at 854.

10. *Id.*

11. *Id.* at 90, 393 S.E.2d at 848.

12. *Id.*

13. *Id.* at 91, 393 S.E.2d at 848.

14. *Id.*

15. *Id.*

16. *Id.*

17. *Id.*

18. *Id.*

19. *Id.*

20. *Id.* at 91, 393 S.E.2d at 848-49.

the victim not to look at him, then struck her several more times on her head and legs with the hammer.²¹ The victim again lost consciousness and did not regain consciousness for five days.²²

Recovery of evidence at the crime scene proved difficult due to the smoke and soot caused by the fire.²³ A hammer was found in the woods near the victim's home.²⁴ The State's fingerprint expert identified a latent print matching defendant's little finger on a strip of metal found a few feet away from where the hammer was found.²⁵ A latent palm print that matched that of the defendant was also found on the front door molding of the victim's home.²⁶

Samples of spermatozoa were collected from the victim.²⁷ Also, a stain which was shown to contain spermatozoa was taken from the bedspread upon which the victim was raped.²⁸ The tests conducted on the vaginal swab and the bedspread showed that the source of the specimens were of blood type A secretor.²⁹ Blood samples from the victim and the defendant revealed that both were type A secretor.³⁰

At trial, a lengthy voir dire was held on the admissibility of evidence of deoxyribonucleic acid (DNA) analysis performed by Cellmark Diagnostics, Inc.³¹ The trial court concluded that the evidence proffered was reliable and based on established scientific methods generally accepted within the field of microbiology and

21. *Id.* at 91, 393 S.E.2d at 849. The victim began to call the defendant "Tim," hoping that he would leave thinking that she could not identify him, instead the angry defendant insisted that his name was Ronnie Pennington and even showed the victim a computer-generated document bearing that name. *Id.* at 91, 393 S.E.2d at 848.

22. *Id.* at 91, 393 S.E.2d at 849. The victim suffered two depressed skull fractures and lost a large amount of blood from several scalp lacerations. Prior to surgery, there was brain matter visible from outside her skull. Her vision was permanently affected by damage to the right parietal region of the brain. At the time of the trial, the victim continued medication to prevent brain seizures. She also suffered a left-side visual field defect, resulting in her lack of awareness of objects on the left side of the visual field. *Id.* at 92, 393 S.E.2d at 849.

23. *Id.* at 92, 393 S.E.2d at 849.

24. *Id.*

25. *Id.*

26. *Id.*

27. *Id.*

28. *Id.*

29. *Id.*

30. *Id.*

31. *Id.* at 93, 393 S.E.2d at 849.

molecular biology.³² Therefore, the court admitted the evidence pertaining to the DNA analysis.³³ A jury convicted the defendant of all five of the counts with which he was charged.³⁴ The defendant received two consecutive sentences of life imprisonment for first-degree rape and first-degree sexual offense.³⁵ He also received consecutive sentences of fifty years for first-degree arson, twenty years for assault with a deadly weapon with intent to kill inflicting serious injury, and three years for felonious breaking and entering.³⁶

On discretionary review, the North Carolina Supreme Court held that the expert testimony was uncontradicted that DNA profiling used established techniques considered reliable within the scientific community.³⁷ The court concluded that DNA profiling was properly admitted into evidence.³⁸

BACKGROUND

A. Nature Of DNA Profiling

1. What Is DNA?

Our bodies are composed of microscopic units called cells, each of which contains information packaged as deoxyribonucleic acid (DNA).³⁹ The configuration of DNA is different in every individual, except for identical twins, and its characteristics remain unchanged during an individual's lifetime.⁴⁰ DNA carries its infor-

32. *Id.*

33. *Id.*

34. *Id.* at 90, 393 S.E.2d at 848.

35. *Id.*

36. *Id.*

37. Discretionary review prior to determination by the court of appeals, was pursuant to N.C. GEN. STAT. § 7A-31(b) which allows appeal:

[W]hen in the opinion of the Supreme Court:

(1)The subject matter of the appeal has significant public interest, or

(2)The cause involves legal principles of major significance to the jurisprudence of the State, or

(3)Delay in final adjudication is likely to result from failure to certify and thereby cause substantial harm

N.C. GEN. STAT. § 7A-31(b) (1989).

38. *State v. Pennington*, 327 N.C. 89, 100, 393 S.E.2d 847, 854 (1990).

39. *Burk, DNA Fingerprinting: Possibilities and Pitfalls of a New Technique*, 28 JURIMETRICS J. 455, 456 (1988) [hereinafter *Burk*].

40. Annotation, *Admissibility, in Prosecution for Sex-Related Offenses, of Results of Test on Semen or Seminal Fluids*, 75 A.L.R. 4th 897, 905 (1990).

mation in code form, much like Morse code.⁴¹ DNA is made up of bases, designated as A,T,C, and G, which encode information for the cell.⁴² Base A will only pair with base T, and base C will only pair with base G.⁴³ DNA is composed of millions of chains of these bases, the order of which constitutes the "genetic code" of an individual.⁴⁴ The shape of the DNA is a "double helix."⁴⁵ These chains may be cut into smaller pieces at specific points by the use of molecules called restrictive enzymes.⁴⁶ The helix can be unzipped into single strands of DNA.⁴⁷ Only complementary strands can be zipped back together, a process called "hybridization."⁴⁸ Hybridization and interpretation of this data are the final steps of a DNA profiling analysis.

2. *The Method Of DNA Profiling*

Currently, there are two tests for profiling DNA which are offered by three different commercial laboratories.⁴⁹ Two of these companies use a process called restriction fragment length polymorphism (hereinafter RFLP).⁵⁰

The RFLP procedure can be broken down into seven steps.

- a. Extraction of the DNA.
- b. Restriction Digestion (cutting the DNA into workable fragments).
- c. Gel Electrophoresis (technique which separates the fragments by size).
- d. Southern Transfer (process which copies the pattern formed onto a white nylon membrane).

41. Burk, *supra* note 39, at 457.

42. *Id.*

43. Thompson & Ford, *supra* note 7, at 62.

44. *Id.*

45. Burk, *supra* note 39, at 457.

46. *Id.*

47. Thompson & Ford, *supra* note 7, at 63.

48. *Id.* (hybridization is a process which pairs up the DNA into its double-strand form by the use of probes).

49. *Id.* at 64.

50. State v. Pennington, 327 N.C. 89, 94 n.1, 393 S.E.2d 847, 850 n.1 (1990). These laboratories are Cellmark Diagnostics Corp. (located in Germantown, Maryland, which uses a process called "DNA fingerprinting") and Lifecodes Corp. (located in Valhalla, N.Y., which uses a technique called a "DNA-Print" test). A third company, Cetus Corp., uses a process called polymerase chain reaction, which will not be discussed here. Thompson & Ford, *supra* note 7, at 48-50.

- e. Hybridization (process which pairs up the DNA into its double-strand form by the use of probes).
- f. Autoradiography (the exposure of the DNA print onto a piece of X-Ray film).
- g. Interpretation of the DNA print.⁵¹

This detailed procedure is relevant when the courts determine whether the scientific evidence of DNA profiling should be admitted.

B. Case History

In various degrees, all courts have, at times, been reluctant to admit unique scientific testimony.⁵² For example, the use of fingerprints as a means of identification was itself subject to doubt and speculation, even though it existed prior to the time of Christ.⁵³ Though universally accepted now, fingerprints as a means of identification, just like DNA profiling, had to make their appearance in some court for the first time.⁵⁴ "As with most scientific phenomena, the passage of time can serve, as it has in fingerprinting, to demonstrate the reliability and acceptance of a once speculative and unproved premise. Thus, the novelty of a chosen technique does not justify rejecting its admissibility into evidence."⁵⁵

The foundation of any case addressing new scientific techniques, such as DNA profiling, is the issue of whether expert testimony may be admitted. When dealing with a new scientific technique, most courts begin with an analysis of *Frye v. United States*.⁵⁶ The court in *Frye* recognized that "[j]ust when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define."⁵⁷

The general rule derived from *Frye* is that before a new scientific technique can be admitted as evidence at trial, the technique

51. For a more complete description of the RFLP process, see Thompson & Ford, *supra* note 7, at 64-76.

52. *State v. Bullard*, 312 N.C. 129, 146, 322 S.E.2d 370, 379 (1984).

53. *Id.* at 146, 322 S.E.2d at 379-80.

54. *Id.* at 146, 322 S.E.2d at 380.

55. *Id.*

56. 293 F. 1013 (D.C. Cir. 1923). This case involved a systolic pressure deception test. The test is based on the theory that truth is spontaneous and results without conscious effort, while the utterance of a falsehood does require a conscious effort. It was believed that this conscious effort is reflected in the raising of blood pressure which can then be measured. *Id.* at 1014.

57. *Id.* at 1014.

"must be sufficiently established to have gained general acceptance in the particular field in which it belongs."⁵⁸ In interpreting the *Frye* test, the Minnesota court stated that "the results of mechanical or scientific testing are not admissible unless the testing has developed or improved to the point where experts in the field widely share the view that the results are scientifically reliable as accurate."⁵⁹ Many states adhere to the *Frye* test when determining whether a new scientific method of evidence should be admitted into court, while other courts have developed their own test.

1. Jurisdictions Adhering To *Frye*

a. New York: *People v. Shi Fu Huang*⁶⁰

New York adheres to the standard for admissibility set forth in *Frye*.⁶¹ In addressing the issue of the admissibility of scientific evidence pertaining to DNA, the *Shi Fu Huang* court stated that the decision to allow evidence of DNA profiling "is of vital importance since it has a significant potential for influencing a jury and greatly increases the likelihood of an erroneous verdict."⁶² The court held that DNA profiling procedures have gained general acceptance in the scientific community, thereby passing the *Frye* test.⁶³

b. West Virginia: *State v. Woodall*⁶⁴

After determining that West Virginia follows the rule estab-

58. *Id.*

59. *State v. Mack*, 292 N.W.2d 764, 768 (Minn. 1980) (the court held that a previously hypnotized witness could not testify in a criminal case concerning the subject matter adduced at the pretrial hypnotic interview).

60. 145 Misc. 2d 513, 546 N.Y.S.2d 920 (1989). The defendant in this case was indicted for second-degree murder and second-degree burglary. At the time of the trial, no appellate court in New York had ruled on the admissibility of DNA evidence. The defendant was of Chinese origin, which greatly decreased the size of the data base. The State's witness testified that the data base of an individual possessing the banding pattern of the sample taken from the victim would occur in roughly one in twenty billion individuals. This is a much larger probability than in the case of a white male. The world population is only five billion people. *Id.* at 517, 546 N.Y.S.2d at 922.

61. *Id.* at 514, 546 N.Y.S.2d at 920.

62. *Id.*

63. *Id.* at 515, 546 N.Y.S.2d at 921. See also *supra* note 51 and accompanying text concerning DNA profiling procedures.

64. 385 S.E.2d 253 (W. Va. 1989). The defendant in this case was convicted

lished in *Frye*, the *Woodall* court held that the reliability of DNA profiling tests are now generally accepted by geneticist, biochemists, and the like.⁶⁵ The court went on to state that a *Frye* hearing⁶⁶ for judicial notice of reliability will no longer be required in West Virginia.⁶⁷

c. *Texas: Glover v. State*⁶⁸

Although never specifically adopting the *Frye* test, the *Glover* court held that it would apply the *Frye* test when addressing the admissibility of DNA profiling.⁶⁹ After looking at other jurisdictions, the court concluded that the DNA profiling "its underlying principles, procedures and technology - is a scientific test that is reliable and has gained general acceptance in the community in the particular fields in which it belongs" thereby passing the *Frye* test.⁷⁰

2. *Jurisdictions Not Adhering To Frye*

a. *Florida: Andrews v. State*⁷¹

After an extensive review of the relevant case law, the *Andrews* court concluded that the *Frye* test had not been adopted by

of first-degree sexual abuse, kidnapping, and aggravated robbery. At the time of the trial, no state's highest court had yet considered the use of DNA profile testing. The test performed proved to be inconclusive, therefore, "[n]o conclusion can be reached concerning the origin of the DNA" taken from the semen samples. *Id.* at 260. See also *infra* notes 168-74 and accompanying text.

65. *Woodall*, 385 S.E.2d at 260.

66. The *Frye* hearing is a voir dire hearing conducted to determine the admissibility of DNA evidence. During this voir dire, evidence is introduced to establish that the new scientific method passes the *Frye* test.

67. *Woodall*, 385 S.E.2d at 260.

68. 787 S.W.2d 544 (Tex. Ct. App. 1990). In this case of first impression, the defendant was convicted of aggravated assault. The DNA samples of the victim and the defendant matched. State's witness testified that the chances that the attacker's DNA matched a person other than the defendant was one in eighteen billion. *Id.* at 547. See also *infra* notes 179-81 and accompanying text.

69. *Glover*, 787 S.W.2d at 547.

70. *Id.* at 548.

71. 533 So. 2d 841 (Fla. Dist. Ct. App. 1988), *review denied*, 542 So. 2d 1332 (Fla. 1989). Here, defendant was convicted of aggravated battery, sexual battery, and armed burglary of a dwelling. At the time of this case, no other appellate decision had addressed the admission of DNA identification evidence in a criminal case. *Id.* at 843. See also *infra* notes 163-67 and accompanying text.

the Florida courts.⁷² The court preferred to adopt a "relevancy approach," admitted the evidence and concluded that the DNA profiling evidence "would meet the *Frye* standard, as well as the relevancy test."⁷³

b. *Virginia: Spencer v. Commonwealth*⁷⁴

The Virginia Supreme Court recently rejected the adoption of the *Frye* test in favor of a test requiring the new procedure to be a "reliable scientific technique."⁷⁵ After concluding that the DNA profiling was properly admitted, the *Spencer* Court went further stating that, "even if *Frye* were the test in Virginia, DNA profiling would meet that test."⁷⁶

c. *Minnesota: State v. Schwartz*⁷⁷

Minnesota has rephrased the *Frye* test to require that experts in the field generally agree that the evidence is reliable and trust-

72. *Andrews*, 533 So. 2d at 843.

73. *Id.* at 847 n.6 (the relevancy test used was the State rule equivalent to Rule 403 of the Federal Rules of Evidence).

74. 238 Va. 275, 384 S.E.2d 775 (1989), *cert. denied*, ___ U.S. ___, 110 S.Ct. 759 (1990). In this case, the defendant was convicted of capital murder and rape. The defendant acknowledged that the DNA tests are accepted "as reliable within the scientific community" and that he "was unable to find or produce one qualified expert to debunk either the theory of DNA printing or the statistics generated therefrom." *Id.* at 289, 384 S.E.2d at 783. The defendant conceded that "the trial court had little choice but to accept the DNA printing evidence," but contended that the court "should hold off until another day any decision that DNA printing is acceptable evidence in the courts of Virginia." *Id.* at 289-90, 384 S.E.2d at 783. *See also infra* notes 175-78 and accompanying text.

75. *Spencer*, 238 Va. at 290, 384 S.E.2d at 783 (without regard to acceptance in the scientific community).

76. *Id.* at 290 n.10, 384 S.E.2d at 783 n.10.

77. 447 N.W.2d 422 (Minn. 1989). In this case, the trial court granted State's motion to admit DNA testing evidence. The trial judge then certified questions of admissibility to the court of appeals. The court of appeals, in turn, certified the same questions to the Supreme Court of Minnesota. The relevant questions were:

1. In determining the admissibility of emerging scientific testing, is a trial court to rely on the *Frye* standard of general acceptability in the scientific community or the relevancy approach derived from Rules of Evidence 403 and 702?

2. May evidence of DNA Fingerprinting test results be admissible in a criminal proceeding?

Id. at 423.

worthy.⁷⁸ The *Schwartz* court urged that this standard “facilitates more objective and uniform rulings” than an approach that would treat new scientific evidence like any other expert opinion evidence.⁷⁹ The court went on to reaffirm the admissibility of new scientific evidence based on the rephrased *Frye* standard.⁸⁰ The court also agreed that DNA profile typing has gained general acceptance in the scientific community which would also pass the *Frye* standard.⁸¹

d. *South Carolina: State v. Ford*⁸²

South Carolina has never specifically adopted the *Frye* test but has adopted a less restrictive standard in regard to the admissibility of new scientific evidence.⁸³ It appears that South Carolina’s test requires that the experts apply “scientifically and professionally established techniques to the solution of a particular problem.”⁸⁴ The *Ford* court concluded that the RFLP analysis and test results would be admissible under their standard, as well as, under the *Frye* standard.⁸⁵

3. *North Carolina’s Frye Test*

North Carolina does not adhere exclusively to the *Frye* formula.⁸⁶ Instead, North Carolina allows the admission of a new scientific method of proof if the method is sufficiently reliable.⁸⁷

78. *Id.* at 424.

79. *Id.*

80. *Id.*

81. *Id.* at 428 (thus, the “DNA Fingerprinting” test results were admitted).

82. ___ S.C. ___, 392 S.E.2d 781 (1990). In this case, the defendant was convicted of conspiracy, kidnapping, and criminal sexual conduct in the first-degree. See also *infra* notes 182-85 and accompanying text.

83. *Ford*, ___ S.C. at ___, 392 S.E.2d at 783.

84. *Id.* See also *State v. Jones*, 273 S.C. 723, 259 S.E.2d 120 (1979). Defendants were convicted of kidnapping, rape, armed robbery, and assault with intent to kill. They appealed, inter alia, on the admission of “bite-mark” expert opinion evidence. The court stated that in this case, admissibility depends upon “the degree to which the trier of fact must accept, on faith, scientific hypotheses not capable of proof or disproof in court and not even generally accepted outside the courtroom.” *Id.* at 728, 259 S.E.2d at 124 (quoting *People v. Marx*, 54 Cal. App. 3d 100, 126 Cal. Rptr. 350 (1975)).

85. *Ford*, ___ S.C. at ___, 392 S.E.2d at 784.

86. *State v. Pennington*, 327 N.C. 89, 98, 393 S.E.2d 847, 852 (1990).

87. *State v. Bullard*, 312 N.C. 129, 148, 322 S.E.2d 370, 381 (1984). See *infra*

Expert testimony of a novel scientific method of gunshot residue testing was admitted in *State v. Crowder*.⁸⁸ In determining the reliability of the test, the court considered the expert's professed experience in the field, his presentation of technical papers on the subject, and his independent research.⁸⁹ The court concluded that these facts rendered his testimony both reliable and competent.⁹⁰

In *State v. Temple*,⁹¹ the court addressed the first impression question of the admissibility of bite mark identification.⁹² The court declared that a new scientific method should be admitted where its "demonstrated accuracy and reliability has [sic] become established and recognized."⁹³ The court stated that "[j]ustice is truth in action, and any instrumentality, which aids justice in the ascertainment of truth, should be embraced without delay."⁹⁴

The new scientific method of hypnotically refreshed testimony was found to be too unreliable to be used as evidence in a judicial setting in *State v. Peoples*.⁹⁵ After review of the large amount of literature on the topic, the *Peoples'* court found that scientists agreed that there were a number of flaws which existed in the method of producing hypnotically refreshed testimony.⁹⁶ Although North Carolina has not specifically adopted the *Frye* test, the courts have used the theory underlying the test. The *Peoples'*

notes 108-28 and accompanying text.

88. 285 N.C. 42, 55, 203 S.E.2d 38, 47 (1974).

89. *Id.* at 53-54, 203 S.E.2d at 46.

90. *Id.* at 55, 203 S.E.2d at 47.

91. 302 N.C. 1, 273 S.E.2d 273 (1981).

92. *Id.* at 11, 273 S.E.2d at 279 (the new scientific method of bite mark identification was determined to be established in the field of Forensic Odontology). See also, Note, *Criminal Law-Expert Testimony on Bite Marks - State v. Temple*, 4 CAMPBELL L. REV. 179 (1982).

93. *Temple*, 302 N.C. at 12, 273 S.E.2d at 280 (1981) (quoting *Toms v. State*, 95 Okla. Crim. 60, 69, 239 P.2d 812, 821 (1952)) (the defendant was convicted of drunk driving and the court held that drunkometer evidence was admissible as a new scientific method).

94. *Id.* at 12, 273 S.E.2d at 280 (quoting *Toms v. State*, 95 Okla. Crim. 60, 69, 239 P.2d 812, 821 (1952)). In *Toms*, the court stated that "[a]ny instrumentality, which aids justice in the ascertainment of truth, should be embraced without delay," but the court noted that this is not within the court's power, but within the legislature's. *Toms*, 95 Okla. Crim. at 69, 239 P.2d at 821. See also *State v. Gray*, 292 N.C. 270, 284, 233 S.E.2d 905, 914 (1977) (court admitted new scientific tests that identified blood groupings from use of body fluids other than blood).

95. 311 N.C. 515, 532, 319 S.E.2d 177, 187 (1984). See also *infra* notes 120-24 and accompanying text.

96. *Id.* at 520, 319 S.E.2d at 180.

court took notice that other jurisdictions which apply the *Frye* test have found hypnotically refreshed testimony to be inadmissible.⁹⁷ The court stressed the "lack of general scientific recognition as a major factor in our decision."⁹⁸

ANALYSIS

In *State v. Pennington*, the North Carolina Supreme Court held that evidence of DNA profile testing was admissible.⁹⁹ The court adopted a revised *Frye* test after examination of the relevant case law in North Carolina.¹⁰⁰ After deciding that North Carolina does not adhere exclusively to the *Frye* standard, the court established four indices to determine the reliability of a scientific method.¹⁰¹ The court also agreed with the district court's conclusion that "the test sample in this case is reliable and that it is based on scientifically established scientific methods which have a general acceptance within the field of microbiology and molecular biology."¹⁰²

The court recognized the general acceptance of DNA profiling as reliable in other jurisdictions, as well as the criticisms presented by commentators.¹⁰³ The court stated that the *Pennington* decision should not be interpreted to mean that DNA testing results should always be admissible.¹⁰⁴

A. *The Inquiry Underlying Frye*

In the lower court, the defendant filed a motion in limine seeking to prohibit the State from introducing into evidence any

97. *Id.* at 532, 319 S.E.2d at 187.

98. *Id.* at 533, 319 S.E.2d at 187 (citing *State v. Grier*, 307 N.C. 628, 638, 300 S.E.2d 351, 356 (1983)) (defendant was convicted of burglary and rape and the court held that polygraph evidence is no longer admissible in any trial, even if it is stipulated to by the parties).

99. *State v. Pennington*, 327 N.C. 89, 100, 393 S.E.2d 847, 854 (1990).

100. *Id.* at 98, 393 S.E.2d at 852. See *supra* notes 86-98 and accompanying text.

101. *Id.* at 98, 393 S.E.2d at 852-53 (these indices were derived from *State v. Bullard*, 312 N.C. 129, 322 S.E.2d 370 (1984)). See *infra* notes 127-59 and accompanying text.

102. *Id.* at 99-100, 393 S.E.2d at 853.

103. *Pennington*, 327 N.C. 89, 100-01, 393 S.E.2d 847, 854 (1990). See *infra* notes 186-99 and accompanying text.

104. *Pennington*, 327 N.C. at 101, 393 S.E.2d at 854. See *infra* notes 200-10 and accompanying text.

results obtained from the DNA profile testing conducted by Cellmark.¹⁰⁵ After a lengthy voir dire, the trial court denied the defendant's motion to exclude the evidence.¹⁰⁶ The defendant in *Pennington* argued to the supreme court that DNA profiling is insufficiently reliable, thereby assigning error to the lower court's admission of this evidence.¹⁰⁷

The *Pennington* court relied heavily upon *State v. Bullard*¹⁰⁸ for their determination of the reliability of the new scientific evidence. In *Bullard*, the defendant was charged with murder.¹⁰⁹ The crucial issue on appeal in *Bullard* was whether the trial court improperly allowed a physical anthropologist to testify as an expert in the identification of a bloody bare footprint.¹¹⁰ In this case of first impression, the court concluded that the trial court correctly allowed the expert testimony and opinion.¹¹¹

The new scientific technique involved in *Bullard* was the comparison of known and unknown bare footprints by size and shape, without relying on rigid detail.¹¹² The defendant's main contention of error was based on the fact that the expert's technique was unprecedented in North Carolina, as well as in the United States.¹¹³

The *Bullard* court stated that "[i]t is undisputed that expert testimony is properly admissible when such testimony can assist the jury to draw certain inferences from facts because the expert is better qualified."¹¹⁴ The defendant in *Bullard* urged the court to make an independent determination that the methods used were reliable, sufficiently established, and have gained general accept-

105. *Pennington*, 327 N.C. at 98, 393 S.E.2d at 852.

106. *Id.*

107. *Id.*

108. 312 N.C. 129, 322 S.E.2d 370 (1984).

109. *Id.* at 131, 322 S.E.2d at 371.

110. *Id.* at 132, 322 S.E.2d at 371-72.

111. *Id.* at 153-54, 322 S.E.2d at 384.

112. *Id.* at 135, 322 S.E.2d at 373. See also *State v. Rogers*, 233 N.C. 390, 64 S.E.2d 572 (1951) (comparison of a bare footprint with that of defendant's, by the use of detailed comparison of the distinguishing points of the footprint).

113. *State v. Bullard*, 312 N.C. 129, 137, 322 S.E.2d 370, 374 (1984).

114. *Id.* at 139, 322 S.E.2d at 376 (citing *Cogdill v. Highway Comm'n*, 279 N.C. 313, 182 S.E.2d 373 (1971)). In this inverse condemnation action, the court found the refusal to allow expert testimony to be error. Expert in hydraulic engineering and design had made studies of the effect of highway fill on flooding of quarries. He thus should have been allowed to express his opinion as to the cause of flooding, which was the nature of the condemnation. *Cogdill*, 279 N.C. at 327, 182 S.E.2d at 381.

ance within the field.¹¹⁵ The court rejected this strict *Frye* standard.¹¹⁶ The court affirmed the admission of the expert's testimony which could be considered sufficiently reliable by the use of visual aids in making observable visual comparisons before the jury.¹¹⁷ On this theory, the *Pennington* court admitted the evidence.

The *Pennington* court also relied on Brandis on North Carolina Evidence.¹¹⁸ The treatise states the general rule that, "when no specific precedent exists, scientifically accepted reliability justifies admission of the testimony of qualified witnesses, and such reliability may be found either by judicial notice or from the testimony of scientists who are experts in the subject matter, or a combination to the two."¹¹⁹

The *Pennington* court was aware of problems in the admission of scientific evidence. In *State v. Peoples*,¹²⁰ the court rejected the admission of hypnotically refreshed testimony due to the inherent problems in the process.¹²¹ The court felt that hypnotically refreshed testimony is "simply too unreliable to be used as evidence in a judicial setting."¹²² The court stated that although North Carolina has not specifically adopted the *Frye* standard, the courts have used the underlying theory of *Frye*.¹²³ The court noted that the polygraph has not yet attained scientific acceptance as a reliable and accurate means of ascertaining truth and deception.¹²⁴

The *Pennington* court stated that the acceptance of a new scientific method within the field is one index of reliability, though not the exclusive index.¹²⁵ The court stated "that the inquiry underlying the *Frye* formula is one of the reliability of the scientific method rather than its popularity within a scientific community . . ."

¹²⁶

115. *Bullard*, 312 N.C. at 144, 322 S.E.2d at 379.

116. *Id.* at 147, 322 S.E.2d at 380.

117. *Id.* at 153, 322 S.E.2d at 384 (the court is attempting to distinguish this type of testimony from expert testimony as to polygraph and hypnotic testimony). See also *infra* notes 133, 149-53 and accompanying text.

118. 1 BRANDIS ON NORTH CAROLINA EVIDENCE § 86 at 385 (1988).

119. *Id.*

120. 311 N.C. 515, 319 S.E.2d 177 (1984). See also *supra* notes 95-98 and *infra* notes 133, 149-153 and accompanying text.

121. *Id.* at 532, 319 S.E.2d at 187.

122. *Id.*

123. *Id.*

124. *Id.* at 533, 319 S.E.2d at 188.

125. *State v. Pennington*, 327 N.C. 89, 98, 393 S.E.2d 847, 852 (1990).

126. *Id.*

The court laid out a list of indices of reliability derived from *Bullard*.¹²⁷ These indices are: the expert's use of established techniques, the expert's professional background in the field, the expert's use of visual aids, and independent research conducted by the expert.¹²⁸

1. *Expert's Use Of Established Techniques*

The court found the expert's use of established techniques as an index of reliability.¹²⁹ The purpose of this index would be to meet North Carolina's revised *Frye* standard. This standard only requires that the method used be an established technique. In contrast, the *Frye* standard requires that the technique be "sufficiently established to have gained general acceptance in the particular field in which it belongs."¹³⁰

In general, the theory underlying DNA profile typing is not controversial.¹³¹ The theories are so well accepted that its accuracy is unlikely even to be raised at a hearing on the admissibility of the tests.¹³² In requiring that the test be reliable, the court is attempting to distinguish a credible test from tests such as hypnosis and the polygraph. These tests have "not yet attained scientific acceptance as a reliable and accurate means of ascertaining truth or deception."¹³³

The established technique requirement does distinguish DNA profiling from hypnosis and polygraph testing. In contrast to these types of tests, "DNA print identification appears [to be] based on proven scientific principles."¹³⁴

127. *Id.*

128. *Id.*

129. *Id.*

130. *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923). *See also supra* notes 56-59 and accompanying text.

131. *Thompson & Ford, supra* note 7, at 60.

132. *Id.*

133. *State v. Foye*, 254 N.C. 704, 708, 120 S.E.2d 169, 172 (1961). *See also State v. Peoples*, 311 N.C. 515, 532, 319 S.E.2d 177, 187 (1984); *State v. Grier*, 307 N.C. 628, 300 S.E.2d 351 (1983). *See also supra* notes 95-98 and accompanying text.

134. *Andrews v. State*, 533 So. 2d 841, 850 (Fla. Dist. Ct. App. 1988), *review denied*, 542 So. 2d 1332 (Fla. 1989).

2. *Expert's Professional Background in the Field*

The court also established the expert's professional background in the field as an index of reliability.¹³⁵ DNA tests are so complex and technical that courts often cannot independently assess their reliability.¹³⁶ Instead, the court must depend on expert testimony.¹³⁷ Courts will generally not evaluate the content of the testimony on DNA but instead, require that the expert be highly qualified.¹³⁸ In general, there are two types of experts who testify as to the reliability of DNA testing: molecular biologists from the laboratories that perform the DNA tests and molecular biologists from the academic community.¹³⁹

The first type of expert, the molecular biologist from the laboratory, is certainly familiar with the laboratory facilities, the testing standards, and the type of test used.¹⁴⁰ However, he has a personal interest in the judicial acceptance of DNA testing, his testimony is therefore susceptible to charges of bias.¹⁴¹

The molecular biologist from the academic community does not have the same financial interest in DNA acceptance.¹⁴² This expert has the necessary background to evaluate the procedures and their acceptance in the community; but, the expert lacks the first-hand knowledge and experience of the laboratory expert.¹⁴³ Obviously, the combined testimony of the two experts minimizes the effects of biased testimony¹⁴⁴ and would therefore effect the purpose of this index.

In *Pennington*, the trial court heard from three State's witnesses.¹⁴⁵ Dr. Herrin was a staff scientist employed by Cellmark for a year and a half.¹⁴⁶ Wesley Kloos was a professor of genetics and microbiology at North Carolina State University.¹⁴⁷ These experts

135. *State v. Pennington*, 327 N.C. 89, 98, 393 S.E.2d 847, 852-53 (1990).

136. Comment, *DNA Identification Tests and the Courts*, 63 WASH. L. REV. 903, 940 (1988).

137. *Id.*

138. *Id.*

139. *Id.*

140. *Id.* at 940-41.

141. *Id.* at 941. See also Thompson & Ford, *supra* note 7, at 59.

142. Comment, *supra* note 136, at 941.

143. *Id.* at 941-42.

144. *Id.* at 942-43.

145. *State v. Pennington*, 327 N.C. 89, 98-99, 393 S.E.2d 847, 853 (1990).

146. *Id.* at 99, 393 S.E.2d at 849.

147. *Id.*

represented the two types of experts, molecular biologists from the laboratories and molecular biologists from the academic community. The third State witness was a hybrid expert. Michael DeGuglielmo was a forensic serologist with the State Bureau of Investigation and had visited Cellmark and observed its laboratory procedures.¹⁴⁸ These three State witnesses, taken together, appear to effectuate the purpose of this index.

3. *Expert's Use of Visual Aids*

The court also listed the expert's use of visual aids as an index of reliability.¹⁴⁹ The purpose of this index is "that the jury is not asked to sacrifice its independence by accepting [the] scientific hypothesis on faith."¹⁵⁰ Again it must be noted that DNA tests are very technical.¹⁵¹ Use of visual aids alone does not guarantee, in all circumstances, that a jury will not sacrifice its independent judgment. However, use of visual aids will allow the jury to verify the expert's findings.¹⁵²

In *Pennington*, Dr. Herrin made every attempt to explain DNA in simple language and used several visual aids to assist the jury in their understanding.¹⁵³ It appears that the use of visual aids may also meet the purpose of an index for reliability.

4. *Independent Research Conducted By The Expert*

The court also established that the independent research conducted by the expert could be used as an index of reliability.¹⁵⁴ The purpose of this index is most likely to require that the expert be competent in the field. It appears that this index goes more to the credibility of the expert than the reliability of the new scientific method. The major issue concerning the admissibility of DNA profile typing evidence is whether the specific test can employ the

148. *Id.* at 98, 393 S.E.2d at 853.

149. *Id.* at 98, 393 S.E.2d at 852-53.

150. *Id.* (citing *State v. Bullard*, 312 N.C. 129, 150-51, 322 S.E.2d 370, 382 (1984)). The court was attempting to distinguish this case from hypnosis and polygraph cases which have held such evidence inadmissible due to the lack of the expert's use of visual aids. See *supra* notes 108-17, 120-24, 133 and accompanying text.

151. Comment, *DNA Identification*, *supra* note 136, at 940.

152. *State v. Bullard*, 312 N.C. 129, 153, 322 S.E.2d 370, 384 (1984).

153. *State v. Pennington*, 327 N.C. 89, 100, 393 S.E.2d 847, 854 (1990).

154. *Id.* at 98, 393 S.E.2d at 852-53.

generally accepted principles underlying the DNA profiling in the forensic setting.¹⁵⁵ Courts will generally look at three sources to determine reliability, these are: "Expert testimony from the relevant scientific community, scientific and legal writings, and judicial opinions from other jurisdictions."¹⁵⁶ This index goes to the first of these three sources and is exhibited by all three of the State's witnesses in *Pennington*. Michael DeGuglielmo visited Cellmark and observed its laboratory procedures.¹⁵⁷ Wesley Kloos worked with techniques aimed at isolating and extracting DNA for twenty-two years, although the specific probes and techniques used by Cellmark were only described in 1985.¹⁵⁸ Dr. Herrin was employed by Cellmark for a year and a half, which constitutes independent research.¹⁵⁹ Although this index appears to focus on the credibility of the witness rather than the reliability of the test, when all four indices are taken together, they appear to demonstrate the reliability of a new scientific technique.

B. *The Decisions Of Other Jurisdictions*

After concluding that the above indices of reliability address the inquiry underlying *Frye*,¹⁶⁰ the *Pennington* court then considered the decisions of other jurisdictions.¹⁶¹ While other jurisdictions may use different methods or tests, they all have come to the same conclusion.¹⁶²

1. *Florida: Andrews v. State*¹⁶³

Andrews v. State was the first appellate decision addressing the admissibility of DNA identification evidence in a criminal case.¹⁶⁴ The *Andrews* court stated the rule that where "a form of scientific expertise has no established 'track record' in litigation, courts may look to a variety of factors that may bear on the relia-

155. Comment, *supra* note 136, at 939.

156. *Id.*

157. *State v. Pennington*, 327 N.C. 89, 98, 393 S.E.2d 847, 853 (1990).

158. *Id.* at 99, 393 S.E.2d at 853.

159. *Id.*

160. *Id.* at 98, 393 S.E.2d at 852-53.

161. *Id.* at 100, 393 S.E.2d at 854.

162. *See supra* notes 71-85.

163. 533 So. 2d 841 (Fla. Dist. Ct. App. 1988), *review denied*, 542 So. 2d 1332 (Fla. 1989). *See supra* notes 71-73 and accompanying text.

164. *Andrews*, 533 So. 2d at 850 n.10.

bility of the evidence."¹⁶⁵ These factors include the novelty of the new technique, like its relationship to more established modes of scientific analysis, specialized literature dealing with the technique, the qualifications and professional stature of the experts, and the nonjudicial uses to which the techniques are put.¹⁶⁶ After deciding that these factors are met, the *Andrews* court then declared that the probative value of the testimony and test was substantially outweighed by their prejudicial effect.¹⁶⁷

2. *West Virginia: State v. Woodall*¹⁶⁸

At the time of *State v. Woodall*, the use of DNA forensic testing had not been considered by the highest court in any state.¹⁶⁹ The *Woodall* court determined that *Frye* was the proper standard in West Virginia.¹⁷⁰ The court found that "the reliability of these tests is now generally accepted by geneticist, biochemist, and the like" and that no *Frye* hearing would be required in the future for judicial notice of its reliability.¹⁷¹ As in *Pennington*, the *Woodall* court stressed that DNA tests would not always be admitted.¹⁷² The court determined that under these facts, the DNA test was inadmissible due to the fact that the laboratory was unable to isolate a DNA print from the semen sample.¹⁷³ Since there was nothing to compare with defendant's DNA print, the evidence did not

165. *Id.* at 847 (citing *United States v. Downing*, 753 F.2d 1224, 1238 (3d Cir. 1985)). In *Downing*, the court interpreted Rule 702 of the Federal Rules of Evidence to require a district court to look at certain factors when ruling upon the admission of novel scientific evidence. These preliminary inquiries are:

(1) the soundness and reliability of the process or technique used in generating the evidence, (2) the possibility that admitting the evidence would over-whelm, confuse, or mislead the jury, and (3) the proffered connection between the scientific research or test result to be presented, and the particular disputed factual issues in the case.

Downing, 753 F.2d at 1237 (3d Cir. 1985).

166. *Andrews*, 533 So. 2d at 847 (Fla. Dist. Ct. App. 1988), *review denied*, 542 So. 2d at 1332 (Fla. 1989) (citing *Downing*, 753 F.2d at 1238-39).

167. *Id.* at 849-50.

168. 385 S.E.2d 253 (W. Va. 1989). *See supra* notes 64-67 and accompanying text.

169. *Woodall*, 385 S.E.2d at 259.

170. *Id.* at 259-60. *See supra* notes 64-67 and accompanying text.

171. *Woodall*, 385 S.E.2d at 260.

172. *Id.*

173. *Id.*

meet the general relevance test adopted by West Virginia.¹⁷⁴

3. Virginia: *Spencer v. Commonwealth*¹⁷⁵

The *Spencer* court stated that "DNA print identification is based upon several well-accepted scientific principles."¹⁷⁶ The defendant in *Spencer* acknowledged that DNA tests are accepted "as reliable within the scientific community" and was unable to debunk either the theory of DNA printing or the statistics generated therefrom.¹⁷⁷ The *Spencer* court stated that even though *Frye* is not the standard in Virginia, it would nonetheless meet the *Frye* test as well the Virginia test.¹⁷⁸

4. Texas: *Glover v. State*¹⁷⁹

The *Glover* court stated that Texas has never specifically adopted the *Frye* test, but does in this case.¹⁸⁰ The State proffered uncontradicted expert testimony that the DNA identification process holds and enjoys a general acceptance in the scientific community in the particular field in which it belongs, but fails to mention what these fields are.¹⁸¹

5. South Carolina: *State v. Ford*¹⁸²

The *Ford* court stated that South Carolina does not adhere to the *Frye* standard, but adheres to a less restrictive standard.¹⁸³ The State proffered uncontradicted evidence as to quality control and use of the DNA profile testing as generally accepted; defend-

174. *Id.*

175. 238 Va. 275, 384 S.E.2d 775 (1989), *cert. denied* ____ U.S. ____, 110 S. Ct. 759 (1990). See *supra* notes 74-76 and accompanying text.

176. *Spencer*, 238 Va. at 286, 384 S.E.2d at 781.

177. *Id.* at 289, 384 S.E.2d at 783.

178. *Id.* at 289 n.10, 384 S.E.2d at 783 n.10. The Virginia court requires the new scientific procedure to be a "reliable scientific technique[.]" without regard to acceptance in the scientific community. *Id.* at 290, 384 S.E.2d at 783.

179. 787 S.W.2d 544 (Tex. Ct. App. 1990). See *supra* notes 68-70 and accompanying text.

180. *Glover*, 787 S.W.2d at 547.

181. *Id.* at 548.

182. ____ S.C. ____, 392 S.E.2d 781 (1990). See *supra* notes 82-85 and accompanying text.

183. *Ford*, ____ S.C. at ____, 392 S.E.2d at 783.

ant maintained that the process as a whole had not been found to be reliable and accepted in the scientific community.¹⁸⁴ The *Ford* court held to the contrary, but warned that DNA test results should not always be admitted into evidence.¹⁸⁵

C. Criticisms

While North Carolina follows the decision of other courts, the *Pennington* court stated that it was aware of criticisms by commentators.¹⁸⁶ There are several criticisms or general factors to be considered in determining the probative value of DNA profiling evidence.¹⁸⁷

The first criticism, and most detrimental, is the possibility of a coincidental match or the likelihood that two unrelated individuals will have the same DNA type.¹⁸⁸ While it is true that no two individuals (except identical twins) have the same DNA type, it is possible that two unrelated individuals may have the same DNA type with regard to the section of DNA examined.¹⁸⁹

A second criticism to consider is the possibility of an incorrect result arising from laboratory error or contamination of the sample.¹⁹⁰ Not only may a sample be contaminated during the complicated laboratory procedure, but biological specimens may be contaminated with other fluids at the crime scene.¹⁹¹ The laboratory environment and the procedures therein, are not foolproof.¹⁹² Fortunately, most of these types of problems would provide only unintelligible results or cause one to overlook a correct match.¹⁹³

A third criticism to consider is the possibility of an "erroneous call" by a laboratory analyst.¹⁹⁴ Due to the fact that DNA test re-

184. *Id.*

185. *Id.* at ____, 392 S.E.2d at 784. Here, the court stated that "[t]he defense may challenge the admissibility of the evidence through the use of various procedural methods such as a motion to suppress or a motion in limine or the evidence may be challenged during trial." *Id.*

186. *State v. Pennington*, 327 N.C. 89, 100-01, 393 S.E.2d 847, 854 (1990).

187. *Thompson & Ford*, *supra* note 7, at 80-81.

188. *Id.* at 80.

189. *Id.*

190. *Id.*

191. *Id.*

192. *Hoeffel*, *supra* note 6, at 480.

193. *Thompson & Ford*, *supra* note 7, at 80. *See also* *Hoeffel*, *supra* note 6, at 519-38, for a more in depth discussion of these criticisms.

194. *Thompson & Ford*, *supra* note 7, at 88.

sults are at times ambiguous or difficult to interpret, the analyst may err in the interpretation of those results.¹⁹⁵ Visual matching is also a subjective process which is particularly susceptible to examiner bias.¹⁹⁶ An error in this judgement may cause two different DNA types to be mistaken for a match.¹⁹⁷

In *Pennington*, Dr. Herrin explained to the jury that "the DNA extracted from a man's blood cells is identical to the DNA extracted from his sperm cells."¹⁹⁸ Contrary to this proposition, it has been stated that:

Because each person receives half of his or her genetic material from each parent, sperm and ova cells contain only half as much DNA as other body cells. Each sperm cell in a semen sample will contain only half of a man's chromosomal complement, drawn at random from his entire genome.¹⁹⁹

Although this criticism focuses primarily upon the reliability of the testimony, as opposed to the reliability of the test, it may raise some doubts as to its reliability. This criticism is why the *Pennington* court left certain areas of this issue subject to attack.

D. Subject To Attack

The *Pennington* court held that evidence of DNA profile testing is generally admissible and was admissible in this case.²⁰⁰ The court further stated that this decision should not be interpreted to mean that DNA test results should always be admitted into evidence.²⁰¹ The *Pennington* court, following precedent set by other jurisdictions,²⁰² left certain areas open for attack by the defend-

195. *Id.*

196. Hoeffel, *supra* note 6, at 485.

197. Thompson & Ford, *supra* note 7, at 88. See also *State v. Schwartz*, 447 N.W.2d 422, 426 (Minn. 1989). In *Schwartz*, the court was troubled by the fact that one of the DNA testing companies admitted having "falsely identified two samples as coming from the same subject" during a test conducted by the California Association of Crime Laboratory Directors. *Schwartz*, 447 N.W.2d at 426.

198. *State v. Pennington*, 327 N.C. 89, 93, 393 S.E.2d 847, 849-50 (1990).

199. Burk, *supra* note 39, at 469-70.

200. *Pennington*, 327 N.C. at 101, 393 S.E.2d at 854 (1990).

201. *Id.*

202. See *State v. Ford*, ___ S.C. ___, ___ 392 S.E.2d 781, 784 (1990), *Glover v. State*; 787 S.W.2d 544, 549 (Tex. Ct. App. 1990); *State v. Woodall*, 385 S.E.2d 253, 260 (W. Va. 1989); *State v. Schwartz*, 447 N.W.2d 422, 428 (Minn. 1989).

ant.²⁰³ Relevancy or prejudice may be attacked, as well as traditional challenges of contamination, standards and controls used by the laboratory, and chain of title.²⁰⁴ These attacks, if persuasive, would taint evidence as unreliable and therefore, would be inadmissible.²⁰⁵

Other areas of attack were left unaddressed by the court. One such area is a constitutional challenge dealing with the right to an adequate defense.²⁰⁶ Defense attorneys are simply not equipped to debate the State's expert due to lack of requisite knowledge of this new and complicated scientific method.²⁰⁷ Another possible issue of challenge may be raised when the cost of DNA profile testing is taken into account in conjunction with the State's requirement to provide indigent defendants with the necessary tools for an effective defense.²⁰⁸

Other less persuasive arguments may also be made. Examples of these arguments include the obtaining of consent and warrants for obtaining blood samples, the Fifth Amendment right against self-incrimination, and invasion of privacy.²⁰⁹ Yet another argument may include defendant's right to a retest.²¹⁰

CONCLUSION

In *State v. Pennington*, the North Carolina Supreme Court announced that expert testimony establishing the reliability of DNA profiling tests were admissible in a prosecution for first degree rape, first degree sexual offense, and other crimes.²¹¹ After reviewing the appellate court decisions of other jurisdictions, the *Pennington* court adopted the majority view that DNA testing is reliable and generally accepted.

The court left the door open for several attacks on the reliability of DNA profile testing by the defendant in each particular case. Although not leaving clear guidance or a set standard for lower courts to follow, this decision affords the best of both worlds. This

203. *Pennington*, 327 N.C. at 101, 393 S.E.2d at 854.

204. *Id.*

205. Thompson & Ford, *supra* note 7, at 57.

206. Hoeffel, *supra* note 6, at 519.

207. *Id.* at 519-20.

208. Burk, *supra* note 39, at 470.

209. *Id.* at 470-71.

210. Hoeffel, *supra* note 6, at 523.

211. *State v. Pennington*, 327 N.C. 89, 101, 393 S.E.2d 847, 854 (1990).

decision enhances the State's interest in solving criminal cases, while leaving areas of attack open for the defendant.

W. Anthony Purcell