
Albert M.T. Finch III
INTRODUCTION


Currently, only the FBI and three commercial labs perform DNA identification. Jane Hanner, Note, DNA Fingerprinting: Evidence of the Future, 79 KY. L.J. 415, 415 n.4 (1991). The following is a list of names and addresses of those commercial labs listed in the above cited article: Lifecodes Corporation, 4 Westchester Plaza, Elmsford, NY 10523, id. at 421 n.54; Cellmark Diagnostics Corporation, 20371 Goldenrod Lane, Germantown, MD 20874, id. at 423 n.63; Cetus Corporation, 1400 53rd Street, Emeryville, CA 94608, id. at 423 n.72. As this article was being published, the Cetus Corporation merged with Chiron Corporation, and is no longer doing business under the Cetus Corporation name.

The most common form of DNA typing is known as restriction fragment length polymorphism (RFLP). Hanner, supra, at 419. This process involves several stages. Id. First, lab technicians extract the DNA from the cells of the sample and purify it. Id. Next, technicians mix the strands with restrictive enzymes which cut the strands into fragments. Id. “These enzymes cut the DNA chains at specific sites, but do not break up the repetitive DNA sequence.” Id. at 420. In other words, the enzymes do not change or disturb the repetitive order created by the four bases of the DNA molecule, adenine, thymine, guanine and cytosine. See infra note 26 and accompanying text for a discussion of the makeup of the DNA molecule. It is important not to disturb that sequence because that sequence in effect makes up the DNA print. See Hanner, supra, at 420. The technician then places the fragmented DNA into a gel and introduces an electric current into the gel which positions the fragments according to size, because the shorter fragments move across the gel faster. Id. Finally, the lab technicians, using radioactive probes, develop a piece of X-ray film, which shows dark bands representing the position of certain fragments. Id. at 421. The end result resembles a “supermarket bar code” which technicians compare to the suspect’s “bar code” to see if there is a match. Id.

Cetus Corporation uses a different procedure of DNA identification known as polymerase chain reaction (PCR). Id. at 423. PCR uses the enzyme “polymerase” to amplify target DNA sequences by creating a million or more copies of them. Hanner, supra, at 424. “A machine called a thermal cycler amplifies the DNA, which is then spotted on a filter to be tested with gene probes.” Id. By comparison to the RFLP test used by Lifecodes and Cellmark, this test requires less biological material, however, “it relies on new, less widely accepted technology.” Id. The procedure used by the FBI is similar to the
sample taken eleven years earlier from the victim's underwear.\textsuperscript{3} The test results proved the semen on the underwear did not come from Charlie Dabbs.\textsuperscript{4} Therefore, Judge Colabella overturned the conviction,\textsuperscript{5} and on August 1, 1991, Charlie Dabbs walked out of prison after nine years of incarceration due to a retroactive DNA test conducted on evidence saved from his trial.\textsuperscript{6}

The \textit{Dabbs} case illustrates the importance of preserving evidence for the application of DNA testing.\textsuperscript{7} This is the first time a court has successfully applied DNA analysis retroactively\textsuperscript{8} to test evidence saved from a crime which predated the existence of sufficient technology to conduct DNA testing.\textsuperscript{9} The preservation of the semen sample enabled Charlie Dabbs, the defendant, to exculpate himself through the use of DNA identification. Properly preserved evidence awaiting the application of future technology, in this case, proved to be worth the wait.

\begin{flushleft}
Cellmark and Lifecodes test procedure; in fact, Cellmark and Lifecodes helped the FBI develop their procedure. \textit{Id.} at 424.
\end{flushleft}

3. Cerisse Anderson, \textit{Convicted Rapist Held Entitled to DNA Test: Advance Justifies Discovery 6 Years Later}, 204 N.Y. L.J. 1 (1990). DNA testing in New York criminal trials did not begin until 1988, and appellate courts have not yet made a ruling on the admissibility of such tests. \textit{Id.} at 1. Blood antigen tests had neither proved Dabbs to be the rapist nor ruled him out as a suspect. \textit{Id.} However, the advent of DNA typing after the conviction changed the exculpatory value of the evidence. \textit{Id.} Hence, the judge ruled that where investigators have preserved evidence which has a high exculpatory potential, the defendant can discover evidence even after a conviction. \textit{Id.}

4. \textit{Id.}

5. \textit{Id.}

6. \textit{Id.} Fortunately, Westchester County stored the evidence in a freezer. Robert Derocher, \textit{Convicted Rapist Released After Genetic Fingerprint Test}, GANNETT SUBURBAN NEWSPAPERS, Aug. 1, 1991 at 1. In most cases, law enforcement personnel would have destroyed or thrown away the sample. \textit{Id.} Here, law enforcement personnel preserved the sample. \textit{Id.}

7. As illustrated in \textit{Dabbs}, DNA typing can be a reliable source to prove a perpetrator's identity and therefore, be an important forensic method which produces significant results. "Forensic science[] [is] [t]he application of scientific facts to legal problems." LORNE T. KIRBY, \textit{Glossary to DNA FINGERPRINTING: AN INTRODUCTION 331} (1990). Judge Colabella said, "[The \textit{Dabbs} case presents a graphic example of the law reacting to modern scientific advances." Derocher, \textit{supra} note 6, at 1.

8. The press adopted the term "retroactive DNA testing" to express the application of genetic fingerprinting to evidence from a crime scene which predated the technology to conduct DNA testing. \textit{See} Lisa Foderaro, \textit{DNA Frees Convicted Rapist After 9 Years}, N.Y. TIMES, Aug. 1, 1991, at B1.

9. Derocher, \textit{supra} note 6, at 1. The Gannett Suburban Newspapers believed Dabbs to be "the first man in the country freed from a conviction using DNA technology on a case before the [DNA] tests existed." \textit{Id.} The New York Times reported that Dabbs was "one of the first" persons released from a retroactive DNA test. Foderaro, \textit{supra} note 8, at B1. Lifecodes, a commercial lab which conducts DNA testing, claimed that the Dabbs reversal was the first instance a court overturned a decision based on the results of a DNA test performed after the technology became available. \textit{After Serving Seven}, \textit{supra} note 1, at 3.
However, in a similar case the wait did not prove to be worthwhile. Two weeks after the reversal of Dabbs' conviction, Miller, another man convicted of rape in New York, challenged his conviction. In this case, though, the semen samples taken from the victim were not available for retroactive DNA analysis because the samples were discarded by the police department property clerk during "year-end housecleaning." The judge found that even if the samples had been saved, no reliable DNA tests could have been obtained from them because the semen samples were placed on a shelf instead of in a freezer resulting in degraded samples from bacterial contamination. The samples could no longer be used to potentially exculpate the defendant, due to the failure of law enforcement personnel to preserve the samples.

Although the Dabbs and Miller cases were tried not more than thirty miles away from each other, each concluded differently. The actions of law enforcement personnel in the Miller case prevented the defendant, Miller, from receiving the same opportunity afforded to the defendant in the Dabbs case. This inconsistency raises a controversial issue that has come under scrutiny over the past few years, namely whether the state has a duty to preserve evidence, particularly biological specimens found at the crime scene, for DNA testing.

This Note will illustrate the importance of DNA typing and explore the possible repercussions incurred from DNA testing in criminal proceedings. First, this Note will provide general background information on DNA testing. Second, this Note will address the inherent limitations in DNA identification which have
increased the burden on police investigators collecting evidence.\textsuperscript{15} Third, this Note will consider the due process concerns related to the state's duty to preserve biological evidence and will examine the case law surrounding this issue.\textsuperscript{16} Finally, this Note will suggest possible means with which states can enforce a duty to preserve biological evidence on law enforcement personnel.\textsuperscript{17} This section will also suggest a standard that police departments should follow to determine whether their procedures for collecting and preserving evidence violate a defendant's due process rights.\textsuperscript{18}

I. THE BASICS OF DNA IDENTIFICATION

The advent\textsuperscript{19} of DNA identification\textsuperscript{20} has revolutionized the crime-solving process.\textsuperscript{21} Police investigators can now identify perpetrators with unprecedented accuracy by using biological evidence taken from the crime scene,\textsuperscript{22} including hair follicles, skin, blood or semen.\textsuperscript{23} Although DNA identification has its benefits, it also has its drawbacks.\textsuperscript{24} This section will explain the basics of DNA identification and present some of its weaknesses.

\textsuperscript{15} See infra notes 50-80 and accompanying text.
\textsuperscript{16} See infra notes 81-143 and accompanying text.
\textsuperscript{17} See infra notes 144-164 and accompanying text.
\textsuperscript{18} See infra notes 165-195 and accompanying text.
\textsuperscript{19} Dr. Alec Jeffreys, a geneticist at the University of Leicester in England, was the first to discover the process of DNA identification in 1985. Laurel Bleeper & William R. Wiebe, Comment, DNA Identification Tests and the Courts, 63 WASH. L. REV. 903, 908 n.22 (1988).
\textsuperscript{20} The terms DNA profiling, DNA typing, DNA analysis, DNA fingerprinting, and genetic fingerprinting are analogous to "DNA identification," KIRBY, supra note 7, at 1, and will be used interchangeably throughout this Note.
\textsuperscript{21} Philip Hager, DNA on Trial as Evidence; "Genetic Fingerprinting" Has Been Embraced as a Revolutionary Advance in Law Enforcement, But Some Courts Are Beginning to Have Doubts, L.A. TIMES, Mar. 27, 1991, at A1. DNA testing is not used exclusively in criminal matters. Janet C. Hoeffel, Note, The Dark Side of DNA Profiling: Unreliable Scientific Evidence Meets the Criminal Defendant, 42 STAN. L. REV. 465, 467 n.13 (1990). Laboratories have used DNA identification in civil cases to resolve paternity suits and to identify human remains as well. Id. However, this Note will focus on the application of DNA identification to criminal cases.
\textsuperscript{22} KIRBY, supra note 7, at 189-90.
\textsuperscript{23} KIRBY, supra note 7, at 51. While DNA testing can utilize various bodily fluids and tissue containing nucleic cells, urine stains and saliva contain insufficient amounts of DNA to conduct a profile. Id.
\textsuperscript{24} See Hoeffel, supra note 21 (providing an overview of the controversy surrounding DNA typing including in-depth attacks on the admissibility of DNA identification evidence). Commentators attack the purported accuracy of DNA testing, suggesting that biological samples used for DNA testing found at the crime scene will be contaminated and lead to inaccurate results. See also Anthony Pearsall, DNA Printing: The Unexamined "Witness" in Criminal Trials, 77 CAL. L. REV. 665 (1989) (discussing controversy surrounding the admissibility of DNA evidence in criminal trials).
Essentially, laboratory technicians compare biological samples taken from a suspect with biological samples taken from the crime scene and determine whether there is a match. The biological samples contain deoxyribonucleic acid (DNA), a chemical compound found in individual cells which transfers genetic characteristics from one generation to the next. Genes, composed of DNA, carry information which form each individual's "blueprint," containing specific codes for every physical trait from gender to eye color. Each cell contains an entire genetic sequence, using only part of the sequence necessary to accomplish its specific job.

Further, since DNA structure is identical throughout every cell in a person's body, lab technicians can perform DNA testing from a biological sample taken from any nucleic cell of the body. There are between ten and one hundred thousand genes in every human. About one-third of those genes are variable, making the number of potential genetic combinations astronomically large. In fact, the possibility that two individuals have identical DNA structure is approximately one in thirty billion.

Since the possibility of the same DNA structure in two individuals is extremely unlikely, the possibility of an erroneous match between a crime scene sample and a defendant's DNA sample is also extremely unlikely. Although traditional blood tests can ex-
clude a suspect, DNA typing can positively identify him as the perpetrator.\textsuperscript{35} Laboratories calculate the chance of a match between unrelated individuals is between one in ten million and one in thirty-three million depending on the type of procedure used.\textsuperscript{36} Therefore, DNA testing is a good forensic tool to determine a perpetrator's identity and prove guilt or innocence.

However, DNA identification has not been embraced with the enthusiasm that one might expect.\textsuperscript{37} Not every court has allowed DNA identification evidence for the purpose of inculpating the perpetrator of the crime.\textsuperscript{38} Moreover, some experts\textsuperscript{39} and commentaries is its extraordinary specificity. Thompson & Ford, supra note 26, at 51-52.

35. Thompson & Ford, supra note 26, at 52-53. Some traditional biological identification techniques are ABO typing, human leukocyte antigen (HLA) typing, and the typing of red cell enzymes and serum protein gel electrophoresis. \textit{Id.} "ABO [blood] typing . . . has limited value for proving identity because the [blood groups tested by this method] are quite common." \textit{Id.} at 51. Human leukocyte antigen is a more specific technique, but has limited value in criminal identifications because it can only be performed on fresh blood. \textit{Id.} Electrophoresis, although specific and effective for identification purposes, also requires relatively fresh blood or semen stains. \textit{Id.}

36. Suzanne H. Stenson, Comment, \textit{Admit it! DNA Fingerprinting is Reliable,} 26 Hous. L. Rev. 677, 700-01 (1989). Laboratories quoting these statistics use RFLP analysis. \textit{Id.} at 687, 700. Laboratories that use single-locus probes quote the probability of a random match between unrelated individuals at one in ten million. \textit{Id.} at 701. Labs using multi-locus probes quote the probability at one in thirty-three billion. \textit{Id.} at 683, 700. See supra note 2 for a description of RFLP analysis.


The court exposed RFLP analysis to unprecedented judicial scrutiny. People v. Castro, 645 N.Y.S.2d 988, 989-995 (Sup. Ct. 1989). The defense attacked Lifecodes' laboratory procedures by criticizing the absence of laboratory controls, inadequate methods for declaring a match, and use of contaminated probes. Dougherty, supra at 285. In the end, the court held the DNA evidence inadmissible on the issue of whether the bloodstain on the watch matched the victim. \textit{Id.} at 284. Such a use would be an "inclusive" inquiry. The court held that DNA evidence was admissible to show that the blood stain on the watch did not belong to the defendant. \textit{Id.} This type of use of DNA evidence is called "exclusive." \textit{Id.} Ironically, the methods for determining exclusion were "less complex and more reliable than those used to show inclusion," and thus, admissible under the \textit{Frye} test. \textit{Id.} See also Parloff, \textit{How Barry Scheck and Peter Neufeld Tripped Up the DNA Experts, AM. LAW.,} (Dec. 1989) (providing an in-depth discussion on the opposition of the introduction of DNA evidence for the purpose of inclusion).
have questioned the reliability, and hence the admissibility of DNA testing. These critics warn that DNA samples taken from a crime scene do not possess the same scientific accuracy as samples taken in a laboratory setting, because evidence taken from a crime scene may be contaminated with foreign substances or degraded by environmental conditions. As a result, DNA prints taken from a crime scene are not as distinct as they would be in a laboratory setting.

39. Simon Ford, a molecular biologist at the University of California-Irvine, warns that DNA samples taken from the crime scene may be contaminated. Hager, supra note 21, at A1.

40. See Hoeffel, supra note 21, at 467-93 for one commentator’s general objections to the introduction of DNA evidence in criminal trials. Lack of standards for record keeping, licensing standards, proficiency testing, standards for declaring matches, contamination in biological samples at crime scenes, contamination of probes, lack of controls to ensure accurate interpretation of results, and lack of a scientific consensus as to the practice of DNA testing all affect the reliability of DNA testing results. Id.

41. Hanner, supra note 2, at 427-34. Most jurisdictions use the standard test promulgated in Frye v. United States, 293 F. 1013 (D.C. Cir. 1923), to determine the admissibility of a genetic test as evidence in a criminal case. Id. at 425. In Frye, the court demanded that a new scientific technique “must be sufficiently established to have gained general acceptance in the particular field in which it belongs” to be considered admissible. Id. at 425. The underlying assumption “is that general acceptance is an indication of reliability.” Thompson & Ford, supra note 26, at 53.


Some commentators have criticized the use of the Frye standard in order to determine the admissibility of a DNA test. See, e.g., Dougherty, supra note 38, at 301-06 (expressing the belief that DNA typing is too complex to be judged by such a simple test).

42. Hager, supra note 25, at A1. While genetic fingerprinting has its supporters who claim it is the perfect crime solving tool, others warn of the premature acceptance of the forensic technique. See, e.g., Hoeffel, supra note 21, at 465-68. DNA tests do not generate an entire composite of a person’s DNA; they only produce several fields of the DNA pattern. Id. at 472. Therefore, the statistics of how rare a match between unrelated persons are deceptive. Id. at 488-89. Furthermore, since a person inherits half his DNA pattern from his mother and half of his DNA pattern from his father, people living in communities where there has been intermarriage may have similar DNA patterns. Id. at 484.

One must also consider the subjectivity of interpreting band patterns which are often faint and blurry. Id. at 480-81, 486. Due to imperfections in the testing conditions of criminal samples, laboratories have trouble determining when a suspect’s DNA pattern matches the DNA pattern of the sample taken from the crime scene. Id. at 481.

laboratory setting;\textsuperscript{44} and therefore make readings from the prints speculative and unreliable.

Pending legislation in Congress attempts to deal with these inherent problems of DNA identification by requiring the National Institute of Standards and Technology (NIST) to appoint an advisory board on DNA forensic analysis.\textsuperscript{45} This advisory board would develop, monitor, and recommend standards for analyzing the quality of DNA testing procedures.\textsuperscript{46} This would include recommending preservation standards for evidence collected by law enforcement personnel in criminal investigations.\textsuperscript{47} However, the

\begin{quote}
\textsuperscript{44} Id. DNA prints are not always clear. Id. Two prints, one contaminated and one pure, taken from an individual might appear different, or prints from different individuals may appear the same. Id.


\textsuperscript{46} A bill was introduced in the House of Representatives on July 30, 1991, known as the DNA Identification Act of 1991. Id. It was proposed to "amend title I of the Omnibus Crime Control and Safe Streets Act of 1968 to authorize funds received by States and units of local government to be expended to improve the quality and availability of DNA records; to authorize the establishment of a DNA identification index; and for other purposes." Id. Section three states:

\textbf{SECTION 3: QUALITY ASSURANCE AND PROFICIENCY TESTING STANDARDS.}

(a) PUBLICATION OF QUALITY ASSURANCE AND PROFICIENCY TESTING STANDARDS.- (1) Not later than 180 days after the date of enactment of this Act, the Director of the National Research Council, in consultation with the Director of the Federal Bureau of Investigation and professional societies of crime laboratory directors, shall appoint an advisory board on DNA quality assurance methods which shall develop, and periodically monitor, recommended standards for quality assurance, including standards for testing the proficiency of forensic laboratories, and forensic analysts, in conducting analyses of DNA. The advisory board shall include as members scientists from state and local forensic laboratories, molecular geneticists and population geneticists not affiliated with a forensic laboratory, and a representative from the National Institute of Standards and Technology.

(2) The Director of the Federal Bureau of Investigation, after taking into consideration such recommended standards, shall issue (and revise from time to time) standards for quality assurance, including standards for testing the proficiency of forensic laboratories, and forensic analysts, in conducting analyses of DNA.

\textsuperscript{47} See generally 135 CONG. REC. S1606 (daily ed. Feb. 22, 1989) (statement of Sen. Paul Simon). In addressing the Senate, Senator Simon (D-Ill.) stated that "law enforcement ... will ultimately be responsible for the integrity and acceptance of this most promising and important technology," and "[g]overnment agencies ... train law enforcement personnel [and] crime scene technicians in the handling and processing and evaluation of DNA evidence." Id. at S1606.
\end{quote}
lack of support shown for this federal legislation is disheartening. As a result, states must bear the burden of controlling the procedures surrounding the collection, preservation and use of DNA evidence. Although this task may seem straightforward, a review of the preservation problems associated with DNA identification will reveal the weighty responsibilities confronting law enforcement personnel.

II. PRESERVATION PROBLEMS

The importance of preserving biological evidence has increased with the establishment of DNA identification. The methods and procedures for preserving evidence must keep pace with the requirements of this new forensic technology. Without them, reliability and thus, admissibility of DNA evidence is questionable, and application of possible new forensic technologies to preserved evidence will be severely retarded.

Various factors limit the admissibility of DNA typing results as evidence in criminal trials. One significant factor limiting the admissibility of DNA evidence is contamination. Accurate DNA analysis requires the biological sample to have a high molecular weight to obtain a distinct print. Exposure to the environment

48. H.R. 3088, 102d Cong., 1st Sess. (1991). Although the pending DNA legislation would seem to take major strides in quieting the concerns of the opponents of DNA identification, there is presently little backing for the legislation. Search of LEXIS, Genfed library, BILL file, STATENET, BILLCAST LEGISLATIVE FORECASTS (July 14, 1992). In fact, there is only a 1% chance that the bill will pass the Senate floor, and only a 5% chance it will pass the House floor, according to the bill tracking report. Id.

49. See infra notes 144-164 and accompanying text for an explanation of how states may carry the burden of preserving evidence when federal cases are to the contrary.

50. See Perlmutter, supra note 13, at 530-47 wherein the author discusses how new forensic methods may require a greater degree of preservation.

51. See 135 Cong. Rec. S1606 (daily ed. Feb. 22, 1989) (statement of Sen. Paul Simon). The use of DNA technology requires quality control mechanisms which will ensure test result reliability. Id. at S1606. Senator Paul Simon hailed DNA fingerprinting but conceded that courts were reluctant to accept DNA evidence, because "no standards exist[ed] to ensure the quality of chemicals, laboratory equipment or procedures; and, very few people [were] qualified to perform, interpret, and testify as to the results and validity of the tests." Id. However, the Senator did point out that the Federal Bureau of Investigation and the National Institute of Health were taking steps to remedy this situation, by training personnel in the "handling, processing, and evaluation of DNA evidence." Id.

52. See infra note 195, discussing some possible applications of DNA identification testing.

53. See Beeler, supra note 19, at 918-22 for a discussion of various factors which affect the reliability of DNA tests.

54. Hoeffel, supra note 21, at 479.

55. Beeler, supra note 19, at 919. However, the weight of the sample does not necessarily affect the reliability of the DNA test. Id. at 918-19.
may degrade the sample, decreasing the molecular weight and making it unsuitable for testing.\textsuperscript{56} Specifically, exposure to light, moisture, heat, radiation or chemical agents can degrade samples over time.\textsuperscript{57} Because these elements are present at crime scenes, evidence gathered from crime scenes often does not produce biological samples that are ideal for testing.\textsuperscript{58} Unfortunately, commercial laboratories marketing DNA testing have done little to validate the reliability of testing criminal evidence.\textsuperscript{59} Instead, commercial laboratories have generally tested unlimited amounts of fresh, hygienic DNA in a laboratory setting.\textsuperscript{60}

Negligence or ignorance of correct handling procedures during transportation and storage will also result in a contaminated biological specimen,\textsuperscript{61} which increases the likelihood of unreliability in testing results. Depending on the tissue source, DNA specimens require vastly different storage techniques. Law enforcement personnel or lab technicians should store some specimens at room temperature, while others should be refrigerated at 4° Celsius, frozen at -20° Celsius to -195° Celsius using liquid nitrogen, or fixed in a saline or alcohol solution.\textsuperscript{62} If the police plan on storing a semen sample for a number of months, refrigeration is required.\textsuperscript{63} Experts recommend shipping samples via courier with one or two-day delivery service to permit the tracing of packages if difficulties

\textsuperscript{56} Id. at 919-20. In many instances, the insufficient weight affects the readability of the print, as opposed to the reliability of the print. Id. at 919. Unreadable tests are merely inconclusive. Id.

\textsuperscript{57} KIRBY, supra note 7, at 69, 70. DNA samples exposed to sunlight for eight weeks were too degraded for analysis. Id. at 69. Also, DNA samples kept at a daily temperature of 41° Celsius were too degraded for analysis. Id. Exposure to soil also yielded a DNA sample degraded to a condition that no profile could be taken. Id. at 70.

\textsuperscript{58} Hoeffel, supra note 21, at 479-83. Semen samples are often contaminated with the cells of the victim. Id. at 482. Other samples are likely to be infested with microorganism DNA from the surrounding environment that may or may not be distinguished from the perpetrator's DNA pattern. Id. at 481-82. The result is a DNA print with misleading bands which obscures the human bands. Id. at 481-82. A laboratory technician can do very little if the biological sample comes to the lab already contaminated. Id. at 482-83. Contamination in the laboratory itself can also occur if laboratory protocol does not require meticulous handling of the specimens. Id. at 480-81.

Some commentators claim environmental contamination does not affect the reliability of DNA testing, but just makes the tests unreadable. Beeler, supra note 19, at 920-21. However, environmental contamination will limit the number of samples that can be tested. Id. at 920.

\textsuperscript{59} Pearsall, supra note 24, at 671-72.

\textsuperscript{60} Id. Hygienic DNA is free from contamination. Id.

\textsuperscript{61} KIRBY, supra note 7, at 55. See supra note 61 and accompanying text for a discussion of what factors degrade the quality of a biological specimen.

\textsuperscript{62} KIRBY, supra note 7, at 55. See supra notes 61 and 73-74 describing the needed size and purity of a DNA sample.

\textsuperscript{63} See State v. Youngblood, 790 P.2d 759, 762 (Ariz. Ct. App. 1989) (holding that "law enforcement officers have a duty to preserve semen samples in a rape case, including refrigerating them.")
arise. Labs do not recommend sending the samples through the postal service even though it may be cost effective. Since samples taken from a crime scene are limited to small stains or small tissue samples, the compliance with these handling procedures is vital to a successful DNA test, because there often will not be an opportunity to replace a lost or degraded sample.

Another factor limiting the reliability of DNA testing results is the apparent difficulty in collecting a sufficient amount of biological evidence to perform a valid test. DNA analysis requires law enforcement personnel to take a certain minimum amount of usable biological material from the crime scene in order to obtain a valid result. For example, the current threshold sample size for a semen stain is approximately the size of a dime, while the threshold for a blood stain is the size of a quarter. For hair samples, labs need at least fifteen hairs which have been removed with the follicle still intact because the follicle is the only part of the hair that contains nucleic cells with DNA suitable for testing. These limitations contribute to the importance of preserving evidence, in that failure to preserve a sample may damage the biological sample to the extent that a DNA test would be impossible to perform.

In an attempt to standardize these limiting factors, commentators have promulgated general guidelines for the preservation of biological samples. For example, American Jurisprudence Trials recommends that any blood stain found on an object at a crime scene which cannot be transported to the laboratory while still on the object should be thoroughly dried, carefully flaked off, and preserved in a glass vial or a sealed envelope. Further, American Jurisprudence Trials suggests that both the investigator and the

64. Kirby, supra note 7, at 55.
65. Id.
66. Kirby, supra note 7, at 55. See infra note 69 and accompanying text for a discussion on DNA sample size requirements.
67. Beeler, supra note 19, at 918-19.
68. Id. The Cetus Corporation test, which is also known as the Polymerase Chain Reaction (PCR), is a patented gene amplification technique which requires far fewer samples of biological material to conduct a DNA test than most other tests. Pearsall, supra note 24, at 669.
69. Beeler, supra note 19, at 918-19. A dime-sized semen stain corresponds to at least 10 microlitres of semen. Id. at 919 n.73. A quarter-sized blood stain corresponds to about 50 microlitres. Id. at 918 n.72. Normal post-rape procedures yield 100 microlitres of fluid, requiring a ratio of semen to vaginal fluid of at least 1 to 10 to obtain sufficient male DNA to conduct a test. Id. at 919 n.73.
70. Interview with Melvin B. Lewis, Professor, The John Marshall Law School, in Chicago, Ill. (Oct. 28, 1991). The cells in a strand of hair are dead and the DNA that was once in them has been taken for further live cell production. Id. Therefore, a handful of cut hair would be useless in conducting a test. Id.
72. Id. at 611-12.
expert bear the duty of preventing the contamination of evidence.\textsuperscript{73} However, neither the article nor the 1991 supplement in \textit{American Jurisprudence Trials} promulgate the most effective means of preservation, since neither recommend refrigeration of the blood sample.\textsuperscript{74}

While DNA testing may be very beneficial, the amount required for a sample and the danger of contamination substantially limit the number of successful cases of retroactive DNA tests that may be performed.\textsuperscript{75} In fact, laboratory tests have often produced inconclusive results because samples were too small or too degraded for effective DNA typing.\textsuperscript{76} These limitations highlight the importance of preservation techniques that investigators currently use\textsuperscript{77} and suggest retaining and improving such techniques in the future.\textsuperscript{78} Efficient methods of preservation therefore, are not just mere suggestions for a better procedure,\textsuperscript{79} but are vital to the production of a reliable DNA identification test.\textsuperscript{80}

\textbf{III. EVOLUTION OF THE GOVERNMENT'S DUTY TO PRESERVE EVIDENCE}

Properly preserved DNA evidence, subjected to a DNA identification test, can serve to exculpate the criminal defendant.\textsuperscript{81} However, destruction or negligent handling of this evidence may destroy the criminal defendant's opportunity to present the best possible defense.\textsuperscript{82} By failing to preserve evidence, the state essentially de-
prives the criminal defendant of his due process rights. This section will present an overview of the significant constitutional issues concerning the preservation of evidence. Through an historical analysis of seminal cases on the issue, this section will show the Supreme Court’s progressive limitation of the government’s duty to preserve evidence.

The Due Process Clause of the Fourteenth Amendment prohibits state action which deprives an individual of life, liberty, or property without due process of law. Due process exists in two forms, substantive and procedural. Substantive due process establishes constitutional limitations on legislative power in certain subject areas. By contrast, procedural due process requires the state to follow certain procedures when it deprives a person of life, liberty, or property.

As one treatise states it: “The adjudicative process itself is governed by the specific guarantees of the Bill of Rights and [by] an independent concept of fundamental fairness which is imposed by the [D]ue [P]rocess [C]lause.” For example, procedural due process requires law enforcement personnel to follow certain administrative procedures such as Miranda warnings. As Supreme Court Justice William O. Douglas once said, “It is procedure that spells much of the difference between rule by law or rule by whim or caprice.”

Originally courts strongly protected a defendant’s due process rights when faced with the government’s duty to preserve evidence in criminal trials. For example, the United States Supreme Court in Brady v. Maryland held that due process requires a prosecutor

83. Id.
84. U.S. CONST. amend. XIV, § 1. “No State shall . . . deprive any person of life, liberty, or property, without due process of law . . . .” Id. A comparable clause in the fifth amendment prohibits similar action by the federal government. U.S. CONST. amend. V. “No person shall . . . be deprived of life, liberty, or property, without the due process of law.” Id. Also, most state constitutions have similar or identical due process clauses. WAYNE R. LAFAVE & AUSTIN W. SCOTT, JR., CRIMINAL LAW 148 (2d ed. 1986).
86. Id. at 1262.
87. Id. at 1263.
89. Id. See also YALE KAMISAR ET AL., MODERN CRIMINAL PROCEDURE 542-63 (6th ed. 1986).
91. See Brady v. Maryland, 373 U.S. 83 (1963) (establishing the foundation of the state’s duty to preserve evidence by creating the prosecutor’s duty to disclose evidence favorable to the accused).
92. Id.
to disclose material evidence which is favorable to the accused.  

The Brady Court ruled that the failure to produce beneficial evidence constituted a due process violation regardless of whether the prosecution’s failure to produce the evidence was in good or bad faith.  

After Brady, lower state courts recognized that the due process disclosure requirement also included the defendant’s right to have evidence preserved. Subsequently, defendants successfully contested the failure of prosecutors to preserve blood, bullets, urine, and physical evidence of arson, rape, and homicide. Using the Brady decision as precedent, lower courts considered three factors in assessing whether the loss or destruction of evidence constituted a deprivation of due process: “(1) the likelihood that the lost evidence was exculpatory; (2) the likelihood that the defendant was significantly prejudiced at trial by the absence of that evidence; (3) and the level of government culpability [for the loss of the evidence].”

93. Id. at 87. In Brady, the state suppressed an extrajudicial statement made by an accomplice admitting to a murder committed in the course of a robbery. Id. at 83. The accomplice admitted to having committed the homicide. Id.

For an in-depth discussion on the rule that a prosecutor must disclose material evidence favorable to the accused, see Daniel A. Klein, Annotation, Prosecutor’s Duty, Under Due Process Clause of Federal Constitution, to Disclose Evidence Favorable to the Accused—Supreme Court Cases, 87 L. Ed. 2d 802 (1990).

94. Brady, 373 U.S. at 87.

95. PAUL GIANELLI & EDWARD IMWINKELRIED, SCIENTIFIC EVIDENCE 106-107 (1986). A pivotal case in establishing a duty to preserve evidence was U.S. v. Bryant, 439 F.2d 642 (D.C. Cir. 1971), aff’d after remand, 448 F.2d 1182 (D.C. Cir. 1971); see GIANELLI, supra, at 107. In Bryant, the court held that the duty of disclosure attaches to evidence as soon as the Government takes possession of the evidence. Bryant, 439 F.2d at 651; see also GIANELLI, supra, at 107. Otherwise, the prosecution could avoid disclosure simply by destroying the evidence. Bryant, 439 F.2d at 651; see also GIANELLI, supra, at 107. Thus, the duty to disclose operates as a duty to preserve evidence before discovery. Bryant, 439 F.2d at 651; see also GIANELLI, supra, at 107.

96. See People v. Garries, 645 P.2d 1306, 1308 (Colo. 1982) (failure to preserve blood stain from crime scene constituted a deprivation of defendant’s guarantee of due process).


98. See People v. Moore, 666 P.2d 419, 423 (Cal. 1983) (failure to preserve urine sample taken from the defendant constituted a deprivation of due process).


100. See Hilliard v. Spalding, 719 F.2d 1443, 1447 (9th Cir. 1987) (failure to preserve a semen sample).


102. GIANELLI, supra note 95, at 110.
However, in *California v. Trombetta*, a case involving the consolidation of several drunk driving cases, the United States Supreme Court limited the government's duty to preserve evidence. In *Trombetta*, the defendants' argued that evidence of intoxication from breath tests should have been suppressed, because the state's failure to preserve the samples prevented the defendants from using the samples to impeach the results of the test. In other words, the defendants claimed that the state's failure to preserve evidence, constituted a violation of the Due Process Clause, because it prevented their ability to present a thorough defense. The Supreme Court, however, held that there was no due process violation caused by the trial court's denial of the defendant's motion to suppress the breath test evidence. It found that the police had acted in good faith in accordance with normal police procedures in destroying the breath samples and that the breath sample had no apparent, as opposed to potential, exculpatory value before it was destroyed. The Court refused to place the duty onto the law enforcement personnel, where the sample had no apparent exculpatory value. Therefore, the Court held that the defendant's due process rights were not violated by the government's failure to preserve evidence.

A few years later, the United States Supreme Court in *Arizona v. Youngblood*, once again reviewed the preservation issue and limited the state's duty to preserve evidence even further. In a 6-to-3 ruling, the *Youngblood* Court held that the government's failure to preserve semen samples from the victim's clothing did not

---

104. Id. at 483-89. The *Trombetta* court stated:
Whatever duty the Constitution imposes on the States to preserve evidence, that duty must be limited to evidence that might be expected to play a significant role in the suspect's defense. To meet this standard of constitutional materiality, the evidence must both possess an exculpatory value that was apparent before the evidence was destroyed, and [also] be of such a nature that the defendant would be unable to obtain comparable evidence by other reasonably available means.

106. Id. at 485-88.
107. Id. at 488.
108. In fact, the Court found that the chance that the breath samples were exculpatory was extremely low. Id. at 482. See supra notes 92-102 and accompanying text for a discussion of a prosecutor's duty to disclose articulated in *Brady*.
109. Id. at 482.
111. Id. at 51-52.
112. Al Kamen, Police Not Bound to Save Evidence, High Court Says; Rights of Criminal Suspects Further Narrowed in Sexual Assault Case, WASH. POST, Nov. 30, 1988, at A4. The police confiscated the victim's clothing which con-
constitute a denial of due process of law unless the defendant could show bad faith on the part of the police. Chief Justice Rehnquist, writing for the majority, said that the Due Process Clause of the Fourteenth Amendment did not impose an absolute duty to retain and preserve all material that may be of some evidentiary significance. He noted that the failure of the police to refrigerate the sample in Youngblood could at worst be described as negligent. In other words, Rehnquist believed that negligence alone in the destruction of evidence was an insufficient ground for relief.

In a concurring opinion, Justice Stevens stated that the defendant's due process rights had not been violated by the destruction of evidence. However, he believed that the majority's proposition of law was too broad to decide the case. Specifically, Justice Stevens stated that in some instances where the lost evidence is critical to the defense, the defendant should not have to prove the police acted in bad faith for the trial to be fundamentally unfair.

On the other hand, Justice Blackmun in his dissent, criticized the majority stating that the Constitution requires a fair trial and not a "good faith" attempt at a fair trial. Justice Blackmun claimed that the Court ignored the primary inquiry of the constitutional materiality of the lost evidence, and instead focused on police conduct. Justice Blackmun recommended that the court concentrate on the type of evidence, the possibility that the evidence might prove exculpatory, and the existence of evidence addressing the same point of contention, in determining whether there was a violation of due process. These elements, as recited by Justice Blackmun, but failed to refrigerate it. By the time the defense could test it, DNA analysis of the sample was impossible. The Tucson Police Department routinely held all evidence in the property office until it sent the samples to the police laboratory. Since Arizona v. Youngblood, the department has implemented new procedures that require storing the evidence at a specific temperature. Perlmutter, supra note 13, at 530 n.4.

113. Youngblood, 488 U.S. at 58. The Court cited cases such as United States v. Marion, 404 U.S. 307 (1971), where the defendant was unable to show that government had intentionally delayed an indictment, to support its bad faith requirement. Youngblood, 418 U.S. at 57.

114. Id.

115. Id. at 58-59.

116. Id. at 60 (Stevens, J., concurring).

117. Id. (Stevens, J., concurring).

118. Id. at 61. (Stevens, J., concurring). Justice Stevens wrote, "[T]here may well be cases in which the defendant is unable to prove that the State acted in bad faith but in which the loss or destruction of evidence is nonetheless so critical to the defense as to make a criminal trial fundamentally unfair." Id. However, Stevens did not think Youngblood was such a case. Id.

119. Id. at 61 (Blackmun, J., dissenting).

120. Id. (Blackmun, J., dissenting).

121. Id. at 68. Justice Blackmun stated in his dissent: Rather than allow a State's ineptitude to saddle a defendant with an impossible burden, a court should focus on the type of evidence, the possibility it
Youngblood, however, did not end the controversy. After the United States Supreme Court remanded the Youngblood case to the Arizona Court of Appeals for further proceedings, the Arizona court disregarded the United States Supreme Court's decision and reversed Youngblood's conviction. The Arizona Court of Appeals held that the Due Process Clause of the Arizona Constitution imposed a duty to preserve evidence on the police despite the lack of bad faith on the part of the government. The Arizona court ruled that where the only "objective evidence is evanescent. . .[and] virtually dispositive of guilt or innocence, and [where] collecting the evidence would place a slight burden upon the state, due process requires that a suspect be informed of his right to gather such evidence prior to its dissipation."

Specifically, the Arizona court had taken the opposite view from the United States Supreme Court, holding that if the evidence had even potential rather than actual exculpatory value, the state had a duty to preserve such evidence. The reasoning of the Arizona court resembles the recommendations set forth by Justice Blackmun in his Youngblood dissent. Thus, although the United States Supreme Court does not recognize a federal constitutional duty to preserve biological evidence, some states recognize such a duty. State initiative in imposing a duty to preserve evidence on law enforcement personnel requires an in depth analysis of the effects of establishing such a duty. The following section discusses the ramifications of recognizing a duty to preserve evidence.

might prove exculpatory, and the existence of other evidence going to the same point of contention in determining whether the failure to preserve the evidence in question violated due process. To put it succinctly, where no comparable evidence is likely to be available to the defendant, police must preserve physical evidence of a type that they reasonably should know has the potential, if tested, to reveal immutable characteristics of the criminal, and hence to exculpate a defendant charged with the crime.

Id. at 69.

122. See Bernstein, supra note 85, at 71-72.
125. Id. at 762. The Arizona Court of Appeals held that the Due Process Clause of the Arizona Constitution provides greater protection for criminal defendants than its federal counterpart. Id. Its contention was based on Arizona case law. Id. The court cited State v. Mitchell, 683 P.2d 750 (Ariz. App. 1984) and Montano v. Superior Court, 719 P.2d 271 (Ariz. 1986) as authority in making its decision. Id. at 759.
127. Id.
128. See id. at 764-65. See supra notes 119-22 and accompanying text for a discussion of Blackmun's constitutional materiality test in Youngblood.
IV. EXAMINING THE EXTENT OF THE DUTY TO PRESERVE EVIDENCE

In jurisdictions where state courts could find that their state constitutional Due Process Clauses place a duty on the government to preserve and retain evidence, the development of new DNA testing methods could make old evidence in storage suddenly potentially exculpatory.\(^{130}\) Since DNA identification is extraordinarily accurate in establishing the identity of a criminal, biological evidence in storage will now be highly material if identity of the perpetrator is at issue.\(^{131}\) Certainly, jurisdictions which have saved evidence will have many requests to retest such evidence based on the evidence's newly acquired exculpatory character.\(^{132}\) However, it is highly unlikely that police have preserved biological evidence in the event that it may be used in future DNA tests.\(^{133}\) Where evidence has not been properly stored, biological evidence will be useless for DNA identification testing.\(^{134}\)

If state courts weigh only the potential exculpatory value of this evidence following the Youngblood dissent and the State v. Youngblood decision, then failure to preserve biological evidence will constitute a denial of due process.\(^{135}\) However, if state courts assess lost evidence by weighing its actual exculpatory value following the majority in Youngblood, failure to preserve such evidence will not constitute a denial of due process.\(^{136}\) If state courts follow the State v. Youngblood decision, they must consider several issues. First, can we charge the police with a duty to preserve evidence for

---

130. See infra note 1-12 and accompanying text for a discussion of the Dabbs reversal as an example of old evidence becoming new exculpatory evidence for the basis of a new trial.

131. See, e.g., Foderaro, supra note 8, at B1. (The Dabbs case is an example of how old evidence has become exculpatory).

132. See N.Y. CRIM. PROC. LAW § 440.10 (McKinney Supp. 1992) (for one state's requirements on what's required for a new trial based on newly discovered evidence); see also 35 N.Y. JUR. 2d Criminal Law § 2976 (1984) (discussion of what is required for a new trial based on newly discovered evidence). Prisoners should be granted new trials based on the premise that stored biological evidence has become newly discovered evidence with the advent of DNA identification technology. Id. Reasonable diligence must be inferred from the fact that DNA testing did not exist before 1985. Id. If the DNA print is not that of the prisoner, the evidence is of such a character that in a new trial it will probably yield a different result; thus, it is evidence which is not merely impeaching or cumulative, but exculpatory. See N.Y. CRIM. PROC. LAW § 440.10 (McKinney Supp. 1992).

133. Foderaro, supra note 8, at B1. "Crucial to the outcome was a 1980 decision by Westchester County, unlike most jurisdictions, to save evidence from all criminal trials in a giant freezer — even after all appeals run out." Id.

134. See infra note 52-80 and accompanying text for a discussion on the effects of improper procedural methods on biological evidence.


136. Youngblood, 488 U.S. at 337.
the purpose of potentially exculpating the defendant? If we can, should the duty be applied retroactively to encompass already decided cases or should it be limited to prospective applications? Finally, how long should the duty to preserve evidence extend in time, or should the duty to preserve evidence shift to the defendant after a substantial period of time? The following paragraphs will address the questions raised when a state court weighs the potential rather than the actual exculpatory value of the evidence.

A response to the first question posed will require a discussion of the basic goals of the United States criminal justice system. The highest goal of our criminal justice process is to minimize the likelihood of an erroneous conviction. A fundamental value of our system is "that it is far worse to convict an innocent person than let a guilty man go free." Since law enforcement personnel implement the U.S. criminal justice process, they have a mandate to further its goals. Therefore, charging law enforcement personnel with the duty to preserve evidence, for the purpose of exculpating a defendant protects the innocent and furthers the goals of our criminal justice system. In order to implement this goal, however, states must charge law enforcement personnel with the duty to preserve evidence.

Having established that such a duty should be imposed, whether a duty to preserve evidence should be applied retroactively to encompass already decided cases or should be limited to prospective applications is still another matter. To be charged with an obligation to preserve evidence, the police at a minimum must have known or should have known that the biological evidence they failed to preserve had potential exculpatory value. Without such knowledge, police investigators would have no reason to preserve evidence. Therefore, where investigators had no knowledge that genetic identification was possible, they could hardly be charged with a duty to preserve biological evidence for a forensic method that they did not know existed. Consequently, whether a duty to preserve evidence should be applied retroactively to encompass already decided cases or prospectively would be dependent on the time a department knew or should have known of the advent of DNA identification. As soon as a department could be imputed with the knowledge of DNA identification's existence, a duty to preserve evidence would be established.

138. Id.
139. See W. PAGE KEETON ET AL., PROSSER AND KEETON ON THE LAW OF TORTS 324-25 (5th ed. 1984) for a definition of "duty."
140. Id.
141. Id.
The first use of DNA testing dates back to 1985 when Alec Jeffreys pioneered the process at the University of Leicester in England.\textsuperscript{142} The first U.S. conviction using DNA typing occurred in Florida in 1987.\textsuperscript{143} If an investigator knew that DNA typing was available for criminal cases or was to become available within a short period of time, a duty to preserve evidence should be imposed. This duty should extend in time at least until police apprehend a suspect and inform him of the existence of the evidence. A duty to preserve evidence for the purpose of DNA identification testing should have started then around 1985.

A prospective duty to preserve evidence naturally leads into the next two issues, namely, how long should the duty to preserve evidence extend in time and whether the duty should shift after a substantial period in time. The resolution of this question involves balancing the state's burdens against the defendant's rights of due process. The foreseeable burden from preserving evidence, considering the number of unsolved crimes, necessitates a limitation on time law enforcement can preserve evidence. As noted in a proposal in a later section, several factors greatly weigh on the state's burden to preserve evidence. On the other hand, the defendant's right to due process is also a weighty consideration. Ultimately, state legislatures will have to weigh the burdens placed on the state against the benefits of exculpatory evidence to the defendant in order to determine a reasonable time for the preservation of the evidence. Due to the importance and highly exculpatory value of the DNA testing, one issue remains clear, namely, that law enforcement personnel should be imputed with some kind of a duty to preserve evidence of potentially exculpatory value. The question of time, however, still remains.

V. STATE AND FEDERAL REMEDIES

Having illustrated the importance of the duty to preserve evidence for DNA identification purposes, this section will propose a remedy to current inadequacies. First, this section will provide the means by which states can circumvent the precedents set by the United States Supreme Court. Then, this section will introduce a standard which will draw upon the strengths of both the bad faith and the constitutional materiality standards.

A. State Constitutions: The Means to a Solution

The United States Supreme Court set the minimum require-

\textsuperscript{142} Beeler, \textit{supra} note 19, at 908 n.22; Dougherty, \textit{supra} note 38, at 269 n.5.

\textsuperscript{143} Unpublished material on file at Senator Paul Simon's office (Oct. 28, 1981).
ments for the preservation of evidence in Arizona v. Youngblood.\textsuperscript{144} This, however, does not preclude state supreme courts from granting defendants more protection through their own interpretation of state constitutions.\textsuperscript{145} Although states must at least meet the Youngblood requirement, a state court has the authority to interpret state constitutional provisions more broadly to protect individual rights.\textsuperscript{146}

\textit{State v. Youngblood}\textsuperscript{147} illustrates the means by which states can extend individual rights beyond the minimum requirement provided by Arizona v. Youngblood.\textsuperscript{148} In State v. Youngblood, the Arizona Court of Appeals adopted the materiality standard, claiming that the Due Process Clause of the Arizona Constitution\textsuperscript{149} placed a greater burden on investigators than its federal counterpart.\textsuperscript{150} As noted earlier,\textsuperscript{151} the Arizona Court of Appeals held that the Due Process Clause of the Arizona Constitution\textsuperscript{152} imposed a duty to preserve evidence on the police despite the lack of bad faith on the part of the government.\textsuperscript{153} Following Arizona's lead, states should further expand federal precedent and create their own standards by implementing the due process clause of their state constitutions. Thus, the states may afford greater due process rights to criminal defendants than the federal courts afford defendants in their interpretation of the Fourteenth Amendment.

Further, attorneys can provide state courts with proper arguments to ensure defendants due process under a state constitutional

\textbf{Notes:}


\textsuperscript{145} Robert F. Utter, \textit{Advancing State Constitutions in Court: Protecting Individual Rights}, TRIAL, Oct. 1991, at 41. \textit{See, e.g.}, Thornhill v. Alabama, 310 U.S. 88 (1940); \textit{see also} Schneider v. State, 308 U.S. 147 (1939) (cases illustrating the Fourteenth Amendment's minimum requirements for individual rights on the states).

\textsuperscript{146} \textit{See} Utter, \textit{supra} note 186, at 41-42 (discussing the various approaches courts use to analyze state constitutional provisions, when faced with similar federal provisions). Federal courts, however, may review state decisions that do not "indicate clearly and expressly that the [decision] is alternatively based on bona fide, separate, adequate and independent grounds." \textit{Id.} at 41.


\textsuperscript{148} \textit{See, e.g.}, State v. Youngblood, 790 P.2d 759 (Ariz. Ct. App. 1989) (despite lack of bad faith by the police, failure to refrigerate and preserve the victim's clothing constituted a due process violation under the Arizona Constitution).

\textsuperscript{149} ARIZ. CONST. art. II, § 4.

\textsuperscript{150} State v. Youngblood, 790 P.2d at 763. \textit{See supra} notes 122-24 and accompanying text for a discussion of the materiality test.

\textsuperscript{151} \textit{See supra} notes 123-29 and accompanying text for a discussion of State v. Youngblood.

\textsuperscript{152} ARIZ. CONST. art. II, § 4.

\textsuperscript{153} \textit{Id.} at 762. The Arizona Court of Appeals held that the due process clause in the Arizona Constitution provides greater protection for criminal defendants than its federal counterpart. \textit{Id.} Its contention was based on Arizona case law. \textit{Id.} The court cited State v. Mitchell, 683 P.2d 750 (Ariz. Ct. App. 1984) and Montano v. Superior Court, 719 P.2d 271 (Ariz. 1986) as authority in making its decision. \textit{Id.} at 759.
provision, thereby protecting individual rights.\textsuperscript{154} The Washington Supreme Court recommended six areas in which attorneys should concentrate in making a persuasive state constitutional argument: (1) the textual language of the state constitution;\textsuperscript{155} (2) significant differences in the text of parallel state and federal constitutional provisions;\textsuperscript{156} (3) state constitutional and common law history;\textsuperscript{157} (4) preexisting state law;\textsuperscript{158} (5) differences in structure between federal and state constitutions;\textsuperscript{159} and (6) matters of particular state interest or local concern.\textsuperscript{160} Attorneys and state court judges can

\begin{itemize}
\item \textsuperscript{154} Utter, supra note 145, at 42, 45.
\item \textsuperscript{155} State v. Gunwall, 720 P.2d 808, 812-13 (Wash. 1986). "The textual language of the State Constitution. The text of the state constitution may provide cogent grounds for a decision different from that which would be arrived at under the Federal Constitution. It may be more explicit or it may have no counterpart at all." Id. at 812.
\item \textsuperscript{156} Id.
\item \textbf{Significant differences in the texts of parallel provisions of the federal and state constitutions.} Such differences may also warrant reliance on the state constitution. Even where parallel provisions of the two constitutions do not have meaningful differences, other relevant provisions of the state constitution may require that the state constitution be interpreted differently.
\item \textsuperscript{157} Id.
\item \textbf{State constitutional and common law history.} This may reflect an intention to confer greater protection from the state government than the Federal Constitution affords from the federal government. The history of the adoption of a particular state constitutional provision may reveal an intention that will support reading the provision independently of federal law.
\item \textsuperscript{158} Id.
\item \textbf{Preexisting state law.} Previously established bodies of state law, including statutory law, may also bear on the granting of distinctive state constitutional rights. State law may be responsive to concerns of its citizens long before they are addressed by analogous constitutional claims. Preexisting law can thus help to define the scope of the constitutional right later established.
\item \textsuperscript{159} Id.
\item \textbf{Differences in structure between the federal and state constitutions.} The former is a grant of enumerated powers to the federal government, and the latter serves to limit the sovereign power which inheres directly in the people and indirectly in their elected representatives. Hence the explicit affirmation of fundamental rights in [a] state constitution may be seen as a guarantee of those rights rather than a restriction on them.
\item \textsuperscript{160} Id. at 813. "Matters of particular state interest or local concern. Is the subject matter local in character, or does there appear to be a need for national uniformity? The former may be more appropriately addressed by resorting to the state constitution." Id.
\end{itemize}

See also Utter, supra note 145, for a discussion of advancing state constitutional arguments; see also Robert F. Utter and Sanford E. Pitler, \textit{Presenting a State Constitutional Argument: Comment on Theory and Technique}, 20 IND. L. REV. 635 (1987) for an even more in-depth review of state constitutional arguments.
use these tools to further protect guarantees of due process.\textsuperscript{161}

With proper support, states could fashion almost any standard for the preservation of biological evidence.\textsuperscript{162} However, states should still consider the shortcomings of the bad faith and materiality standards in creating their own procedural due process requirements regarding preservation of evidence.\textsuperscript{163} If case law concerning the preservation of biological evidence favors defendants, police investigators will be forced to follow state-promulgated procedures for the preservation of DNA evidence.\textsuperscript{164}

B. Considerations in Creating an Acceptable Standard for the State's Duty to Preserve Evidence

Creating an acceptable standard for the duty to preserve evidence requires states to consider the advent of DNA identification and its requirements for preservation. The previous section provided the means with which to create a standard for the duty of preserving evidence. The following section will scrutinize the two standards previously promulgated by the Supreme Court, and suggest a new standard which accounts for the advent of DNA identification.

1. Faults of the "Bad Faith" Test

The establishment of a forensic technique which makes biological evidence virtually dispositive of guilt or innocence requires the Supreme Court to reevaluate the state's duty to preserve such evidence.\textsuperscript{165} Burdens of preservation must increase with the materiality of the evidence,\textsuperscript{166} because DNA profiling adhering to proper procedures can establish guilt or innocence beyond a reasonable doubt.\textsuperscript{167} Preservation of such material evidence cannot be sub-

\begin{footnotesize}
\begin{enumerate}
\item[161.] Utter, \textit{supra} note 145, at 42.
\item[162.] \textit{See generally} Utter, \textit{supra} note 145, at 42, 45.
\item[163.] \textit{See infra} notes 180-188 and accompanying text for a discussion of the shortcomings of the materiality test.
\item[164.] \textit{See, e.g.,} State v. Youngblood, 790 P. 2d 759 (Ariz. Ct. App. 1989) (state court's decision to dismiss case based on law enforcement personnel's failure to preserve evidence).
\item[165.] \textit{See} Perlmutter, \textit{supra} note 13, at 541-42 ("New testing devices have improved the state's ability to prove guilt... Rather than addressing the danger of wrongful conviction resulting from the mishandling of evidence, the Court focused attention on what should have been a collateral issue-police motive... ").
\item[166.] \textit{See} Perlmutter, \textit{supra} note 13, at 534-41 for a discussion which advocates for acceptance of the materiality test expressed in Justice Blackmun's dissent in \textit{Youngblood}. \textit{See also} Bernstein, \textit{supra} note 85, at 1262-63. \textit{See infra} note 119-121 and accompanying text, discussing the constitutional materiality test in Blackmun's dissent in \textit{Arizona v. Youngblood}.
\item[167.] \textit{See supra} notes 35-36 and accompanying text for a discussion of the specificity of DNA typing. \textit{Contra} Hoeffel, \textit{supra} note 21, for a discussion which criticizes the premature acceptance of DNA typing.
\end{enumerate}
\end{footnotesize}
jected to the "bad faith" standard set forth by the majority in *Youngblood*.

First, the Court which established the *Youngblood* standard faced factual circumstances which did not properly consider the advent of DNA fingerprinting. The criminologist in *Youngblood* tried to obtain blood group substances from the victim's clothing using the P-30 (protein molecule tests) and ABO technique. These procedures do not have the same specificity as DNA fingerprinting. Thus, biological samples taken from the crime scene contain a greater exculpatory value than they did in the past. Logically, a failure to preserve biological samples has greater consequences than at the time the *Youngblood* Court established its duty to preserve evidence. Therefore, a new standard taking into consideration the establishment of DNA identification should be formed.

Second, the "bad faith" standard inappropriately focuses on the motive of the investigator rather than the relative value of the lost evidence. Such a standard condones police incompetence by providing no incentive for police to carefully preserve highly informative and possibly exculpatory evidence. Although the *Youngblood* standard eases the burden on investigators, it inherently threatens the level of diligence used during inquiries into the identity of perpetrators.

Third, the bad faith standard set forth in *Youngblood* was never truly defined by the court. The Court's failure to define its own standard leaves the defendant with no guidelines to protect himself from the negligence of law enforcement personnel. Chief Justice Rehnquist simply abandoned the materiality standard, by writing, "failure of the police to refrigerate the clothing... can at worst be described as negligent." His words suggest that if an investigator was reckless, the Court could find his actions were in

168. Perlmutter, *supra* note 13, at 538 (arguing that the focus on intent is "theoretically unsound"); *see also Youngblood*, 488 U.S. at 68-69 (Blackmun, J., dissenting).
170. *Id.*
171. *Id.*
172. See Perlmutter, *supra* note 13, at 537-41 for a discussion of the Court's inappropriate focus on intent rather than the value of evidence.
173. *See Kamen, supra* note 112, at A4. Charles Whitebread, a criminal law professor at the University of Southern California Law School, said it's "virtually impossible" for a criminal defendant to show law enforcement personnel's bad faith when they lose evidence. *Id.* Since judicially imposed procedural restraints, such as *Youngblood*, would likely leave police unhampered, "[t]he ruling means that if police feel like preserving [evidence] they will and if they don't, they won't." *Id.; see also Perlmutter, supra* note 13, at 537-41.
176. *Id.* at 58.
DNA Identification

As Justice Blackmun asks, in his dissent, does good faith require a certain degree of diligence from investigators, or is an officer who fails to take a few steps to place biological evidence in the refrigerator acting in good faith? Would a deliberate failure to establish acceptable standards for the preservation of evidence for the purposes of DNA testing amount to bad faith? Youngblood failed to address these questions. However, the dissenter's views were also not without criticism.

2. The Shortcoming of the Materiality Test

Other commentators have recognized Chief Justice Rehnquist's decision in Youngblood as an erosion of defendants' due process right to a fair trial and recommend that courts adopt Justice Blackmun's materiality test. The materiality test recommends that courts concentrate on the type of evidence lost, the possibility that the evidence might have been exculpatory and the existence of other evidence addressing the same point of contention. However, the materiality test has a flaw.

Chief Justice Rehnquist must be credited with perceiving one imperfection with the materiality test, its overbearing burden on police. Investigators should not be held to a duty to preserve evidence unless they can be charged with the knowledge that the evidence will have a potentially high exculpatory value, so no duty and thus no burden will be imposed before the advent of DNA identification.

But, conceivably, a duty to preserve would extend to all unsolved cases after the advent of DNA typing, and police would have to store all evidence of unsolved crimes until defendants are apprehended and notified of the prosecution's evidence. Since murder

177. Id. at 66 (Blackmun, J., dissenting).
178. Id.
179. Id.
181. See Bernstein, supra note 85, at 1273-280. "The materiality test is the most acceptable standard by which to judge state failure to preserve evidence for the defendant." Id. at 1280. Then in a footnote, the commentator states, "[a] suitable variation of the materiality standard such as that proposed by Justice Blackmun would adequately meet criminal defendants' due process rights." Id. at 1280 n.180.
183. Youngblood, 488 U.S. at 57.
185. Ideas based upon an interview with Professor Melvin B. Lewis, The John Marshall Law School in Chicago, Ill. (Oct. 28, 1991). This idea deserves further discussion, especially in light of cases such as Dabbs and Miller. See supra notes 1-13 and accompanying text for a discussion of the Dabbs and Miller cases. Courts will soon have to address this problem since many jurisdictions
has no statute of limitations barring prosecutions, theoretically the
government would have to preserve evidence from unsolved
murders indefinitely.\textsuperscript{186} Further, all evidence retained from un-
resolved rape investigations would have to be preserved until that
state’s corresponding statute of limitations has run.\textsuperscript{187} In 1988, the
FBI reported that over 60\% of the rapes and about one fourth of the
homicides remain unresolved.\textsuperscript{188} Consequently, states would have
to construct and maintain vast storage facilities, at an enormous
cost, to store all the biological evidence collected from unsolved
crimes.\textsuperscript{189} Therefore, the materiality test also has its flaw.

3. A New Test

Considering the deficiencies of both existing standards, states
should adopt a compromise between the bad faith standard set forth
by the majority in \textit{Youngblood} and the constitutional materiality
standard set forth by Justice Blackmun’s dissent in \textit{Youngblood}. Courts should consider potential rather than actual exculpatory
value to insure a defendant’s guarantee of due process. Such con-
siderations conform to our criminal justice system’s basic premise
“that it is better to allow some of the guilty to escape conviction
than to risk conviction of an innocent person.”\textsuperscript{190} One result of our
system’s premise is that prosecutors have the burden of producing
evidence to persuade the factfinder of the existence of elements of
the crime charged beyond a reasonable doubt.\textsuperscript{191} A culpability test
such as the bad faith test invites state oppression and favors a pre-
sumption of guilt, rather than a presumption of innocence.\textsuperscript{192}

\textsuperscript{186} See U.S. v. MacDonald, 456 U.S. 1, 17 n.1 (1982) (“there is no statute of
limitations for murder”).

\textsuperscript{187} See Beaird v. State, 772 S.W.2d 116 (Tex. 1989) (statute of limitations for
rape of a child in Texas is five years; also illustrates state’s trend at extending
statute of limitations for rape cases); see People v. Harvey, 571 N.E.2d 1185 (Ill.
1991) (statute of limitations for rape in Illinois is three years).

\textsuperscript{188} Id.

\textsuperscript{189} Interview with Melvin B. Lewis, Professor, The John Marshall Law

\textsuperscript{190} LAFAVE, supra note 84, at 16.

\textsuperscript{191} Establishing guilt beyond a reasonable doubt is a constitutional require-
ment under the due process clause. \textit{Id.} at 17 n.8; \textit{see also id.} at 48-49.

\textsuperscript{192} See supra note 95 describing how states could throw away evidence at
their own whim if states had no duty to preserve evidence. \textit{See also U.S. v.
Bryant, 439 F.2d 642 (D.C. Cir. 1971), aff’d after remand, 448 F.2d 1182 (D.C.
Cir. 1971).}
The duty to preserve evidence should shift from the state to the defendant after a reasonable period of time elapses so as not to impose an unreasonable burden on our criminal justice system.\textsuperscript{193} Justice Blackmun's dissent in\textit{Youngblood} briefly advocates for the burden of preservation to shift from the state to the defendant after a reasonable period of time and after the defendant has been informed of the existence of the evidence.\textsuperscript{194} Justice Blackmun, however, did not specify what length of time constitutes a reasonable time, nor did he take into account defendants who have not yet been apprehended.\textsuperscript{195}

State legislatures should determine reasonable periods of time that police must preserve evidence. Some factors that legislatures should consider in making this decision include costs to the state (including personnel and refrigeration costs), physical burden to the state, the percentage of crimes solved as a factor of years passed, and the fundamental fairness to the defendant forgone by a failure to preserve evidence. The final test should weigh and balance each of these factors.

\textbf{VI. CONCLUSION}

DNA identification analysis has many potential extraordinary applications for solving criminal investigations.\textsuperscript{196} Hopefully, the


\textsuperscript{194} \textit{Youngblood}, 488 U.S. at 70 (Blackmun, J., dissenting). Justice Blackmun stated:

Due process must also take into account the burdens that the preservation of evidence places on the police. Law enforcement officers must be provided with the option, as is implicit in\textit{Trombetta}, of performing the proper tests on physical evidence and then discarding it. Once a suspect has been arrested the police, after a reasonable time, may inform defense counsel of plans to discard the evidence. When the defense has been informed of the existence of the evidence, after a reasonable time the burden of preservation may shift to the defense.

\textit{Id.}

\textsuperscript{195} \textit{Id.}

\textsuperscript{196} Police in England have experimented with a revolutionary process known as Rapid Elimination Mass Screening (REMS). Terry Kirby, \textit{Genetic Testing Breakthrough Allows Mass Screening of Suspects; Forensic Scientists Have Developed a Cheap and Simple Method of Undertaking Mass Screenings of Potential Suspects Using DNA Profiling Technique}, \textit{The Independent}, Aug. 28, 1991, at 6. The process uses mass-screenings of potential suspects in order to determine the perpetrator of a crime. \textit{Id.} REMS uses a simpler version of the supermarket code of RPLS to eliminate conceivable suspects. \textit{Id.} If the lab finds a match between the simple bar code and a suspect, then the prosecution will produce an entire fingerprint for trial. \textit{Id.} Some South Wales detectives have already put the process into practice. \textit{Id.} They plan to profile up to 5,000 potential suspects in the investigation of a murder. \textit{Id.} Potentially, entire towns could be profiled in order to catch a criminal. \textit{Id.}

Also, some states have passed statutes allowing the implementation of a DNA data bank consisting of all convicted felons, including inmates currently incarcerated. \textit{See Judge Holds Virginia's DNA Databank Proposal Constitu-}
proposed federal legislation, addressing the standardization of DNA identification will gain support and become law, and the remaining difficulties with DNA identification will be resolved. In the meantime, states must take the initiative and address the due process deficiencies that Youngblood has created. This entails recognizing the shortcomings of both the materiality and bad faith tests and creating a workable standard which is fundamentally fair to defendants and not too burdensome on law enforcement personnel. States can use state constitutional provisions to create such a test. State legislatures in those states that have and will recognize a duty to preserve evidence should also limit the duty to preserve evidence by shifting the duty to preserve evidence to the defendant after a specific reasonable amount of time has passed. Until states decide these questions, police would benefit from the use of reasonable diligence and newly accepted preservation methods, such as refrigeration, to preserve biological evidence of unresolved cases after the advent of DNA identification. Otherwise, state courts may overturn a conviction based on the defendant’s deprivation of due process if the state has failed to preserve the evidence.\textsuperscript{197} Forensic science’s “most significant breakthrough in resolving serious crime since fingerprinting was invented”\textsuperscript{198} has arrived and seems here to stay. However, states must insure that law enforcement personnel do what is necessary to reap the benefits offered through DNA fingerprinting.

\textit{Albert M.T. Finch, III}