U.S. Department of Justice
Office of Justice Programs
National Institute of Justice

Convicted by Juries, Exonerated by Science:

Case Studies in the Use of DNA Evidence to Establish Innocence After Trial





Research Report

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Convicted by Juries, Exonerated by Science: Case Studies in the Use of DNA Evidence to Establish Innocence After Trial

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Message from the Attorney General

Our system of criminal justice is best described as a search for the truth. Increasingly, the forensic use of DNA technology is an important ally in that search.

The development of DNA technology furthers the search for truth by helping police and prosecutors in the fight against violent crime. Through the use of DNA evidence, prosecutors are often able to conclusively establish the guilt of a defendant. Moreover, as some of the commentaries suggest, DNA evidence—like fingerprint evidence—offers prosecutors important new tools for the identification and apprehension of some of the most violent perpetrators, particularly in cases of sexual assault.

At the same time, DNA aids the search for truth by exonerating the innocent. The criminal justice system is not infallible, and this report documents cases in which the search for truth took a tortuous path. With the exception of one young man of limited mental capacity, who pleaded guilty, the individuals whose stories are told in the report were convicted after jury trials and were sentenced to long prison terms. They successfully challenged their convictions, using DNA tests on existing evidence. They had served, on average, 7 years in prison.

By highlighting the importance and utility of DNA evidence, this report presents challenges to the scientific and justice communities. Among the tasks ahead are the following: maintaining the highest standards for the collection and preservation of DNA evidence; ensuring that the DNA testing methodology meets rigorous scientific criteria for reliability and accuracy; and ensuring proficiency and credibility of forensic scientists so that their results and testimony are of the highest caliber and are capable of withstanding exacting scrutiny.

Meeting these scientific challenges requires continued support for research that contributes to the advancement of the forensic sciences. The research agenda must also enable criminal justice practitioners to understand and to make appropriate use of the rapidly advancing and increasingly available technology.

The National Institute of Justice (NIJ) commissioned this study to encourage discussion of the challenges to the scientific and justice communities

presented by DNA evidence. The commentaries presented here—authored by prominent experts from a variety of disciplines—and the cases documented in the pages that follow, are testimony to the power and potential of DNA evidence. We hope that these commentaries and the NIJ report spur a broader debate about the value of DNA technology and the role of science in the criminal justice system's search for truth.

Janet Reno

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Foreword

Commentaries on DNA Testing

Commentary by Edward J. Imwinkelried

Professor of Law
University of California at Davis

The outcomes in the 28 cases documented in this report dramatize the real nature of the question of standards for determining the admissibility of scientific evidence in the United States.

Until recently, the *Frye* standard governed that question in most jurisdictions. In *Frye* v. *United States*,[1] the court announced that to be admissible, scientific testimony must be based on a technique that has "gained general acceptance in the particular field in which it belongs."[2] The court singled out novel scientific evidence and prescribed a special test for the introduction of such testimony. At one point, that test was the controlling law in both the Federal courts and 45 States.[3] It is true that in 1993 the United States Supreme Court abandoned *Frye* and adopted a more flexible validation standard in *Daubert* v. *Merrell Dow Pharmaceuticals, Inc*.[4] However, the Court decided *Daubert* on statutory rather than constitutional grounds, and, consequently, each State remains free to fashion its own standard for admitting scientific evidence. As of 1995, 22 States apparently remained committed to *Frye*.[5] In short, the conservative general acceptance test is still in place in almost half the States.

Moreover, even in his lead opinion in *Daubert*, Mr. Justice Blackmun indicated that, at least in some respects, trial judges may continue to admit scientific evidence more cautiously and restrictively. The Justice initially pointed to Federal Rule of Evidence 403, authorizing trial judges to exclude logically relevant evidence when "its probative value is substantially out-

[1]293 F.1013 (D.C. Cir. 1923).

[2]Id. at 1014.

[3]Note, 40 *OHIO ST.L.J.* 757, 769 (1979).

[4]113 S.Ct. 2786 (1993).

[5]Meaney, Joseph R., "From *Frye* to *Daubert*: Is a Pattern Unfolding?" 35 *JURIMETRICS* 191, 193 (1994).

weighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury…." The Justice then quoted Judge Weinstein, a distinguished jurist and scholar, as declaring: "[E]xpert evidence can be both powerful and quite misleading because of the difficulty in evaluating it. Because of this risk, the judge in weighing possible prejudice against probative force under Rule 403…exercises more control over experts than over lay witnesses."[6]

Two points must be made. First, Justice Blackmun and Judge Weinstein are voicing conventional wisdom in suggesting that lay jurors attach greater weight to scientific evidence. The California Supreme Court has asserted that a "misleading aura of certainty…often envelops a new scientific process."[7] In a similar vein, the Court of Appeals for the District of Columbia, birthplace of the *Frye* rule, has written that jurors frequently attribute a "mystic infallibility" to scientific testimony.[8]

There have been empirical investigations into the impact that scientific evidence has on lay jurors. Although those studies are far from conclusive, they largely contradict the assertion that scientific evidence overwhelms lay jurors.[9] After surveying the literature, two respected commentators concluded that "the image of a spellbound jury mesmerized by…a forensic expert is more likely to reflect…fantasies than the…realities of courtroom testimony."[10]

Second, and more importantly, the advocates of special restrictions on the admissibility of scientific testimony misunderstand the fundamental nature of the question:

> It is misleading to focus solely on the strengths and weaknesses of scientific evidence. In principle, the judgment must be comparative. To the extent that we discriminate against scientific evidence, subjecting it to uniquely discriminatory, restrictive rules such as *Frye*, we encourage the

[6]138 *F.R.D.* at 632.

[7]*People* v. *Kelly*. 17 Cal. 3d 24, 32, 549 P.2d 1240, 1245, 130 *Cal. Rptr.* 144, 149 (1976).

[8]*United States* v. *Addison*, 498 F.2d 741, 744 (D.C. Cir. 1974).

[9]"Standard for Admitting Scientific Evidence: A Critique from the Perspective of Juror Psychology," 28 *VILL.L.REV.* 554 (1983) 566–70.

[10]Rogers, Richard, and Charles Patrick Ewing, "Ultimate Opinion Prescriptions: A Cosmetic Fix and a Plea for Empiricism," 13 LAW 7 *HUM.BEHAV.* 357, 363 (1989).

> courts to rely on other types of evidence. Thus, our task is not to make an absolute judgment about the merits of scientific evidence. Rather, our task is to compare it with other types of evidence to decide whether the differential treatment of scientific evidence is justifiable.[11]

As the 28 cases collected in this report demonstrate, when we subject new scientific techniques such as DNA typing to special admissibility rules, we force the courts to rely on inferior types of evidence, such as eyewitness testimony. In all 28 cases, without the benefit of DNA evidence, the triers of fact had to rely on eyewitness testimony, which turned out to be inaccurate. In *United States* v. *Wade*,[12] Mr. Justice Brennan noted: "The vagaries of eyewitness identification are well known; the annals of criminal law are rife with instances of mistaken identification." Those annals must now be lengthened to include the 28 wrongful convictions discussed in this report. In roughly two-thirds of the cases, the triers heard testimony based on traditional forms of expertise, such as hair analysis—testimony that passes muster under the *Frye* standard but that, again, turned out to be erroneous. There are numerous proficiency studies establishing that there is a significant margin of error in such traditional forensic techniques.[13] The sobering fact is that in all 28 cases, the error was unmasked—and justice finally served—only because of the novel scientific technique of DNA typing.

The "junk science" controversy has made it tempting to propose special restrictions for scientific evidence, especially testimony resting on relatively new scientific techniques. One lesson to be learned from this report, however, is that before succumbing to that temptation, we should pause to pose two questions. First, have the critics of scientific evidence *proven* that the type of testimony in question presents a unique probative danger—or have they merely made that assertion? Further, if we impose a unique restriction on scientific testimony, on balance are the courts more likely to reach just results—or are we condemning the courts to reliance on suspect types of testimony that call into question the caliber of justice dispensed in our courts? This report should be read with those two questions foremost in mind.

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[11]28 *VILL.L.REV.* at 564.

[12]388 U.S. 218 (1967).

[13]Giannelli, Paul C., "The Admissibility of Laboratory Reports: The Reliability of Scientific Proof," 49 *OHIO ST.L.J.* 671 (1988).

Commentary by Walter F. Rowe

Professor, Department of Forensic Sciences
The George Washington University

The introduction of DNA profiling has revolutionized forensic science and the criminal justice system. DNA technology has given police and the courts a means of identifying the perpetrators of rapes and murders with a very high degree of confidence.

As recently as the late 1960s, the only methods available for genetic marker analysis of blood and other body fluids were the Lattes test, the absorption-elution test, and the absorption-inhibition test. Only ABO blood group substances and ABO isoantibodies could be detected in biological stain evidence. Over the intervening years, electrophoretic methods for typing polymorphic proteins—such as phosphoglucomutase, esterase D, glyoxalase, hemoglobin, and haptoglobin—became available.

While these methods are in theory capable of greatly narrowing down the possible sources of biological stain evidence, they often fail to yield a result because of deterioration of the genetic marker. They even can yield completely erroneous results.

For a variety of reasons, DNA profiling has significantly advanced the analysis of biological stain evidence. First, these methods are intrinsically more discriminating than the methods of genetic marker analysis heretofore used. DNA profiling is more likely to exonerate a wrongly accused suspect. Second, the DNA molecule is more stable than polymorphic proteins. Third, microbial degradation does not lead to erroneous typing results.

An unforeseen consequence of the introduction of DNA profiling has been the reopening of old cases. Persons convicted of murder and rape before DNA profiling became available have sought to have the evidence in their cases reevaluated using this new technology. In some cases, DNA test results have exonerated those convicted of the offenses and resulted in their release from prison.

The National Institute of Justice commissioned a research study of such DNA exculpatory cases. Conducted by the Institute for Law and Justice and described in this report, the study has identified 28 cases in which DNA testing led to the exoneration of persons previously convicted of murder or rape.

Most forensic scientists involved in DNA analysis have been aware that in some cases, DNA profiling has been instrumental in correcting injustices. Previously, however, almost all the information had been anecdotal. This report assembles a wealth of information on such cases, and the accounts of exculpatory DNA cases it presents will go a long way toward countering uninformed attacks on forensic DNA testing. Study results also should provide strong arguments for law enforcement officials who seek funding from State legislatures to establish forensic DNA laboratories. Furthermore, the study should completely dispel any lingering public perception of forensic DNA testing as a threat to civil liberties.

At the same time, the study also raises several important issues that need to be confronted by the legal community, law enforcement agencies, and the forensic science profession. The careful reader of this report will note the number of cases in which law enforcement agencies and prosecutors went forward with criminal prosecutions when only minimal genetic marker data were available. Critics of DNA typing who have opposed the admission of any DNA evidence should ponder the likely consequences of such an absolute prohibition: Law enforcement agencies and forensic science laboratories would be compelled to revert to the older and less discriminating serological methods (such as ABO blood typing and polymorphic protein typing). Many innocent defendants who would be exonerated by DNA typing would instead be prosecuted because the less powerful techniques failed to exclude them.

A second important issue is the number of cases in which there was misconduct on the part of the prosecution's scientific experts. For example, the forensic serologist who testified against Gary Dotson failed to disclose that, because the alleged victim was also a type B secretor, the fraction of the male population that could have contributed the semen found on the vaginal swabs exceeded 60 percent, making the serological evidence in the case probative of very little.[1] In this instance, the prosecution's expert witness

[1]Webb, Cathleen Crowell, and Marie Chapian, *Forgive Me*, New York: Berkeley Books, 1986.

failed to volunteer potentially exculpatory information but did not actually lie under oath.

Three cases discussed in this report involved expert scientific testimony by Fred Zain. Mr. Zain was a forensic serologist in the West Virginia State Police Crime Laboratory for a number of years; he then worked briefly as a forensic serologist for the Bexar County (Texas) Medical Examiner's Office. Mr. Zain's conduct as a forensic serologist was called into question when the results of a DNA test freed Glen Woodall. At Mr. Woodall's original trial, Zain testified that Woodall's ABO, phosphoglucomutase (PGM), glyoxalase (GLO), and secretor types matched those found in the semen sample. Such an event is possible but highly unlikely given that Woodall was unambiguously excluded by subsequent DNA tests. A special commission convened by order of the West Virginia Supreme Court of Appeals investigated Zain and the West Virginia State Police Crime Laboratory. As a result of this investigation, the State Supreme Court ruled that none of the testimony given by Zain in more than 130 cases was credible.[2] The court further ordered that Zain be indicted for perjury.[3] It is sobering to reflect that but for the adventitious appearance of DNA typing, Glen Woodall would still be languishing in prison and Fred Zain might still be sending innocent persons to prison.

The advent of DNA typing will go a long way toward preventing miscarriages of justice, like the Dotson and Woodall cases, in the future. Most wrongly accused suspects will be exonerated during the initial testing of physical evidence, long before prosecution would even be considered. The quantity and quality of documentation required by laboratory quality assurance/quality control protocols preclude the wholesale falsification of test results. The minuscule quantities of DNA required for PCR-based typing procedures also allow the preservation of sufficient DNA for independent laboratory testing.

One problem that DNA testing will not remedy is inadequate legal counsel. In case after case reported here, defense counsel failed to consult competent scientific experts. Even a neophyte forensic serologist would have detected the problems with the prosecution's serological evidence in the Dotson

[2]"Court Invalidates a Decade of Blood Test Results in Criminal Cases," *New York Times* (November 12, 1993):A20.

[3]Harper, Jane, "West Virginia Court Wants Forensics Expert Prosecuted," *Houston Post* (July 17, 1994):A22.

case. It is also clear that in case after case, defense counsel failed to review the case notes of the prosecution's forensic serologists. Even a layperson would have seen that Fred Zain's written reports and sworn testimony were contradicted by his case notes. Again, one has to reflect on the likelihood that numerous innocent persons are presently incarcerated because of the inadequacy of their attorneys.

This National Institute of Justice report on DNA exculpatory cases is a unique contribution to the growing literature on forensic DNA profiling. It should be read and pondered by anyone having an interest in this burgeoning field of forensic science.

Commentary by Rockne Harmon

Senior Deputy District Attorney
Alameda County, California

The introduction of forensic DNA typing into the legal system was heralded as the most significant event in criminalistics since dermal fingerprint identification. Few developments ever live up to their advance billing—but DNA has!

Cases are now being prosecuted that never would have been possible before the advent of DNA typing. Many States have created DNA data bases on known offenders that they compare against unsolved crimes. Several States have produced matches from their data base searches, and a handful of these cases already have been successfully prosecuted.

About 9 years after its introduction, forensic DNA typing is still used only selectively. This is due, in part, to several factors: the unavailability of forensic typing to local prosecutors, the time required to perform the typing, and the costs of the tests if private laboratories are utilized.

When forensic DNA typing is performed in cases under investigation or still pending in court, the results occasionally exonerate a suspect or suspects. Such cases rarely are front-page news because the tests have served their purpose. Investigators can redirect their efforts to alternative suspects. Prosecutors can dismiss charges filed against innocent suspects.

This report reviews more than two dozen cases in which forensic DNA typing ultimately exonerated suspects or defendants. Most were prosecuted at a time when forensic DNA typing was not available to police or prosecutors. Each case has a slightly different sequence and series of events. Because of these differences, each case provides additional insight into how the legal system might avoid the pitfalls of the past, whether or not the testing is performed in pending or postconviction cases.

Some already have used the cases discussed in this report to argue that hundreds more innocent defendants are in prison. They contend that the current "exclusion" rate for forensic DNA labs—close to 25 percent—suggests that

a similar percentage of innocent defendants were wrongly convicted before the availability of forensic DNA typing. Unfortunately, too many variables are contained in the “exclusion” rate to draw any meaningful conclusions from it. Furthermore, nothing about the cases reviewed here necessarily supports such a conclusion.

The only clear conclusion that can be drawn is that this new technology can be used within the existing legal framework to undo past injustices. In other words, both the science and the legal system worked in these cases! This report provides additional insights into how such cases can be identified in the future.

Commentary by Ronald S. Reinstein

Presiding Judge, Criminal Department
Superior Court of Arizona
Maricopa County

This report is an excellent example of the marriage between science and law and of the invaluable resource that DNA evidence has become in the forensic field. When justice can be served in such dramatic fashion by the exoneration of previously adjudged guilty individuals, science demonstrates its practical effect.

Yet the 28 cases cited in the report relate only to individuals released from prison because of DNA testing. Vastly more far-reaching in the long run is the use of DNA typing both to exclude some suspects who otherwise might be charged and to identify many other suspects who might not have been charged but for the DNA typing.

What is frustrating to many who are excited about the possibilities of the use of DNA in the forensics area is the slow pace it is traveling on the road to admissibility. Many jurisdictions do not have sufficient funds to establish their own laboratories or to send to private laboratories items of evidence for typing. Laboratories that perform testing often have backlogs measured in months. Courts, prosecutors, and defense counsel impose a great burden on laboratories' time in the usual discovery battles that occur whenever a new technique arrives on the forensic scene.

It is interesting to observe how quickly some DNA-evidence opponents embrace the science when it benefits certain defendants' interests but how defensive they become when the evidence points *toward* other defendants. But this is not unique to DNA evidence.

It is the responsibility of the court to promote the search for truth. If that search can be assisted by science that can give reliable results, the whole system as well as society benefits. It is also the responsibility of the court to try to prevent juror confusion caused by lawyers and experts who sometimes seem unable to explain scientific evidence in language the jury understands.

The future should be brighter as the technology improves so that the process of DNA typing will likely become much quicker, less complex, and less expensive. The battle of the experts, it is hoped, will also subside eventually, especially in the confusing area of the statistical meaning of a match.

The conflict between various forensic experts, population geneticists, and statisticians on "the meaning of a match" is a prime example of how science and the law sometimes do not mesh, especially in jurisdictions that follow the *Frye* test of general acceptance in the scientific community. The numbers being bandied about by various experts are almost beyond comprehension for trial jurors.

It seems logical to allow relevant, reliable, qualitative expert opinion—for example, that the probability of a random match in DNA testing is extremely remote given a reliable multilocus match. Likewise, experts should be able to testify from their experience about whether they are aware of random matches at four or five loci of unrelated individuals, and whether one evidence sample matches another to a reasonable degree of scientific certainty. There is a serious question about whether DNA-match testimony should be treated any differently from that of fingerprints, bite marks, hair and fiber samples, ballistics, shoe prints, and the like.

Restrictions currently imposed in some jurisdictions on the use of DNA evidence unreasonably divest such evidence of its compelling nature. If our justice system's goal is the continuing search for truth, as evidenced by the results of the study described in this report, then a similar argument can be made for the admissibility of relevant and reliable DNA-match testimony in our courts.

Commentary by George W. Clarke and Catherine Stephenson

Deputy District Attorneys
San Diego County, California

The study described in this report highlights significant aspects of the use of DNA evidence in the investigation and prosecution of criminal cases. While DNA typing is employed in various types of criminal cases (e.g., murder, robbery, kidnaping), the majority of DNA investigations entail sexual assault offenses. Indeed, in all of the cases reported in this study, sexual assault was alleged alone or in tandem with other crimes.

That the majority of DNA profiling cases concern sexual assault—usually rape—is not surprising. In few other criminal endeavors is the perpetrator as likely to deposit significant physical evidence. Occasionally, that evidence is hair, blood, or saliva; more often it is semen. Of the 28 cases reported in this study, all but two appear to have involved the analysis of the sperm component of the semen. Sexual assault cases by their very nature normally include evidence rich in DNA profile evidence.

Our enthusiasm for the use and interpretation of DNA typing, however, should be tempered inasmuch as the vast majority of sexual assault cases involving both child and adult victims do not require resolution of identity. The majority of child and adult sexual assault cases presented to us for determinations of whether to file criminal charges involve a perpetrator known to the victim. The defense normally presented is consent. In other cases, there is a denial that any sexual act occurred at all. These cases frequently do not involve physical evidence of sexual assault (injury, semen, saliva). This absence of physical evidence can be due to delay on the part of the victim in making a report to the police or to the very nature of the act, such as fondling, which is unlikely to result in the deposit or recovery of trace evidence. In such cases, the prosecutor first must resolve whether an assault even took place.

This report emphasizes that in those cases where identity *is* an issue, law enforcement officers must be diligent in the search for DNA evidence both

at the scene and in or on the victim. Careful and timely collection and preservation of evidentiary material is critical. Collecting the bed sheets before they are washed and recovering evidence from the victim before the victim showers are important components of effective investigation. Thorough, well-documented, and honestly disseminated interviews of the victim are equally critical.

Forensic DNA typing laboratories—as numerous commentators have noted—encounter rates of exclusion of suspected attackers in close to 25 percent of cases. Careful examination of such results is commonly required whether in the pre- or postconviction setting. Typing results that exclude a suspected assailant may not demonstrate innocence. Not uncommonly, evidence collected and subjected to DNA profiling may reveal results from biological material left by other consensual sexual partners unrelated to the offense investigated or from other individuals having contact with the victim. Consideration of those results in the context of all other evidence in a specific case is essential to the determination of what took place. Law enforcement officers, prosecutors, and judges must conscientiously undertake such examinations in order to fulfill the factfinding functions with which they are entrusted.

As this report notes, judges and juries may soon routinely expect DNA typing evidence in sexual assault cases as the use of DNA technology becomes more widely known. DNA profiling evidence can speak, but not with the passion of a victim's voice. DNA typing results can shed light on "who"; it cannot explain precisely when, or how, or even why. The victim who survives the sexual assault must always be the primary and most important source of information.

Commentary by Matt L. Rodriguez

Superintendent of Police
Chicago Police Department

Criminal justice in the United States is a system founded on skepticism. "Innocent until proven guilty" and "beyond reasonable doubt" reflect more than the systematic doubt and deferred judgment that are afforded individuals accused of crime in our society. These maxims help define the incredibly high standards that the system's practitioners must meet before someone can be judged guilty.

In recent years police and prosecutors have increasingly turned to technology as a way to achieve these standards of proof with greater efficiency and effectiveness. Throughout the Nation, law enforcement agencies have entered an era in which high technology is not only desirable but also necessary to combat crime and ensure justice. Recent advances in forensic and biometric technologies, in particular, have created enormous opportunities for law enforcement to identify offenders with greater speed and certainty.

But while new technology presents opportunities, it is not without its challenges. The rate of change in technology, already fast-paced, is accelerating rapidly. And the demands on law enforcement are increasing dramatically in terms of both case volume and complexity. This environment of change exerts tremendous pressure on today's law enforcement administrators. Not only must we figure out what new technology to acquire and when to acquire it, but, just as importantly, we must ensure that our internal policies and operational procedures are keeping pace with advances in technology.

This study of DNA analysis in exculpatory cases highlights—in a very "real world" manner—both the opportunities and the challenges that this particular technology poses for law enforcement.

As a forensic science tool for criminal justice, DNA analysis has a relatively short history, dating back to groundbreaking cases in the late 1980s. What is significant about this "start date," from a law enforcement perspective, is that it stands in stark contrast to the age and experience levels of many of our police officers, especially those in larger cities. With an average age

oftentimes of 40 or more, and with many police officers having 15, 20, or more years of experience, police departments today are populated with officers who did not grow up with DNA analysis and similar technologies. The result is that many agencies are still playing "catch up" when it comes to operating in today's high-technology world.

At the same time, the O.J. Simpson case and other recent sensational trials have put law enforcement under an intensely powerful microscope, examining our most basic procedures for collecting, processing, and caring for evidence. Although such scrutiny is never comfortable, it is appropriate and welcome, for the ultimate test of what we do in policing is in the courtroom. Increased scrutiny has challenged police departments to become more knowledgeable about DNA technology and more professional in evidence collection and processing. How we respond to this challenge will be crucial to our success and to the cause of justice in an even higher tech future.

Typically, when faced with challenges of this magnitude, law enforcement's first reaction is to concentrate on the specialists within our profession—in this case, the evidence technicians and crime laboratory analysts. These people are certainly critical to the effective processing of evidence, especially in the current environment of scrutiny and technological sophistication. But it is a mistake for law enforcement to focus solely on these specialists. Extensive and up-to-date training and procedures need to be provided to all of our police officers.

As the first responders to most crime scenes, patrol officers in particular must be aware of the potential opportunities and pitfalls posed by DNA technology, just as they must be extremely sensitive to the full range of evidentiary matters involved in protecting and processing crime scenes. Up and down the chain of command as well, police personnel must become more knowledgeable about DNA technology and more aware of, and responsive to, its implications for crime-scene and evidence processing. In the post-O.J. Simpson era, the handling of evidence until it reaches the crime laboratory will be as important as the laboratory technology, conditions, or procedures themselves.

Although the challenges posed by DNA analysis are many, they are outweighed by the enormous possibilities the technology presents. DNA analysis is a powerful and often necessary tool for establishing *the presence or absence* of someone at a crime scene. Readers of this study must remember that this issue cuts both ways.

In the future we must reduce the likelihood of innocent persons being wrongly convicted, just as we must *increase* the chances of guilty parties being identified and held responsible for the crimes they commit. This can be achieved through continued refinement of DNA technology, coupled with better training and procedures to ensure that evidence is skillfully gathered, stored, and submitted for analysis. When used properly and appropriately, DNA analysis can permit us to address the skepticism and doubt that are intrinsic to our system of justice.

Commentary by Peter Neufeld, Esq. and Barry C. Scheck

Mr. Scheck Is Professor of Law and
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Postconviction DNA exonerations provide a remarkable opportunity to re-examine, with greater insight than ever before, the strengths and weaknesses of our criminal justice system and how they bear on the all-important question of factual innocence. The dimensions of the factual innocence problem exceed the impressive number of postconviction DNA exonerations listed in this report. Indeed, there is a strong scientific basis for believing these matters represent just the tip of a very deep and disturbing iceberg of cases. Powerful proof for this proposition lies with an extraordinary set of data collected by the Federal Bureau of Investigation (FBI) since it began forensic DNA testing in 1989.

Every year since 1989, in about 25 percent of the sexual assault cases referred to the FBI where results could be obtained (primarily by State and local law enforcement), the primary suspect has been excluded by forensic DNA testing. Specifically, FBI officials report that out of roughly 10,000 sexual assault cases since 1989, about 2,000 tests have been inconclusive (usually insufficient high molecular weight DNA to do testing), about 2,000 tests have excluded the primary suspect, and about 6,000 have "matched" or included the primary suspect.[1] The fact that these percentages have remained constant for 7 years, and that the National Institute of Justice's informal survey of private laboratories reveals a strikingly similar

[1]Although there is no sure way to determine what the results would have been on the inconclusive tests if results had been obtainable, it seems a fair assumption, given the strong trends over a 7-year period, that the percentages of exclusions and inclusions of the primary suspect would have run about the same as the cases where results were obtainable. Indeed, since most of the FBI's cases since 1989 involved RFLP tests, which require greater amounts of sample than PCR-based testing, it would be interesting to test this hypothesis by performing PCR tests on some of the old inconclusive cases where primary suspects were either acquitted or convicted.

26-percent exclusion rate, strongly suggests that postarrest and postconviction DNA exonerations are tied to some strong, underlying systemic problems that generate erroneous accusations and convictions.

It must be stressed that the sexual assault referrals made to the FBI ordinarily involve cases where (1) identity is at issue (there is no consent defense), (2) the non-DNA evidence linking the suspect to the crime is eyewitness identification, (3) the suspects have been arrested or indicted based on non-DNA evidence, and (4) the biological evidence (sperm) has been recovered from a place (vaginal/rectal/oral swabs or underwear) that makes DNA results on the issue of identity virtually dispositive.

It is, of course, possible that some of the FBI's sexual assault exclusions have included false negatives. False negatives could occur, for example, because of (1) laboratory error; (2) situations where the victim of the assault conceals the existence of a consensual sexual partner within 48 hours of the incident *and* the accused suspect did not ejaculate (if the suspect ejaculated, the DNA should be identified along with the undisclosed sexual partner); or (3) multiple assailant sexual assault cases where none of the apprehended suspects ejaculated (the FBI counts the exclusion of all multiple suspects in a case as just one exclusion). Nonetheless, even with these caveats, it is still plain that forensic DNA testing is prospectively exonerating a substantial number of innocent individuals who would have otherwise stood trial, frequently facing the difficult task of refuting mistaken eyewitness identification by a truthful crime victim who would rightly deserve juror sympathy.

Without DNA testing, the prospects of wrongful convictions in these exclusion cases are evident. Even if one assumes half the normal conviction rate (State conviction rates for felony sexual assaults average about 62 percent), one would expect that hundreds of people who have been exonerated by FBI DNA testing in sexual assault cases over the last 7 years would have otherwise been convicted.

The Institute for Law and Justice report does not purport to be more than a quick survey, based primarily on press clippings and summary interviews, of postconviction DNA exoneration cases, and it does not undertake any systematic analysis of them. Since we have been, through the Innocence Project at Cardozo Law School, either attorneys of record or assisting counsel in the vast majority of these cases, we have attempted to

investigate, with care and in detail, some of the factors that have led to the conviction of the innocent.[2]

Interestingly, in many respects the reasons for the conviction of the innocent in the DNA cases do not seem strikingly different than those cited by Yale Professor Edwin Borchard in his seminal work, *Convicting the Innocent* (Garden City Pub., 1932), which reviewed 65 cases, and more recently by Hugo Bedau and Michael Radelet in *In Spite of Innocence* (Northeastern University Press, 1992), which reviewed 416 erroneous convictions in death cases from 1900 to 1991. Mistaken eyewitness identification, coerced confessions, unreliable forensic laboratory work, law enforcement misconduct, and ineffective representation of counsel, singly and often in combination, remain the leading causes of wrongful convictions.

There are, however, historically unique aspects to the DNA exoneration cases. Most significantly, both the postconviction cases described in this report and the prospective sexual assault exclusions produced by the FBI and other laboratories create an opportunity for groundbreaking criminal justice research.

Take, for instance, just the FBI's sexual assault cases. One can confirm among these cases, with greater scientific assurance than is ordinarily provided by a trial verdict, which suspects charged were truly innocent and which suspects were truly guilty. We believe it crucial to identify, prior to any DNA testing, precisely what factors in the investigatory and charging process produced incorrect results in some of these cases and correct results in others. Are there systemic weaknesses that can be identified in eyewitness identification procedures, crime scene investigations, non-DNA labora-

[2]While we would be the last to discount the possibility of laboratory error in any DNA testing case, be it an exclusion or an inclusion, great pains have been taken in the postconviction DNA exoneration cases to minimize this factor. First, it must be stressed that these cases, even if involving a homicide, have invariably involved analysis of sperm from swabs (vaginal, oral, or anal) or from clothes worn by the victim. Thus, the chance of inadvertently cross-contaminating the samples with someone else's sperm is remote. Secondly, sexual assault evidence provides an intrinsic redundancy, or internal control, in that the DNA profile from epithelial cells found in samples can be cross-checked against the known DNA profile of the victim. Finally, before convicted prisoners have been released, either through postconviction court orders or clemency grants from governors, the prosecution has insisted upon independent testing of samples by their own experts and elimination samples from other possible sperm donors (husbands or boyfriends) even if it was the prosecution's position at trial that the sperm came from the perpetrator.

tory tests (hair, fiber, etc.), police interrogation techniques, or other investigatory methods used by police and prosecutors that are conducive to false or true arrests and convictions? Perhaps there has never been a richer or more exciting set of cases for criminal justice researchers to explore in terms of shedding light on how law enforcement methods impact the crucial problem of factual innocence.

Finally, notwithstanding the research opportunities presented by the postarrest and postconviction DNA exoneration cases as to *how* wrongful accusations and convictions occur, the most significant implication of these cases is already apparent—the extent of factually incorrect convictions in our system must be much greater than anyone wants to believe. Postarrest and postconviction DNA exonerations have invariably involved analysis of sexual assault evidence (sperm), even if a murder charge was involved, that proved the existence of mistaken eyewitness identification. Since there does not seem to be anything inherent in sexual assault cases that would make eyewitnesses more prone to mistakes than in robberies or other serious crimes where the crucial proof is eyewitness identification, it naturally follows that the rate of mistaken identifications and convictions is similar to DNA exoneration cases.

The recently passed anti-terrorism bill contains a sweeping and unprecedented curtailment of the right to obtain postconviction habeas corpus relief in the Federal courts: Strict time limits (1 year in nondeath cases, 3 months in death cases) have been set for filing the writ; State court factual findings are "presumed to be correct"; State court misinterpretations of the United States Constitution are not a basis for relief unless those misinterpretations are "unreasonable"; and all petitioners must show, prior to obtaining a hearing, facts sufficient to establish by clear and convincing evidence that but for the constitutional error, no reasonable factfinder would have found the petitioner guilty. In short, just as DNA testing, the most important technological breakthrough of twentieth century forensic science, demonstrates that the problem of wrongful convictions in America is systemic and serious, Congress and the President, in our view, have eviscerated the "great writ" that for two centuries provided relief to those who were unjustly convicted. Hopefully, before this century closes, as the ramifications of the DNA exoneration cases become better understood, this triumph of political expediency over America's traditional concerns for liberty and justice will be redressed.

CHAPTER I

Introduction

“I had,” said he, “come to an entirely erroneous conclusion which shows, my dear Watson, how dangerous it always is to reason from insufficient data.”

Arthur Conan Doyle, ***The Adventure of the Speckled Band***

One way to view science is that it is a search for truth.[1] Forensic science is no exception. As Attorney General Janet Reno emphasized, "The use of forensic science as a tool in the search for truth allows justice to be done not only by apprehending the guilty but also by freeing the innocent."[2]

This report describes a study that focused on the freeing of the innocent—persons initially convicted and imprisoned but later released through postconviction forensic use of DNA technology.

Purpose and Scope of the Study

The principal purpose of the study, initiated in June 1995, was to identify and review cases in which convicted persons were released from prison as a result of posttrial DNA testing of evidence. As of early 1996, researchers had found 28 such cases: DNA test results obtained subsequent to trial proved that, on the basis of DNA evidence, the convicted persons could not have committed the crimes for which they were incarcerated.

The study also involved a survey of 40 laboratories that conduct DNA testing.

This report does not probe the strengths or weaknesses of forensic DNA technology when applied to criminal cases.[3] The discussion of DNA instead is limited to its use in exculpating convicted defendants serving prison sentences.

The authors do not claim to be scientific experts in DNA technology. This report cites reference materials that probe technological details more deeply than occurs on these pages.

The balance of this chapter outlines the study's design and provides basic background information on forensic DNA identification testing. Chapters II and III, respectively, present the study's findings and their policy implications. The final chapter consists of brief profiles of the 28 exculpatory cases. A glossary defines DNA-related terms, and the appendix reports DNA test results for some of the exculpated persons profiled in this report.

Study Design

To identify cases that met study criteria—defendant conviction, imprisonment, and subsequent exoneration and release resulting from posttrial exculpatory DNA tests—researchers examined legal and newspaper data bases and interviewed a variety of legal and DNA experts. Once initially identified as likely candidates for the study, cases were verified and assessed through interviews with the involved defense counsel, prosecutors, and forensic laboratory staff; through reviews of court opinions; and, in some instances, through examinations of case files.

For example, initial identification of the Glen Woodall case resulted from an automated search of newspaper data bases, which identified articles about the case in several West Virginia newspapers, the *Philadelphia Inquirer*, and the *Cleveland Plain Dealer*. An opinion by the West Virginia Supreme Court of Appeals in the appeal of Woodall's conviction (*State* v. *Woodall*, 385 S.E.2d 253, W. Va. 1989) contained the name of Woodall's defense attorney, who was called and interviewed at length and who provided materials related to the criminal case.

Those materials described improper activities by Fred Zain, once a serologist for the West Virginia State Police. A phone conversation with the West Virginia assistant attorney general handling the Zain misconduct cases resulted in the receipt of public case documents containing extensive details on Zain's activities related to the Woodall investigation and prosecution.

A review of transcripts from the criminal and, later, civil cases yielded the name of the laboratory that conducted the DNA testing that exculpated Woodall. A lengthy interview was conducted with the laboratory's forensic scientist who performed the DNA tests on the Woodall evidence. He provided documentation related to his examinations in the case.

Cases related to a special West Virginia Supreme Court of Appeals investigation into government misconduct surrounding Woodall's case (438 S.E.2d 501, W. Va. 1993; 445 S.E.2d 165, W. Va. 1994) also were reviewed.

Researchers collected information for the survey of DNA-testing laboratories through telephone interviews. An experienced crime laboratory director assisted the Institute for Law and Justice in conducting the survey.

This study, conducted in a short time period with limited funding, reflects a modest level of analysis and focuses on a relatively small number of cases.

One can state with confidence, however, that as of the study's completion, the 28 cases identified represent most of the situations in the country where convicted felons had been released from prison on the basis of postconviction DNA testing.[4]

Background on Forensic Use of DNA Identification Testing

Perhaps the most significant advance in criminal investigation since the advent of fingerprint identification is the use of DNA technology to help convict criminals or eliminate persons as suspects. DNA analyses on saliva, skin tissue, blood, hair, and semen can now be reliably used to link criminals to crimes. Increasingly accepted during the past 10 years, DNA technology is now widely used by police, prosecutors, defense counsel, and courts in the United States.

An authoritative study on the forensic uses of DNA, conducted by the National Research Council of the National Academy of Sciences, has noted that:

> …the reliability of DNA evidence will permit it to exonerate some people who would have been wrongfully accused or convicted without it. Therefore, DNA identification is not only a way of securing convictions; it is also a way of excluding suspects who might otherwise be falsely charged with and convicted of serious crimes.[5]

Forensic use of DNA technology in criminal cases began in 1987 when police asked Dr. Alec J. Jeffreys (who coined the term "DNA fingerprints"[6]) of Leicester University (England) to verify a suspect's confession that he was responsible for two rape-murders in the English Midlands.[7] Tests proved that the suspect had not committed the crimes. Police then began obtaining blood samples from several thousand male inhabitants in the area to identify a new suspect.[8] In another 1987 case in England, Robert Melias became the first person convicted of a crime (rape) on the basis of DNA evidence.[9]

In one of the first uses of DNA in a criminal case in the United States, in November 1987, the Circuit Court in Orange County, Florida, convicted Tommy Lee Andrews of rape after DNA tests matched his DNA from a blood sample with that of semen traces found in a rape victim.[10]

Two other important early cases involving DNA testing are *State* v. *Woodall*[11] and *Spencer* v. *Commonwealth.*[12] In *Woodall*, the West Virginia Supreme Court was the first State high court to rule on the admissibility of

DNA evidence. The court accepted DNA testing by the defendant, but inconclusive results failed to exculpate Woodall. The court upheld the defendant's conviction for rape, kidnaping, and robbery of two women. Subsequent DNA testing determined that Woodall was innocent, and he was released from prison (see the case profile in chapter IV for more details).

The multiple murder trials in Virginia of Timothy Wilson Spencer were the first cases in the United States where the admission of DNA evidence led to guilty verdicts resulting in a death penalty. The Virginia Supreme Court upheld the murder and rape convictions of Spencer, who had been convicted on the basis of DNA testing that matched his DNA with that of semen found in several victims. In *Spencer*, the defendant's attack upon the introduction of DNA evidence was limited to the contention that its novelty should lead the court to "hold off until another day any decision …"[13] There was no testimony from expert witnesses that challenged the general acceptance of DNA testing among the scientific community.[14]

The first case that seriously challenged a DNA profile's admissibility was *People* v. *Castro*;[15] the New York Supreme Court, in a 12-week pretrial hearing, exhaustively examined numerous issues relating to the admissibility of DNA evidence. Jose Castro was accused of murdering his neighbor and her 2-year-old daughter. A bloodstain on Castro's watch was analyzed for a match to the victim. The court held the following:

- DNA identification theory and practice are generally accepted among the scientific community.
- DNA forensic identification techniques are generally accepted by the scientific community.
- Pretrial hearings are required to determine whether the testing laboratory's methodology was substantially in accord with scientific standards and produced reliable results for jury consideration.

The *Castro* ruling supports the proposition that DNA identification evidence of *exclusion* is more presumptively admissible than DNA identification evidence of *inclusion*. In *Castro*, the court ruled that DNA tests could be used to show that blood on Castro's watch was not his, but tests could not be used to show that the blood was that of his victims.

In *Castro*, the court also recommended extensive discovery requirements for future proceedings, including copies of all laboratory results and reports;

explanation of statistical probability calculations; explanations for any observed defects or laboratory errors, including observed contaminants; and chain of custody of documents. These recommendations soon were expanded upon by the Minnesota Supreme Court, in *Schwartz* v. *State*,[16] which noted, "…ideally, a defendant should be provided with the actual DNA sample(s) in order to reproduce the results. As a practical matter, this may not be possible because forensic samples are often so small that the entire sample is used in testing. Consequently, access to the data, methodology, and actual results is crucial…for an independent expert review."[17]

In *Schwartz*, the Supreme Court of Minnesota refused to admit the DNA evidence analyzed by a private forensic laboratory; the court noted the laboratory did not comply with appropriate standards and controls. In particular, the court was troubled by failure of the laboratory to reveal its underlying population data and testing methods. Such secrecy precluded replication of the test.

In summary, courts have successfully challenged improper application of DNA scientific techniques to particular cases, especially when used to declare "matches" based on frequency estimates. However, DNA testing properly applied is generally accepted as admissible under *Frye*[18] or *Daubert*[19] standards.[20] As stated in the National Research Council's 1996 report on DNA evidence, "The state of the profiling technology and the methods for estimating frequencies and related statistics have progressed to the point where the admissibility of properly collected and analyzed DNA data should not be in doubt."[21] At this time, 46 States admit DNA evidence in criminal proceedings. In 43 States, courts have ruled on the technology, and in 3 States, statutes require admission (see exhibit 1).

Exhibit 1. DNA Evidence Admission in Criminal Trials by State

State	DNA Admitted	State	DNA Admitted
Alabama	Yes	Montana	Yes
Alaska	Yes	Nebraska	Yes
Arizona	Yes	Nevada	Statute
Arkansas	Yes	New Hampshire	Yes
California	Yes*	New Jersey	Yes*
Colorado	Yes	New Mexico	Yes
Connecticut	Yes	New York	Yes
Delaware	Yes	North Carolina	Yes
Florida	Yes	North Dakota	No
Georgia	Yes	Ohio	Yes
Hawaii	Yes	Oklahoma	Statute
Idaho	Yes	Oregon	Yes
Illinois	Yes*	Pennsylvania	Yes
Indiana	Yes	Rhode Island	No
Iowa	Yes	South Carolina	Yes
Kansas	Yes	South Dakota	Yes
Kentucky	Yes	Tennessee	Statute
Louisiana	Yes	Texas	Yes
Maine	No	Utah	No
Maryland	Yes*	Vermont	Yes
Massachusetts	Yes	Virginia	Yes
Michigan	Yes	Washington	Yes
Minnesota	Yes	West Virginia	Yes
Mississippi	Yes	Wisconsin	Yes
Missouri	Yes	Wyoming	Yes

* Decision by Intermediate Court of Appeals

Notes

1. “Science is the search for truth—it is not a game in which one tries to beat his opponent, to do harm to others.”—Linus Pauling, 1958. Cited in Beck, Emily Morison (ed.), *Familiar Quotations*, Boston: Little, Brown and Company, 1980.

2. Keynote address by Attorney General Janet Reno before the American Academy of Forensic Sciences, Nashville, Tennessee, February 21, 1996.

3. For articles debating the forensic use of DNA technology, see Thompson, William, “Evaluating the Admissibility of New Genetic Identification Tests: Lessons from the DNA War,” *The Journal of Criminal Law & Criminology*, 84, 1 (1993):22–104; Harmon, Rockne, “Legal Criticisms of DNA Typing: Where’s the Beef?” *The Journal of Criminal Law & Criminology*, 84, 1 (1993):175–188; and Neufeld, Peter, “Have You No Sense of Decency?” *The Journal of Criminal Law & Criminology*, 84, 1 (1993):189–202.

4. The study’s results have been reviewed by many persons, including those involved in a peer review process. To date, no one has identified additional cases that, as of the study’s completion in February 1996, are the type examined in this report.

5. National Research Council, National Academy of Sciences, *DNA Technology in Forensic Science*, Washington, D.C.: National Academy Press, 1992:156. (Cited as NRC report.) Another reference source is McKenna, Judith, J. Cecil, and P. Coukos, “Reference Guide on Forensic DNA Evidence,” *Reference Manual on Scientific Evidence*, Federal Judicial Center (1994). This guide has a useful glossary of terms at p. 323.

6. Jeffreys, Alec J., Victoria Wilson, and Swee Lay Thein, “Hypervariable ‘Minisatellite’ Regions in Human Nature,” *Nature*, 314 (1985):67; “Individual-Specific ‘Fingerprints’ of Human DNA,” *Nature*, 316 (1985):76.

7. The first reported use of DNA identification was in a noncriminal setting to prove a familial relationship. A Ghanaian boy was refused entry into the United Kingdom (U.K.) for lack of proof that he was the son of a woman who had the right of settlement in the U.K. Immigration authorities contended that the boy could be the nephew of the woman, not her son. DNA testing showed a high probability of a mother-son relationship. The U.K. Government accepted the test findings and admitted the boy. See Kelly, K.F, J.J. Rankin, and R.C. Wink, “Methods and Applications of DNA Finger-

printing: A Guide for the Non-Scientist," *Criminal Law Review* (1987):105, 108; Note, "Stemming the DNA Tide; A Case for Quality Control Guidelines," *Hamline Law Review*, 16 (1992):211, 213–214.

8. Gill, Peter, Alec J. Jeffreys, and David J. Werrett, "Forensic Application of DNA Fingerprints," *Nature*, 318 (1985):577. See also Seton, Craig, "Life for Sex Killer Who Sent Decoy to Take Genetic Test," *The Times* (London) (January 23, 1988):3. A popular account of this case, *The Blooding*, was written by crime novelist Joseph Wambaugh, New York, N.Y.: William Morrow & Co., Inc., 1989.

9. Bureau of Justice Statistics, "Forensic DNA Analysis: Issues," Washington, D.C.: U.S. Department of Justice, Bureau of Justice Statistics, June 1991, at 4, note 8.

10. The admissibility of the DNA evidence was upheld by the intermediate appeals court, which cited the uncontroverted testimony of the State's expert witnesses. *State* v. *Andrews*, 533 So.2d 841 (Dist. Ct. App. 1989). See also Office of Technology Assessment, Congress of the United States, *Genetic Witness: Forensic Uses of DNA Tests*, Washington, D.C.: July 1990.

11. 385 S.E.2d 253 (W. Va. 1989).

12. 384 S.E.2d 775 (1989). Additional court appeals by Spencer were rejected by the Virginia Supreme Court at 384 S.E.2d 785 (1989); 385 S.E.2d 850 (1989); and 393 S.E.2d 609 (1990).

13. Supra note 12 at 783.

14. Id., at 797.

15. 545 N.Y.S.2d 985 (Sup. Ct. 1989). Castro's case was never tried. He pleaded guilty to the murders in late 1989.

16. *Schwartz* v. *State*, 447 N.W.2d 422 (1989).

17. Id., at 427. The Minnesota Supreme Court further held that the use of statistical probabilities testimony should be limited because of its potential for prejudicing the jury. Id., at 428. The opinion was later modified in *State* v. *Bloom*, 516 N.W.2d 159 (1994).

18. *Frye* v. *United States*, 293 F. 1013 (D.C. Cir. 1923). The test for the admissibility of novel scientific evidence enunciated in this case has been the most frequently invoked one in American case law. To be admissible, scientific evidence must be "sufficiently established to have gained general acceptance in the particular field in which it belongs."

19. *Daubert* v. *Merrell Dow Pharmaceuticals, Inc.*, 113 S.Ct. 2786 (1993). The Supreme Court used this civil case to articulate new standards for interpreting the admissibility of scientific evidence under the Federal rules of evidence. This standard, while encompassing *Frye*, allows a court to expand its examination to include other indicia of reliability, including publications, peer review, known error rate, and more. The court also should consider factors that might prejudice or mislead the jury. For the application of *Daubert* to DNA technology, see Sheck, Barry, "DNA and *Daubert*," *Cardozo Law Review*, 15 (1994):1959.

20. This brief overview is not a treatise on DNA evidence admissibility in criminal cases. For more authoritative articles, see, Thompson, supra note 3; Kaye, D.H., "The Forensic Debut of the National Research Council's DNA Report: Population Structure, Ceiling Frequencies and the Need for Numbers," *Jurimetrics Journal*, 34, 4 (1994):369–382; Comments, "Admissibility of DNA Statistical Data: A Proliferation of Misconception," *California Western Law Review*, 30 (1993):145–178.

21. National Research Council, National Academy of Sciences, *The Evaluation of Forensic DNA Evidence* (prepublication copy), Washington, D.C.: National Academy Press, 1996:2.14.

CHAPTER II

Study Findings

Findings pertaining to characteristics of the 28 DNA exculpatory cases identified during the study are discussed first. The chapter concludes with the results of the telephone survey of DNA laboratories.

General Characteristics Shared by Many Study Cases

The 28 cases in this study were tried in 14 States and the District of Columbia. The States are Illinois (5 cases), New York (4 cases), Virginia (3 cases), West Virginia (3 cases), Pennsylvania (2 cases), California (2 cases), Maryland, North Carolina, Connecticut, Kansas, Ohio, Indiana, New Jersey, and Texas. Many cases share a number of descriptive characteristics, as noted below.

Most cases mid- to late 1980s. Most cases involved convictions that occurred in the 1980s, primarily mid- to late 1980s, a period when forensic DNA technology was not readily accessible. The earliest case involved a conviction in 1979, the most recent in 1991.

In each of the 28 cases, a defendant was convicted of a crime or crimes and serving a sentence of incarceration. While in prison, each defendant obtained, through an attorney, case evidence for DNA testing and consented to a comparison of the evidence-derived DNA to his own DNA sample. (In *Nelson*, the prosecutor conducted the tests.) In each case, the results showed that there was not a match, and the defendant was ultimately set free. Exhibit 2 presents an overview of the study cases.

Sexual assault the most frequent crime. All 28 cases involved some form of sexual assault. In six (*Bloodsworth*, *Cruz*, *Hernandez*, *Linscott*, *Nelson*, and *Vasquez*), assailants also murdered their victims. All alleged assailants were male. All victims were female: most were adults, others teenagers or children. All but one case involved a jury trial. (The nonjury case, *Vasquez*, involved a guilty plea from a defendant who had mental disabilities.) Of the cases where the time required for jury deliberations was known, most had verdicts returned in less than 1 day, except for *Kotler*, which required 2 days.

Prison time served. The 28 defendants served a total of 197 years in prison (an average of almost 7 years each) before being released as a result of DNA testing. The longest time served was 11 years, the shortest 9 months. For a variety of legal reasons, defendants in several cases continued to remain in prison for months after exculpatory DNA test results. In *Green*, DNA testing was performed after conviction but prior to sentencing.

Exhibit 2. Overview of DNA Study Cases

Case Name/Location	Primary Charges	Date Convicted	Sentence/Served
Alejandro, Gilbert Uvalde, TX	Sexual assault	October 1990	12 yrs/4 yrs
Bloodsworth, Kirk Baltimore, MD	Murder, rape	March 1985	Death, later reduced to life/Almost 9 yrs
Bravo, Mark Diaz Los Angeles Co., CA	Rape	December 1990	8 yrs/3 yrs
Brison, Dale Chester County, PA	Rape, kidnaping	June 1991	18–42 yrs/3½ yrs
Bullock, Ronnie Chicago, IL	Aggravated sexual assault	May 1984	60 yrs/10½ yrs
Callace, Leonard White Plains, NY	Sodomy, sexual abuse	March 1987	25–50 yrs/Almost 6 yrs
Chalmers, Terry Leon White Plains, NY	Rape, sodomy	June 1987	12–24 yrs/8 yrs
Cotton, Ronald Burlington, NC	Rape (2 counts)	January 1985 November 1987 (second trial)	Life+54 yrs/10½ yrs
Cruz, Rolando Chicago, IL	Murder, kidnaping, rape	March 1985	Death/11 yrs
Dabbs, Charles Westchester Co., NY	Rape	April 1984	12½–20 yrs/7 yrs
Davis, Gerald Wayne Kanawha Co., WV	Kidnaping, sexual assault (2 counts)	May 1986	14–35 yrs/8 yrs
Daye, Frederick Rene San Diego, CA	Rape (2 counts), kidnaping	August 1984	Life/10 yrs
Dotson, Gary Chicago, IL	Rape, aggravated kidnaping	July 1979	25–50 yrs/8 yrs
Green, Edward Washington, DC	Rape	July 1989	Never sentenced/9 months
Hammond, Ricky Hartford, CT	Sexual assault, kidnaping	March 1990	25 yrs and 3 yrs probation/2 yrs
Harris, William O'Dell Charleston, WV	Sexual assault	October 1987	10–20 yrs/7 yrs, then 1 yr home confinement

Exhibit 2. Overview of DNA Study Cases (continued)

Case Name/Location	Primary Charges	Date Convicted	Sentence/Served
Hernandez, Alejandro Chicago, IL	Murder, kidnaping, rape	March 1985	Death/11 yrs
Honaker, Edward Nelson County, VA	Rape, sexual assault, sodomy	June 1985	3 life terms+34 yrs/10 yrs
Jones, Joe C. Topeka, KS	Rape, aggravated kidnaping	February 1986	Life+10–25 yrs/6½ yrs
Kotler, Kerry Suffolk County, NY	Rape (2 counts)	February 1982	25–50 yrs/11 yrs
Linscott, Steven Cook County, IL	Murder, rape	November 1982	40 yrs/3 yrs in prison; 7 yrs out on bond
Nelson, Bruce Allegheny Co., PA	Murder, rape	September 1982	Life/9 yrs
Piszczek, Brian Cuyahoga Co., OH	Rape	June 1991	15–25 yrs/4+ yrs
Scruggs, Dwayne Indianapolis, IN	Rape	May 1986	40 yrs/Over 7½ yrs
Shephard, David Union County, NJ	Rape	September 1984	30 yrs/Almost 10 yrs
Snyder, Walter (Tony) Alexandria, VA	Rape, sodomy	June 1986	45 yrs/Almost 7 yrs
Vasquez, David Arlington Co., VA	Murder, rape	February 1985	35 yrs/5 yrs
Woodall, Glen Huntington, WV	Sexual assault, kidnaping	July 1987	2 life terms+203–335 yrs/4 yrs, then 1 yr under electronic home confinement

Many defendants also qualified for public defenders or appointed counsel. Most defendants appealed their convictions at least once; many appealed several times. Most appeals focused on trial error (e.g., ineffective assistance of counsel) or new evidence. For example, in some cases, the victims recanted their defendant identification testimony.

Prior police knowledge of the defendants. Police knew 15 defendants prior to their arrests, generally through criminal records. It is not known

whether, in some cases, that may have influenced police to place suspects in photo spreads and lineups shown to victims and other eyewitnesses.

Evidence Presented During/After Trial: Common Attributes

The 28 cases shared several common themes in the evidence presented during and after trial.

Eyewitness identification. All cases, except for homicides, involved victim identification both prior to and at trial. Many cases also had additional eyewitness identification, either placing the defendant with the victim or near the crime scene (e.g., in *Bloodsworth*, five witnesses testified that they had seen the defendant with the 9-year-old victim on the day of the murder). Exhibit 3 presents an overview of the evidence and DNA testing in the study cases.

Many defendants presented an alibi defense, frequently corroborated by family or friends. For example, Edward Honaker's alibi was corroborated by his brother, sister-in-law, mother's housemate, and trailer park owner. The alibis apparently were not of sufficient weight to the juries to counter the strength of the eyewitness testimony.

Use of forensic evidence. A majority of the cases involved non-DNA-tested forensic evidence that was introduced at trial. Although not pinpointing the defendants, that evidence substantially narrowed the field of possibilities to include them. Typically, those cases involved comparisons of nonvictim specimens of blood, semen, or hair at the crime scene to that of the defendants. Testimony of prosecution experts also was used to explain the reliability and scientific strength of non-DNA evidence to the jury.

Alleged government malfeasance or misconduct. Eight cases, as reported by defense attorneys and reflected in some judges' opinions, involved allegations of government misconduct, including perjured testimony at trial, police and prosecutors who intentionally kept exculpatory evidence from the defense, and intentionally erroneous laboratory tests and expert testimony admitted at trial as evidence. For example:

- In *Honaker*, the defendant's attorney alleged that the government intentionally kept exculpatory evidence from the defense, including information that two of the government's witnesses were secretly hypnotized to enhance their testimony and that the prosecution's criminalist was never

Exhibit 3. Overview of Selected Evidence and DNA Testing

Defendant	Selected Evidence	DNA Testing
Alejandro, Gilbert	DNA evidence testimony; victim ID	Restriction Fragment Length Polymorphism (RFLP) tests of semen stain on victim's nightgown excluded Alejandro.
Bloodsworth, Kirk	Five witness IDs; self-incriminating statements	Polymerase Chain Reaction (PCR) test of panties excluded Bloodsworth.
Bravo, Mark Diaz	Victim ID; blood analysis; misrepresentation	RFLP test of blanket, sheet, and victim's panties excluded Bravo.
Brison, Dale	Victim ID; hair analysis; weak alibi	RFLP test of semen-stained panties excluded Brison.
Bullock, Ronnie	Two victim IDs; police ID; proximity of residence	PCR test of semen-stained panties excluded Bullock. DNA tests on vaginal and anal swabs were inconclusive.
Callace, Leonard	Victim ID; blood analysis; weak alibi	RFLP test of semen-stained jeans excluded Callace.
Chalmers, Terry Leon	Victim ID; weak alibi	PCR test of two vaginal swabs excluded Chalmers.
Cotton, Ronald	Victim ID; similarity of shoes and flashlight	PCR test of vaginal swab and underwear excluded Cotton.
Cruz, Rolando	Alleged "dream visions" of the murder; inculpatory witness statements	PCR test of semen-stained underwear excluded Cruz and included Brian Dugan.
Dabbs, Charles	Victim ID; blood analysis	RFLP test of semen-stained panties excluded Dabbs.
Davis, Gerald Wayne	Victim ID; semen analysis	PCR test of the victim's underwear excluded Davis. No DNA found matching the victim from DNA tests done on Davis' bedsheets and underwear.
Daye, Frederick Rene	Victim ID; witness ID; blood analysis; misrepresentation	PCR test of semen-stained jeans excluded Daye.
Dotson, Gary	Victim ID; semen analysis; hair analysis	RFLP test of panties was inconclusive. PCR test of panties excluded Dotson and included victim's boyfriend.
Green, Edward	Victim ID; blood analysis	RFLP test of the victim's clothing excluded Green.

Exhibit 3. Overview of Selected Evidence and DNA Testing (continued)

Defendant	Selected Evidence	DNA Testing
Hammond, Ricky	Victim ID; victim ID of car; hair analysis; weak alibi	RFLP and blood tests excluded Hammond.
Harris, William O'Dell	Victim ID; semen analysis	PCR test of evidence slide excluded Harris.
Hernandez, Alejandro	Self-incriminating and inculpatory statements; inculpatory witness statements	PCR test of semen-stained underwear excluded Hernandez and included Brian Dugan.
Honaker, Edward	Victim ID; witness ID; hair analysis; similarity of clothing	PCR test of vaginal swab excluded Honaker and both of victim's boyfriends.
Jones, Joe C.	Victim ID; proximity to crime scene; similarity of pants; 2 witness IDs	PCR test of partial vaginal swab excluded Jones.
Kotler, Kerry	Victim ID; non-DNA genetic analysis	PCR test of panties excluded Kotler and victim's husband.
Linscott, Steven	Blood analysis; hair analysis; "dream confession"	Pretrial DNA tests were inconclusive. PCR test excluded Linscott.
Nelson, Bruce	Testimony of codefendant, self-incriminating statement	RFLP test excluded Nelson.
Piszczek, Brian	Victim ID; weak alibi	PCR test of vaginal and anal swabs and nightgown excluded Piszczek.
Scruggs, Dwayne	Victim ID; similarity of boots	PCR test of vaginal swab and bloodstain excluded Scruggs.
Shephard, David	Victim ID; blood analysis; weak alibi	DNA test of panty liner excluded Shephard.
Snyder, Walter (Tony)	Victim ID; similarity of clothing; blood analysis; weak alibi	PCR test of vaginal swab excluded Snyder.
Vasquez, David	Witness ID; no alibi; confession; hair analysis	PCR test of evidence matched Timothy Spencer. Attempts to compare hair with blood samples were inconclusive.
Woodall, Glen	Blood analysis; hair analysis; victim ID; similarity of clothing	PCR and RFLP tests of vaginal swabs and clothing excluded Woodall.

told that Honaker had a vasectomy (and could not have been the source of the sperm in the victim).

- In *Cruz*, a supervising officer in the sheriff's department admitted, during the third trial, that he had lied about corroborating the testimony of his deputies in the earlier trials. This testimony focused on Cruz's "dream visions" of the murder.

- In *Kotler*, the government's serologist reportedly lied about his qualifications. In addition, Kotler's attorneys alleged that the government intentionally withheld exculpatory evidence from the defense. For example, police reports stated that the victim did not actually positively identify the defendant's picture but described him only as a "look alike." Furthermore, as recorded in police reports, the victim's description of the defendant was inaccurate for age, height, and weight. The defense was never informed about those reports.

- In cases involving defendants Glen Woodall, William O'Dell Harris, and Gerald Wayne Davis (and his father), the perjured testimony of Fred Zain, a serologist then with the West Virginia State Police, was in large part responsible for the wrongful convictions that ensued. The West Virginia Supreme Court of Appeals, in a special report on Zain's misconduct in more than 130 criminal cases, stated that such behavior included "…overstating the strength of results; …reporting inconclusive results as conclusive; …repeatedly altering laboratory records; …."[1] The report also noted that Zain's irregularities were "the result of systematic practice rather than an occasional inadvertent error." In addition, the report stated that Zain's "supervisors may have ignored or concealed complaints of his misconduct."[2]

- In *Alejandro*, the defendant was also wrongfully convicted by expert testimony from Fred Zain, who had moved from West Virginia to Texas and worked for the Bexar County crime laboratory. In July 1994, a Uvalde County grand jury indicted Zain for perjury, tampering with government records, and fabricating evidence. As of early 1996, charges of tampering and of fabricating evidence had been dropped, leaving three charges for aggravated perjury in effect, for which Zain reportedly seeks dismissal on statute of limitations grounds.

Evidence discovered after trial. In most of the cases in this study, DNA test results represented newly discovered evidence obtained after completion of the trials. States have time limits on filing motions for new trials on

the basis of newly discovered evidence. For example, in Virginia, new evidence must be presented by motion within 21 days after the trial.[3] Thus, the *Honaker*, *Snyder*, and *Vasquez* cases required a pardon from Virginia's governor to release the defendants from prison.

In some of the study cases, prosecutors waived time limits when presented with the DNA exculpatory results. However, prosecutors also have contested defendants' attempts to release evidence for DNA testing.

States also differ in the legislation and procedures pertaining to postconviction appointment of counsel and to authorization to pay for the DNA testing. Many cases involved indigents.

DNA testing. The DNA testing phase of these cases also has common characteristics. Nearly all the defendants had their tests performed by private laboratories. The tests were conducted using blood from defendants, blood or blood-related evidence from victims, and semen stains on articles of the victims' clothing or on nearby items (a blanket was tested in one case). In over half the cases, the prosecution either conducted a DNA test totally independent of that of the defense or sent test results obtained by the defendant's laboratory to a different one to determine whether the laboratory used by the defense interpreted test results properly.

Eight laboratories used Restriction Fragment Length Polymorphism (RFLP) DNA testing, 17 conducted Polymerase Chain Reaction (PCR) testing, and 2 used both tests. For one case, the type of DNA test conducted is unknown.

Preservation of evidence. In some cases, evidence samples had deteriorated to the point where DNA testing could not be performed. In *Brison*, the laboratory could not test cotton swabs from the rape kit but, instead, tested a semen stain from the victim's underwear. In *Daye*, after the appellate court affirmed the defendant's conviction and the State Supreme Court denied certification, the evidence was about to be destroyed when Daye's attorney filed to stay the destruction in order to conduct DNA testing.

The chain of custody in some of the cases also demonstrated a lack of adherence to proper procedures. Authorities on the subject note that the "mishandling of real evidence affects the integrity of the factfinding process."[4] In *Dabbs*, the defendant's attorneys reported that the defense was initially advised by the prosecution that the evidence (victim's underwear that contained a semen stain) had been destroyed (a conclusion based on failure of

authorities to find the evidence in police or court custody). Eventually, the defense found the evidence at the county crime laboratory.

Results of DNA Laboratory Survey

Conducted in June 1995, the nationwide telephone survey of 40 public and private laboratories that performed DNA tests sought answers to such questions as: From the time the laboratories began DNA testing, how many cases have they handled? Of that number, what percentage yielded results that excluded defendants as sources of the DNA evidence or were inconclusive?

The 40 surveyed laboratories yielded 19 whose available data were sufficient for the purposes of this study. The 19 included 13 at the State/local level, 4 in the private sector, an armed forces laboratory, and the FBI's laboratory.

Most of the laboratories had initiated DNA testing only within the previous few years. Twelve began testing between 1990 and 1992. Three of the four private laboratories began in 1986 or 1987, while the FBI started DNA testing in 1988.

Seven of the laboratories reported using RFLP testing; four, PCR testing; and eight, both types of tests.

The 19 laboratories reported that, since they began testing, they had received evidence in 21,621 cases for DNA analysis, with the FBI accounting for 10,060 cases. Three of the 4 private laboratories averaged 2,400 each; the State and local laboratories averaged 331 each.

In about 23 percent of the 21,621 cases, DNA test results excluded suspects, according to respondents. An additional 16 percent of the cases, approximately, yielded inconclusive results, often because the test samples had deteriorated or were too small. Inconclusive results aside, test results in the balance of the cases did not exclude the suspect.

The FBI reported that, in the 10,060 cases it received, DNA testing results were about 20 percent inconclusive and 20 percent exclusion; the other 18 laboratories (11,561 cases) reported about 13 percent and 26 percent, respectively.*

*If inconclusive cases were omitted, the exclusion rate for the FBI would be approximately 25 percent, and the average exclusion rate for the other 18 laboratories would be about 30 percent.

Unfortunately, the laboratories were unable to provide more details. They did not maintain data bases that would permit categorization of DNA test results by type of offense and other criteria. What happened to the suspects who were excluded through DNA testing also cannot be determined. Were they released, or were they charged on the basis of other evidence, for example?

Thus, only the most general information is known about the results of DNA testing by laboratories. To obtain more detailed information would require a comprehensive research project.

Notes

1. Matter of West Virginia State Police Crime Laboratory, 438 S.E.2nd 501, 503 (W.Va. 1993).

2. Id., at 504.

3. Virginia Supreme Court Rules, Rule 3A: 15(b).

4. Giannelli, Paul, "Chain of Custody and the Handling of Real Evidence," *American Criminal Law Review*, 20, 4 (Spring 1983):527–568.

CHAPTER III

Policy Implications

The 28 cases examined by the study raise issues that have policy implications for the criminal justice system. The most significant are presented below.[1]

Reliability of Eyewitness Testimony

In the majority of the cases, given the absence of DNA evidence at the trial, eyewitness testimony was the most compelling evidence. Clearly, however, those eyewitness identifications were wrong. In one of the clearest examples of eyewitness testimony overwhelmingly influencing the jury, the Pennsylvania Intermediate Court of Appeals commented on the evidence in the Dale Brison case:

> The Commonwealth's evidence consisted primarily of the victim's identification testimony. However, the victim's stab wounds in addition to the weather and reduced visibility may well have affected the victim's ability to accurately view her assailant, and thus, she may have been prompted to identify appellant merely because she remembered seeing him in the neighborhood. Moreover, the victim did not specifically describe any of her assailant's facial characteristics to the police. There was also no conclusive physical evidence, aside from a single hair sample which may have been consistent with any male of [A]frican-[A]merican descent, linking appellant to the crime.[2]

This points conclusively to the need in the legal system for improved criteria for evaluating the reliability of eyewitness identification.

In *Neil* v. *Biggers*,[3] the U.S. Supreme Court established criteria that jurors may use to evaluate the reliability of eyewitness identifications. However, the reliability of eyewitness testimony has been criticized extensively in the literature.[4] In a recent interview, Dr. Elizabeth Loftus, one of the best-known critics of the reliability of eyewitness identification, commented on the role of DNA testing in exonerating innocent persons who served time in prison. Dr. Loftus noted that a significant factor is the potential susceptibility of eyewitnesses to suggestions from police, whether intentional or unintentional. As reported, Dr. Loftus stated that there is "pressure that comes from the police [who] want to see the crime solved, but there is also a psychological pressure that is understandable on the part of the victim who wants to see the bad guy caught and wants to feel that justice is done."[5]

Dr. Loftus has recommended more open-ended questioning of victims by the police to avoid leading questions. In addition, Dr. Loftus and others

have recommended use of expert testimony regarding the pros and cons of relying on eyewitness testimony.[6]

Reliability of Non-DNA Analyses of Forensic Evidence Compared to DNA Testing

In many of the study cases, according to documentation examined and those interviewed, scientific experts had convinced juries that non-DNA analyses of blood or hair were reliable enough to clearly implicate the defendants. Scientific conclusions based on non-DNA analyses, however, were proven less discriminating and reliable than those based on DNA tests. These findings point to the need for the scientific community to take into account the reliability of non-DNA forensic analyses vis-à-vis DNA testing in identifying the sources of biological evidence.

In a recent habeas corpus hearing in a murder case, a U.S. district court held that expert testimony on microscopic hair comparisons was inadmissible under the *Daubert* standard.[7] The court cited studies documenting a high error rate and found that there are no accepted probability standards for human hair identification. The court ruled that in this case the expert's hair testimony was "imprecise and speculative, and its probative value was outweighed by its prejudicial effect."[8]

Competence and Reliability of DNA Laboratory Procedures

One of the lasting effects of the O.J. Simpson case will likely be greater scrutiny by defense lawyers of the prosecution's forensic DNA evidence presented in criminal cases. In the Simpson case, the defense, in essence, put the crime laboratory on trial. The National Research Council (NRC) report entitled *DNA Technology in Forensic Science* states:

> There is no substantial dispute about the underlying [DNA] scientific principles. However, the adequacy of laboratory procedures and the competence of the experts who testify should remain open to inquiry.[9]

The NRC report recommends some degree of standardization to ensure quality and reliability. The report recommends that each forensic laboratory engaged in DNA testing must have a formal, detailed program of quality assurance and quality control. The report also states:

> Quality-assurance programs in individual laboratories alone are insufficient to ensure high standards. External mechanisms are needed to ensure adherence to the practices of quality assurance. Potential mechanisms include individual certification, laboratory accreditation, and state or federal regulation.[10]

As recently reported by the American Society of Crime Laboratory Directors, 32 public DNA laboratories have been accredited. In addition, one private laboratory is accredited.[11]

Whether laboratories that conduct DNA tests possess the requisite qualifications has significant cost implications for the criminal justice system in terms of reducing the number of redundant DNA tests. In many cases in this study, both prosecution and defense obtained independent DNA tests of the biological stain evidence. Although independent examinations are common in areas that are more open to interpretation (e.g., mental fitness for trial), DNA testing, for exculpatory purposes, should be performed in a qualified laboratory, and the results, if they exculpate the suspect, should be accepted by both parties. Such acceptance would seem more likely if DNA tests were performed by laboratories that all parties agreed were qualified.

Preservation of Evidence for DNA Testing

In some States, sentenced felons may experience difficulty obtaining access to evidence for DNA testing. With an increasing volume of criminal cases, some police agencies destroy evidence when defendants have exhausted their appeals. Even when defendants obtain access to the evidence, it may be too deteriorated for DNA testing. In some of the study cases, insufficient evidence prevented laboratories from conducting Restriction Fragment Length Polymorphism (RFLP) testing, but Polymerase Chain Reaction (PCR) testing was still possible.

Preserving biological stain evidence and maintaining the proper chain of custody of the evidence are essential for successful DNA testing.[12] At the trial stage, however, the U.S. Supreme Court has ruled that unless a criminal defendant can show bad faith on the part of the police, failure to preserve potentially useful evidence does not constitute a denial of due process of law.[13] After a defendant's conviction, prosecutors are not required by constitutional duty to preserve evidence indefinitely. As noted earlier, in *Daye*, the evidence was about to be destroyed when his attorney filed to stay the destruction to conduct what turned out to be an exculpatory DNA test.

Training in DNA Forensic Uses

The introduction of DNA technology into the criminal trial setting is likely to create uncertainty, spawned in part by the complexity of the technology, and also to possibly generate unrealistic expectations of the technology's power in the minds of some or all of the players: prosecution, defense, judges, and jurors. The scientific complexities of the technology may influence all parties to rely more heavily on expert testimony than on other types of evidence.

As the use of DNA technology becomes more widely publicized, juries will come to expect it, like fingerprint evidence. This will place more pressure on prosecutors to use the technology whenever possible, especially as the cost decreases. Prosecutors must be trained on when to use the technology and how to interpret results for the jury.

When the prosecution uses DNA evidence, the defense will be forced to attack it through expert testimony. The defense must rebut the persuasiveness of the evidence for the jury. As stated in the NRC report, "Mere cross examination by a defense attorney inexperienced in the science of DNA testing will not be sufficient."[14] Thus, defense counsel as well as the prosecution and judiciary must receive training in the forensic uses of DNA technology.

Third-Party Consensual Sex Sources

The primary objective of the defense in using DNA testing in rape cases is to show that the defendant is excluded as the source of the semen evidence. Even when exclusion is established, the prosecution may be motivated, as in *Davis*, to eliminate as suspects any and all consensual sex partners as sources of semen in rape cases. During the first trial of Gerald Wayne Davis, the prosecution contended that the semen in the victim came from Davis. After DNA testing had excluded Davis as the source of the semen, the prosecution contended, in the second trial, that Davis could have still raped the victim but not ejaculated and that the semen in the victim could have come from the victim's fiancé just prior to the rape. The prosecution never obtained a blood sample from the fiancé because he died before the second trial.

A question under the law is whether third parties can be compelled to provide biological evidence for DNA testing. In some cases, the government refused to release defendants after exculpatory DNA results until third parties were located and tested. Kerry Kotler was held for an additional year after his exculpatory DNA test so the government could test the victim's husband. Edward Honaker was held for an additional 9 months after his exculpatory DNA test so the government could test the victim's boyfriend and "secret lover."

Multiple-Defendant Crimes

The DNA technology used to analyze biological evidence from crime scenes must not be oversold as an exculpatory tool—it does have limitations. Multiple-suspect crimes present a particular problem for use of DNA identification as a crime-solving tool. In multiple-suspect sexual assaults without eyewitnesses, such as a rape-murder, it is possible that only one of the suspects ejaculated in, or even raped, the victim. In such cases, DNA testing of semen would seem likely to exculpate one or more of the suspects. This type of situation presents a real dilemma for police and prosecutors. Because of exculpatory DNA tests on semen and possibly other exculpatory evidence (e.g., an alibi, lack of other physical evidence), pressure mounts on prosecutors to release one or more of the suspects. The only other evidence against them may be the testimony of a suspect who is matched to the crime by DNA analysis.

In *Dabbs*, for example, the victim testified that she was dragged into an alley and raped by one man while two other men held her down. The police arrested Dabbs on the basis of identification of him by the victim, a distant cousin. The other alleged assailants were never identified or arrested. The DNA test showed that the semen evidence from the victim did not match Dabbs. One theory of the case, however, was that Dabbs participated in the crime but was not the rapist. The prosecutor ultimately dismissed the original indictment against Dabbs because of the DNA results and the reluctance of the victim to testify at a new trial.

Posttrial Relief

Most States have a time limit on presenting evidence newly discovered after trial, conviction, and sentencing. The reason for limiting the time to file appeals based on new evidence is to ensure the integrity of the trial process

and jury verdicts. Many DNA issues in the study cases were not raised until the postconviction stages. Absent constitutional issues, many State procedures, as in Virginia,[15] may preclude consideration of new exculpatory DNA evidence at postconviction stages. Some of the study defendants, after receiving exculpatory DNA results, were released only by agreement of the prosecutor; sometimes they needed a pardon by the governor.

Some States, such as Oregon, permit judges to use discretion to waive new-evidence rules and set aside verdicts or order new trials.[16] Thus, some States may allow an out-of-time motion for a new trial when newly discovered evidence clearly serves the interests of justice.[17]

At postconviction stages, appointment of counsel and payment for DNA testing become issues for indigents. While some appeals courts have ordered State-paid DNA testing for indigents where justified (e.g., where the overall case against the defendant is weak), other court rulings deny such relief, especially where the exculpatory value is speculative.[18] As DNA testing to exculpate convicted persons becomes more widespread, States need to consider these issues.

Future DNA Forensic Uses

The momentum is growing, spurred in part by the public's education from the Simpson trial, for DNA testing in criminal cases. Juries may begin to question cases where the prosecutor does not offer "conclusive" DNA test results if the evidence is available for testing. More defense attorneys in court-appointed cases may file motions for DNA testing and request the State to pay for the tests (this issue may also be raised as a *Brady* motion for the prosecutor to conduct the tests).

The shift will be for more DNA testing in pretrial stages. Prosecutors should find that DNA testing is as helpful to them as to the defense in excluding suspects early in the investigation. This will enable the police and prosecution to save money in the long run by focusing investigations in more fruitful directions.

In Britain, mass DNA screening in search of suspects has, in recent years, produced arrests in several highly publicized cases. The most recent case involved the rape-murder of a 15-year-old South Wales girl.[19] The South Wales constabulary obtained saliva swab samples from over 2,000 men who lived in the vicinity of the murder. Police went door-to-door inviting men to

a makeshift laboratory to submit the samples. The saliva samples were used to develop DNA profiles to compare to the DNA profile obtained from the assailant's semen.

British law does not permit compulsory sampling, but the police made it clear that anyone who refused would become the subject of intense police investigation. A 19-year-old resident of the victim's neighborhood was arrested when his saliva sample was the only one of the thousands taken that could not be eliminated.

Such DNA dragnet methods, while employed sparingly in Great Britain, may increase as the ease and affordability of DNA testing improves. It is unlikely that such mass-testing methods would gain favor in the United States. Constitutional protections against self-incrimination and unreasonable searches and seizures, as well as the American public's zealous protection of privacy rights, would preclude such DNA dragnet practices from being implemented in this country.

Notes

1. This report does not discuss the issue of government misconduct because it is not particularized to the use of DNA technology. Beyond the limited instances noted in this report, enough examples of government misconduct in the criminal justice system exist in the popular media for government officials to be well aware of the problem.

2. *Commonwealth* v. *Brison*, 618 A.2d 420, 425 (Pa. Super. 1992).

3. *Neil* v. *Biggers*, 409 U.S. 188, 199–200 (1972) (factors include accuracy of the witness' prior description of the defendant, opportunity to view the defendant at the time of the crime, level of certainty demonstrated, witness' degree of attention, and time between the crime and the confrontation).

4. Loftus, Elizabeth, and D. Fishman, "Expert Psychological Testimony on Eyewitness Identification," *Law and Psychology Review*, 4 (1978):87–103 (lack of reliability on cross-racial identification); Loftus, Elizabeth, and W. Wagenaar, "Ten Cases of Eyewitness Identification: Logical and Procedural Problems," *Journal of Criminal Justice*, 18 (1990):291–319 (witnesses can be induced to point to the suspect after subtle suggestion on the part of the

investigator); and Cutler, Brian, et al., "The Reliability of Eyewitness Identification: The Role of System and Estimator Variables," *Law and Human Behavior*, 11, 3 (1987):233–258 (level of stress experienced during crime may affect identification).

5. "DNA Testing Turns a Corner as Forensic Tool," *Law Enforcement News* (October 15, 1995):10.

6. Loftus, Elizabeth, and N. Schneider, "Judicial Reactions to Expert Testimony Concerning Eyewitness Reliability," *UMKC Law Review*, 56, 1 (1987):1–45; and Handberg, Roger, "Expert Testimony on Eyewitness Identification: A New Pair of Glasses for the Jury," *American Criminal Law Review*, 32, 4 (Summer 1995):1013–1064.

7. *Williamson* v. *Reynolds*, 904 F. Supp. 1529 (E.D. Okl. 1995).

8. Id., at 1558. The National Research Council report, *DNA Technology in Forensic Science*, notes that, in contrast to microscopic hair comparison, with the advent of DNA technology, the use of hair as an individual identifier will become more common. National Research Council, National Academy of Sciences, *DNA Technology in Forensic Science*, Washington, D.C.: National Academy Press, 1992:158.

9. *DNA Technology in Forensic Science*, supra note 8, at 145–146.

10. Id., at 16. In its 1996 DNA report, *The Evaluation of Forensic DNA Technology* (National Academy Press, Washington, D.C.), the National Research Council reaffirmed this position (page 3.12). The DNA Identification Act of 1994 (Public Law 103–322) also provides for a DNA advisory board to set standards for DNA testing.

11. Telephone conversation with Manuel Valdez, treasurer, American Society of Crime Laboratory Directors, March 8, 1996. (More than 100 public laboratories perform DNA tests.)

12. See "Oops! We Forgot to Put It in the Refrigerator: DNA Identification and the State's Duty to Preserve Evidence," *The John Marshall Law Review*, 25 (1992):809–836.

13. *Arizona* v. *Youngblood*, 109 S. Ct. 333, 337 (1988). The Supreme Court also stated that "police do not have a constitutional duty to perform any particular tests."

14. Supra note 9 at 160.

15. Virginia Supreme Court Rules, Rule 3A: 15(b).

16. An Oregon judge recently released Laverne Pavlinac and John Sosnovske from prison, where they had served 5 years after being convicted of murdering a young woman. The judge set aside their convictions because Keith Hunter Jesperson, a convicted serial killer, pleaded guilty to the murder for which the couple was convicted. See *The New York Times*, November 28, 1995:28.

17. *Tuffiash* v. *State*, 878 S.W. 2d 197 (Tex. App. 1994). This case involved perjured trial testimony from Fred Zain, the State's forensic serologist.

18. See *State* v. *Thomas*, 586 A. 2d 250 (N.J. Appl. Div. 1991); and *Commonwealth* v. *Brison*, 618 A. 2d 420 (Pa. Super. 1992). Compare to *People* v. *Buxon*, 593 N.Y.S. 2d 87 (App. Div. 1993).

19. "Crime-Solving by DNA Dragnet," *The Washington Post* (February 2, 1996):A21.

CHAPTER IV

Profiles of DNA Exculpatory Cases

Presented alphabetically, each profile of the 28 DNA exculpatory cases identified by the study consists of a brief summary of the facts of the case, key prosecution evidence admitted during trial, postconviction challenges, DNA testing results, and case conclusion.

Gilbert Alejandro (Uvalde County, Texas)

Factual background. On the evening of April 27, 1990, a woman in her fifties came home and was attacked from behind by a man. The man placed a pillow over her head and sexually assaulted her. He then fled the house. The woman could not describe the man except for basic physical size. She also noted that the man was wearing some kind of cap, a gray T-shirt, and dark-colored shorts. The police canvassed the area and questioned three men, one of whom was wearing clothes matching the victim's description. The police did not detain them. The victim picked out Alejandro from his photograph in a mug book.

In October 1990 Gilbert Alejandro was convicted of aggravated sexual assault by a Uvalde County jury. He was sentenced to 12 years in prison.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- The victim identified Alejandro from a police mug shot.
- The victim identified Alejandro in court (although she stated that she had a pillow over her head during the assault).
- Fred Zain, the chief forensic expert for Bexar County, Texas, testified that a DNA test of Alejandro's sample matched DNA found on the victim's clothing "and could only have originated from him [Alejandro]."
- Alejandro's only alibi was from his mother, who testified that he was at home at the time of the assault.

Postconviction challenges. Bexar County performed the forensic laboratory work in this case for the Uvalde County prosecutor's office. Bexar County discovered that the State's forensic expert in this case, Fred Zain (see also the Gerald Wayne Davis, William O'Dell Harris, and Glen Woodall cases), had falsified results and lied about his credentials when he was employed as a State police serologist in West Virginia. When

Alejandro's lawyers were informed of this, they filed a writ of habeas corpus. At this time, Alejandro was released to his parents and placed on electronic monitoring.

On July 26, 1994, a Uvalde County District Court heard Alejandro's petition. Present at this hearing were an original trial juror, the original jury foreman, and a Bexar County forensic DNA analyst. The two jurors testified that they based their guilty verdict solely on Zain's testimony and without his testimony the jury would have acquitted on the basis of reasonable doubt. The DNA analyst testified that results from at least one other DNA test had excluded Alejandro. He also testified that the test to which Zain testified was inconclusive and could not have been the basis of a conviction.

DNA results. In July 1990 the original DNA tests done in this case—the ones Zain testified were inculpatory—were inconclusive. A Restriction Fragment Length Polymorphism (RFLP) test performed by the Bexar County crime laboratory on October 3, 1990, excluded Alejandro as the source of the semen left on the victim's nightgown. The district court also reported that an additional test was done on December 19, 1990, after the trial, and it too excluded Alejandro. According to the district court's findings of fact, Fred Zain knew of these exculpatory results and failed to report them to anyone.

Conclusion. As a result of the findings of fact by the district court, the court of criminal appeals overturned Alejandro's conviction and released him to stand trial again without Zain's testimony. The district attorney, however, declined to prosecute the case. On September 21, 1994, Alejandro was released from electronic monitoring and all charges were dismissed. Alejandro served 4 years of his sentence. On June 27, 1995, he was awarded $250,000 in a civil suit against Bexar County.

Kirk Bloodsworth (Baltimore, Maryland)

Factual background. On July 25, 1984, a 9-year-old girl was found dead in a wooded area. She had been beaten with a rock, sexually assaulted, and strangled.

Kirk Bloodsworth was convicted on March 8, 1985, of sexual assault, rape, and first-degree premeditated murder. A Baltimore County judge sentenced Bloodsworth to death.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- An anonymous caller tipped police that Bloodsworth had been seen with the girl earlier in the day.
- A witness identified Bloodsworth from a police sketch compiled by five witnesses.
- The five witnesses testified that they had seen Bloodsworth with the little girl.
- Bloodsworth had told acquaintances he had done something "terrible" that day that would affect his marriage.
- In his first police interrogation, Bloodsworth mentioned a "bloody rock," even though no weapons were known of at the time.
- Testimony was given that a shoe impression found near the victim's body was made by a shoe that matched Bloodsworth's size.

Postconviction challenges. In 1986 Bloodsworth's attorney filed an appeal contending the following: Bloodsworth mentioned the bloody rock because the police had one on the table next to him while they interrogated him; the terrible thing mentioned to friends was that he had failed to buy his wife a taco salad as he had promised; and police withheld information from defense attorneys relating to the possibility of another suspect.

The Maryland Court of Appeals overturned Bloodsworth's conviction in July 1986 because of the withheld information. He was retried, and a jury convicted him a second time. This time Bloodsworth was sentenced to two consecutive life terms.

After an appeal of the second conviction was denied, Bloodsworth's lawyer moved to have the evidence released for more sophisticated testing than was available at the time of trial. The prosecution agreed, and in April 1992 the victim's panties and shorts, a stick found near the murder scene, reference blood samples from Bloodsworth and the victim, and an autopsy slide were sent to Forensic Science Associates (FSA) for Polymerase Chain Reaction (PCR) testing.

DNA results. The FSA report, issued on May 17, 1993, stated that semen on the autopsy slide was insufficient for testing. It also stated that a small semen stain had been found on the panties.

The report indicated that the majority of DNA associated with the epithelial fraction had the same genotype as the semen due to the low level of epithelial cells present in the stain. It was an expected result, according to the report. Finally, the report concluded that Bloodsworth's DNA did not match any of the evidence received for testing. FSA did, however, request a fresh sample of Bloodsworth's blood for retesting in accord with questions about proper labeling on the original sample.

On June 3, 1993, FSA issued a second report that stated its findings regarding Bloodsworth's DNA were replicated and that he could not be responsible for the stain on the victim's underwear (see appendix for complete results).

Conclusion. On June 25, 1993, the FBI conducted its own test of the evidence and discovered the same results as FSA. In Maryland, new evidence can be presented no later than 1 year after the final appeal. Prosecutors joined a petition with Bloodsworth's attorneys to grant Bloodsworth a pardon. A Baltimore County circuit judge ordered Bloodsworth released from prison on June 28, 1993. Maryland's governor pardoned Bloodsworth in December 1993. Bloodsworth served almost 9 years of the second sentence, including 2 years on death row.

Mark Diaz Bravo (Los Angeles County, California)

Factual background. On February 20, 1990, a patient at the psychiatric hospital where Bravo worked claimed she had been raped in an alcove earlier that afternoon. During the course of police interviews, she named several different people as her assailant. One of those she named was Bravo. She later stated she was sure Bravo was the attacker.

A Los Angeles County jury found Mark Diaz Bravo guilty of rape in 1990. He was sentenced by the court to a prison term of 8 years.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- The victim named Bravo as the assailant and made an in-court identification.

- Bravo had misrepresented himself in the past on applications and on his business card.
- Blood tests done on a blanket near the crime scene showed a blood type consistent with Bravo's blood type, which is found in only 3 percent of the population.
- Bravo's alibi defense was not aggressively pursued.

Postconviction challenges. Bravo's appeal to the intermediate court of appeals was denied. Before his appeal was decided in 1992, he filed a postconviction motion in the Superior Court of Los Angeles County. In 1993 a superior court judge granted Bravo's motion to release a blanket, a sheet, and a pair of panties to the defense for DNA testing.

DNA results. Prosecutors received a report from Cellmark Diagnostics on December 24, 1993, stating that none of the tested semen had DNA that matched Bravo's.

Conclusion. On January 4, 1994, Bravo's lawyer filed a writ of habeas corpus. A Los Angeles County Superior Court judge ordered Bravo to be released on January 6, 1994. The judge stated that Bravo had not received a fair trial, that the victim had recanted her testimony, that Bravo's alibi was unimpeachable, and that the DNA tests were irrefutable. On January 7, 1994, Bravo was released from prison after serving 3 years of his sentence.

Dale Brison (Chester County, Pennsylvania)

Factual background. On the evening of July 14, 1990, the victim was walking from a convenience store to her home when an assailant came from behind her, put one hand on her throat and one on her waist, and forced her to walk with him. The assailant stabbed her in the side as they walked, and the victim lost consciousness. When she awoke, the assailant was walking her to some bushes near an apartment complex. The assailant then repeatedly assaulted the victim sexually.

In a jury trial before the Chester County Court of Common Pleas, Dale Brison was convicted of rape, kidnaping, aggravated assault, carrying a prohibited offensive weapon, and three counts of involuntary deviate sexual intercourse. Brison was sentenced to 18 to 42 years of imprisonment. His term was 8 to 20 years for rape and 4 to 10 years for assault, to be served consecutively. He also received 6 to 12 years for each of the involuntary de-

viate sexual intercourse convictions (although each of these was to run concurrently, they were to be served consecutively with the other sentences). Brison sought DNA testing during the trial, but his request was denied.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- There were two separate victim identifications of Brison near the victim's apartment building.
- A hair sample from the scene of the crime was consistent with Brison's.
- Brison's alibi, sleeping on the couch of his home, was corroborated only by his mother.

Postconviction challenges. In 1992 the Pennsylvania Superior Court ruled (618 A.2d 420) that DNA testing must be performed if the evidence had been maintained and the semen stain from the victim's underwear was not badly degraded. It also ruled that the burden of the cost of this test was upon the Commonwealth.

DNA results. Cellmark Diagnostics reported that no result was discernible from the vaginal swab, but the semen stain from the victim's panties yielded results that exculpated Brison as the assailant.

Conclusion. After the tests were performed, the district attorney's office conducted its own. Results matched those of the first one, and Brison was freed after serving 3½ years of his sentence.

Ronnie Bullock (Chicago, Illinois)

Factual background. On March 18, 1983, a 9-year-old girl was walking to school when a man dressed like a police officer approached her. He then chased the girl, forced her into a car, drove to a nearby alley, and raped her. On April 18, 1983, in the same area, a 12-year-old girl reported that a man displaying a badge chased her, forced her into a car, drove to an alley, and raped her.

Bullock was charged in both incidents, but charges stemming from the second were dropped. Ronnie Bullock was convicted of aggravated criminal sexual assault by a Cook County jury in May 1984. A judge sentenced Bul-

lock to 60 years in prison for deviate sexual assault and 15 concurrent years for aggravated kidnaping.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- A police officer identified Bullock from a composite sketch compiled by the two victims.
- Both victims identified Bullock in a police lineup.
- Bullock lived in the area where the rapes occurred.

Postconviction challenges. Immediately following Bullock's conviction, he insisted that the evidence be impounded. This motion was approved, and the judge ordered that the victim's panties be stored in the circuit court clerk's office freezer. An appeals court upheld Bullock's conviction in March 1987. Bullock also filed a motion for postconviction relief, which was denied in October 1990. He then submitted a motion in 1993 to have the evidence released for DNA tests. The prosecution agreed to this motion; it was granted in June 1993. There was a delay, however, between the granting of the motion and Cellmark Diagnostics' test because some of the evidence (including the victim's panties) had disappeared. Bullock's attorneys eventually found the materials and sent them to Cellmark Diagnostics.

DNA results. The report from Cellmark Diagnostics, completed in October 1994, stated that PCR testing was performed on a sperm and nonsperm fraction of the victim's panties, a rectal swab, the blood of the victim, and the blood of Bullock. No conclusions could be reached from the rectal swab due to an insufficient quantity of human DNA. The report stated that Bullock was excluded as the source of both the sperm and the nonsperm fractions in the semen stain on the victim's panties (see appendix for complete results).

Conclusion. On October 14, 1994, Bullock was released without bond but ordered to remain confined to his parents' house on electronic monitoring. The prosecution wanted to run its own tests on the panties, so a hearing was scheduled for November 23, 1994. When the Cook County laboratory arrived at the same conclusion, a judge dismissed the charges, and the district attorney's office declined to prosecute in a new trial. Bullock served $10^{1}/_{2}$ years of his sentence.

Leonard Callace (White Plains, New York)

Factual background. In January 1985 a teenage girl was walking to her car in the parking lot of a shopping center. She was accosted by two men at knife point and forced into a nearby car. One man, allegedly Callace, sexually assaulted the victim repeatedly while the other man watched from the front seat. The second man was never identified.

A Suffolk County jury took 1 hour to convict Leonard Callace of sodomy (four counts), sexual abuse (three counts), wrongful imprisonment, and criminal possession of a weapon. Callace rejected a plea bargain that would have given him 4 months in prison if he pled to a lesser charge. On March 24, 1987, Callace was sentenced to 25 to 50 years in prison.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- A sketch by police artists resembled Callace.
- The victim identified Callace from a photo array and made an in-court identification.
- The blood group of the semen was type A, the same as Callace's.
- Callace's alibi was uncorroborated.

Postconviction challenges. Callace's conviction was affirmed on appeal and leave to appeal to the court of appeals was denied. While in prison, Callace learned about DNA testing and how it was used to free a former inmate (see case summary of Charles Dabbs). He asked his attorney about the original trial evidence.

Callace's attorney remembered two things from the original trial record. First, the victim had just picked up her jeans from the cleaners. Second, the victim spit out semen onto the jeans after one of the assaults. Therefore, any semen on those jeans would have come from the assailant; if it did not match Callace's, he could be freed. The defense used this information to secure the jeans from the prosecution for DNA testing at Lifecodes, Inc. On June 27, 1991, a Suffolk County Court judge granted Callace's motion to consider DNA tests as "new evidence" (573 N.Y.S.2d 137). The judge also ruled that if the samples did not match, he would hold a hearing to consider postconviction relief for Callace.

DNA results. The RFLP analysis performed by Lifecodes, Inc., on the victim's jeans showed that DNA in the semen stains did not match Callace's.

Conclusion. On October 5, 1992, Callace was released from prison. The prosecution dismissed all charges against Callace and declined to prosecute in a new trial because of the DNA evidence and the reluctance of the victim to endure another trial. Callace served almost 6 years of his sentence.

Terry Leon Chalmers (White Plains, New York)

Factual background. On August 18, 1986, a woman was raped, and Terry Chalmers was arrested for the crime.

He was convicted by a Westchester County jury on June 9, 1987, of rape, sodomy, robbery, and two counts of grand larceny. The court sentenced Chalmers to 12 to 24 years in prison.

Prosecutor's evidence at trial. The prosecution based its case against Chalmers on several points:

- The victim identified Chalmers from a police photo array.
- The victim identified Chalmers in two separate police lineups and in the courtroom.
- Chalmer's alibi was uncorroborated.

Postconviction challenges. Chalmers filed an appeal claiming that the police lineup was improperly conducted. The Appellate Division of the New York Supreme Court ruled on July 18, 1990, that the lineup was properly conducted, and even if it were not, the victim's in-court identification was sufficient. The court affirmed Chalmers' conviction (559 N.Y.S.2d 27).

Chalmers applied to the Innocence Project to assist him in obtaining postconviction relief. Project lawyers secured the physical evidence and forwarded it to Forensic Science Associates (FSA) for DNA testing.

DNA results. FSA tested samples of blood from the victim and Chalmers as well as from the vaginal and cervical swabs from the original rape kit. The first report from FSA, on July 8, 1994, showed the results from tests of the victim's blood and the two swabs. The second report, dated July 26, 1994, stated that Chalmers could be eliminated as the source of the semen on the

two swabs on the basis of differences in three polymarker genes (see appendix for results).

Conclusion. Chalmers' conviction was vacated and charges were dismissed on January 31, 1995. The related larceny charges were dismissed in April 1995. Chalmers served 8 years of his sentence.

Ronald Cotton (Burlington, North Carolina)

Factual background. In two separate incidents in July 1984, an assailant broke into an apartment, severed phone wires, sexually assaulted a woman, and searched through her belongings, taking money and other items.

On August 1, 1984, Ronald Cotton was arrested for the rapes. In January 1985, Cotton was convicted by a jury of one count of rape and one count of burglary. In a second trial, in November 1987, Cotton was convicted of both rapes and two counts of burglary. An Alamance County Superior Court sentenced Cotton to life plus 54 years.

Prosecutor's evidence at trial. Cotton's alibi was supported by family members. The jury was not allowed to hear evidence that the second victim failed to pick Cotton out of either a photo array or a police lineup. The prosecution based its case on several points:

- A photo identification was made by one of the victims.
- A police lineup identification was made by one of the victims.
- A flashlight in Cotton's home resembled the one used by the assailant.
- Rubber from Cotton's tennis shoe was consistent with rubber found at one of the crime scenes.

Postconviction challenges. Cotton's attorney filed an appeal. The North Carolina Supreme Court overturned the conviction because the second victim had picked another man out of the lineup and the trial court did not allow this evidence to be heard by the jury.

In November 1987 Cotton was retried, this time for both rapes. The second victim had decided that Cotton was the assailant. Before the second trial, a man in prison, who had been convicted for crimes similar to these assaults, stated to another inmate that he had committed Cotton's crimes. The supe-

rior court judge refused to allow this information into evidence, and Cotton was convicted of both rapes and sentenced to life.

The next year Cotton's appellate defender filed a brief that did not argue the failure to admit the second suspect's confession. The conviction was affirmed. In 1994 two new lawyers, at the request of the chief appellate defender, took over Cotton's defense. They filed a motion for appropriate relief on the grounds of inadequate appeal counsel. They also filed a motion for DNA testing that was granted in October 1994. In the spring of 1995, the Burlington Police Department turned over all evidence that contained the assailant's semen for DNA testing.

DNA results. The samples from one victim were too deteriorated to be conclusive, but the samples from the other victim's vaginal swab and underwear were submitted to PCR testing and showed no match to Cotton. At the defense attorneys' request, the results were sent to the State Bureau of Investigation's DNA data base containing the DNA patterns of convicted, violent felons in North Carolina prisons. The State's data base showed a match with the convict who had earlier confessed to the crime.

Conclusion. After Cotton's attorneys received the DNA test results in May 1995, they contacted the district attorney, who joined the defense attorneys in the motion to dismiss the charges. On June 30, 1995, Cotton was officially cleared of all charges and released from prison. In July 1995 the governor of North Carolina officially pardoned Cotton, making him eligible for $5,000 compensation from the State. Cotton had served 10½ years of his sentence.

Rolando Cruz and Alejandro Hernandez (Chicago, Illinois)

Factual background. On February 25, 1983, a 10-year-old girl was kidnaped from her home, raped, and bludgeoned to death. Her body was found several days later in a wooded area. An autopsy showed she had died from several blows to the head, and her body evidenced a broken nose, postmortem scratches, and sexual assault. Two weeks later an anonymous tip led sheriff's detectives to Hernandez. He allegedly made statements that he knew the men involved in the crime but that he was not one of the perpetrators. On the basis of his statements, Hernandez was arrested on March 6, 1984.

Several days later, the detectives spoke with Cruz, who was an acquaintance of Hernandez. Cruz allegedly reported "visions" to the police—visions whose details were similar to those associated with the crime. Cruz was indicted on March 9, 1984, on the basis of those statements.

In 1985, in a DuPage County Circuit Court, Rolando Cruz and Alejandro Hernandez were jointly tried, convicted, and sentenced to death for kidnaping, rape, and murder. A jury was unable to reach a verdict on a third codefendant.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- Several law enforcement officers testified that Cruz and Hernandez made incriminating statements.
- Several witnesses testified that Cruz and Hernandez admitted to having intimate knowledge of the crime.
- Cruz's alleged "dream visions" of the murder, though not tape recorded, were admitted into evidence on the basis of the testimony of sheriff's detectives.
- The alibi defenses of the two men were not aggressively pursued.
- The Hernandez defense also contended that any inculpatory statements by him against others were made to collect a $10,000 reward.

Postconviction challenges. After an appeal by Cruz, the Illinois Supreme Court ruled that Cruz was "denied a fair trial by reason of introduction of admissions of codefendants" (521 N.E.2d 18). The court ruled on January 19, 1988, that the three men should have been tried separately when it was clear that the prosecution was going to use inculpatory statements by defendants as evidence against one another. The case was reversed and remanded to the DuPage Circuit Court. The Illinois Supreme Court essentially made the same ruling on Hernandez's appeal (521 N.E.2d 25) on January 19, 1988.

Cruz was again convicted by a jury in a DuPage County Circuit Court, and he appealed. The Illinois Supreme Court initially affirmed the circuit court's decision, but, in view of many amicus curiae briefs, the court agreed to look at Cruz's conviction again. This time, on July 14, 1994, the court reversed

the decision of the circuit court (643 N.E.2d 636). The reversal was largely based on statements made by another man, Brian Dugan, a convicted rapist-murderer, who claimed to have committed the crime alone. Dugan's confession was made through hypothetical statements during a plea bargain for other crimes, so the confession could not be used against him.

Hernandez's second conviction, in a separate appeal, was also reversed and remanded. He was convicted a third time by a jury, and this conviction, too, was overturned.

DNA results. In September 1995 DNA tests showed that neither Cruz nor Hernandez were the contributors of the semen found at the crime scene. Tests also determined that Brian Dugan could not be eliminated as a potential contributor. Prosecutors contended that the DNA evidence showed only that Cruz and Hernandez were not the rapists, but they could still have been present at the crime. Cruz's new defense team decided on a bench trial. Hernandez awaited a fourth jury trial.

Conclusion. Before the judge gave a directed verdict in the Cruz case, a sheriff's department lieutenant recanted testimony he had provided in previous trials. In the earlier trials, the lieutenant provided corroborating testimony that two of his detectives told him immediately about Cruz's dream-vision statements. At Cruz's latest trial, however, the lieutenant said he was in Florida on the day of the supposed conversations and could not have spoken to anyone about Cruz's statements. On November 3, 1995, a DuPage County judge acquitted Cruz on the basis of the recanted testimony, the DNA evidence, and the lack of any substantiated evidence against Cruz. Rolando Cruz served 11 years on death row.

Hernandez's case was also dismissed, and he was set free. He served 11 years on death row. Brian Dugan has not been charged with the murder. He has refused to testify about the case unless he is granted death-penalty immunity.

Charles Dabbs (Westchester County, New York)

Factual background. Early on the morning of August 12, 1982, the victim was walking home when she was assaulted from behind. She was forcibly dragged into an alley between a warehouse and another building. The assailant dropped the victim down a flight of stairs, and she lost consciousness. When she awoke, she saw two other men with the original assailant. One of

the attackers held the woman's legs, one held her arms, and the third raped her. She was able to identify only the face of the man who raped her (allegedly Dabbs). The alleged accomplices were never located.

Charles Dabbs was convicted of first-degree rape by a jury in a Westchester County Court on April 10, 1984. He was ordered to serve $12\frac{1}{2}$ to 20 years in prison.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- The victim was able to identify Dabbs because they are distant cousins.
- The victim testified that the assailant wore a distinctive cap and had a distinctive laugh, which she stated were both similar to Dabbs'.
- ABO typing of a semen stain on the victim's pants showed the presence of the H and the B antigens; Dabbs is an O secretor whose body fluids contain the H antigen. This blood typing showed that Dabbs could not be excluded as a source of the semen.

Postconviction challenges. Dabbs appealed his conviction, but it was upheld by the appellate court in June 1988 (529 N.Y.S.2d 557). On November 21, 1990, the Westchester County Supreme Court granted Dabbs' request for DNA testing (570 N.Y.S.2d 765). The court ruled that any preserved evidence was to be released by the county laboratory for testing by Lifecodes, Inc.

DNA results. Lifecodes, Inc., reported that DNA tests of a gauze pad and a cutting from the victim's jeans yielded inconclusive results. RFLP testing was conducted, however, on a cutting from the victim's underwear. The DNA from the semen on the panties did not match the DNA from a blood sample submitted by Dabbs.

Conclusion. On the basis of the DNA results, Dabbs' attorney filed a motion to have the conviction vacated. The prosecution elected not to oppose Dabbs' motion, and on July 31, 1991, the Westchester County Supreme Court ruled that the DNA analysis was sufficient to indicate that the defendant was not the perpetrator. The prosecution moved to dismiss the indictment on the basis of the DNA results and the reluctance of the victim to testify at a new trial. The dismissal was granted by the court on August 22,

1991. The court's written opinion was published on November 7, 1991 (587 N.Y.S.2d 90). Dabbs served 7 years of his sentence.

Gerald Wayne Davis (Kanawha County, West Virginia)

Factual background. The victim testified that on the evening of February 18, 1986, she had dropped off laundry at the home of Davis, a family friend. When she returned to pick up the laundry, she was attacked and raped by Davis on his waterbed. Davis's father, according to the victim's testimony, was present during the assault and made no efforts to intervene on her behalf.

In May 1986 Gerald Wayne Davis was convicted by a Kanawha County jury of kidnaping and two counts of sexual assault. The circuit court judge sentenced Davis to 14 to 35 years in prison. Dewey Davis, the defendant's father, also was convicted of abduction, first-degree sexual abuse, and second-degree sexual assault.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- The victim knew Davis and identified him to police.
- The victim also made an in-court identification of Davis.
- A State police chemist testified that DNA tests could not exclude Davis as the source of the semen found on the victim's underpants.
- Police found a shoe and a jacket belonging to the victim in the Davis home.
- The Davises asserted an alibi that they did nothing while the victim washed clothes.

Postconviction challenges. Both Davis and his father filed appeals. The appellate court dismissed one count of sexual assault and the kidnaping charge for both defendants. As a result, their sentences were reduced to 10 years each.

After an investigation of cases involving chemist Fred Zain (see also the Glen Woodall and William O'Dell Harris cases), many convicted persons were permitted to file a writ of habeas corpus if Zain worked on their cases. Davis filed such a writ based on the potential for falsified evidence by Zain

and the possibility of exculpatory evidence in a new DNA test. The West Virginia Superior Court granted the writ on the condition that DNA tests be performed on the remaining trial evidence.

DNA results. Davis's defense attorney asked for DNA tests to be performed on the original trial evidence. The judge agreed to the use of the Center for Blood Research (CBR) for testing. The results showed DNA markings from the victim and a man, but not from Davis. Prosecutors ran a second series of tests. They also excluded Davis as the semen source. DNA tests also were performed on Davis's underwear and bedsheets. These tests showed no evidence of the victim's DNA.

Conclusion. As a result of these DNA test results, the convictions were annulled and Davis was released to home confinement on March 16, 1994, pending a new trial. The prosecution, contending that Davis still could have raped the victim and not ejaculated, pursued a second trial. On December 4, 1995, a Kanawha County Circuit Court jury deliberated for 90 minutes before acquitting Davis of second-degree sexual assault and first-degree sexual abuse. All charges have also been dismissed against the elder Davis. Both Davises had served 8 years of their sentences.

Frederick Rene Daye (San Diego, California)

Factual background. The crime occurred on the evening of January 10, 1984, while a young woman was walking from a drugstore to her car. One man (alleged to be Daye) opened the victim's driver side door, pushed the victim to the passenger side, and let a second man into the back seat. The two men, after finding only $6 in the woman's purse, stole the woman's wedding and engagement rings, a pearl ring, and her earrings. Then they forcibly removed her clothes and raped her. The two men dumped the victim on a residential street and drove away.

The two defendants were prosecuted in separate trials, and at Daye's trial the other defendant, who was known to a person who witnessed the car theft, pleaded the Fifth Amendment. A jury required almost 8 hours to convict Frederick Rene Daye of kidnaping, robbery, two counts of rape in concert, and vehicle theft. On August 14, 1984, the San Diego County Superior Court sentenced Daye to serve life, with the possibility of parole, on the kidnaping charge, and 14 years and 8 months for all other counts. He was ordered to serve his sentence at California State Prison-Solano.

Prosecutor's evidence at trial. Daye's defense at trial was mistaken identification. The prosecution's evidence included:

- Blood typing from a semen stain matched Daye's ABO blood type B.
- The victim made a photo identification.
- The victim and a witness to the crime made lineup identifications.
- Daye gave a false name and other misinformation to the police at the time of his arrest.

Postconviction challenges. Daye appealed the conviction, claiming an erroneous admission of tainted identification evidence, ineffective counsel at trial, suppression of the out-of-court identification, improper impeachment with prior convictions, and instructional errors. The judgment of Daye's conviction was affirmed in appellate court on February 29, 1986. The California Supreme Court denied review of his case.

A statement by David Pringle, the other defendant in this case, was made to the San Diego County Superior Court on February 1, 1990. This statement indicated that Daye was not the other man involved in the crime; it also named the man who was with Pringle. The court appointed a defense attorney to investigate this matter. When no followup work was done by this attorney, Appellate Defenders, Inc. (ADI), helped Daye file a writ of habeas corpus petition. The petition, filed in June 1992, addressed both Pringle's affidavit and the lack of action taken by Daye's lawyer. Habeas relief was denied on August 11, 1992, and the case was remanded to superior court with directions to consider whether to vacate the appointment of Daye's attorney.

The court ruled that Daye was entitled to new representation, and ADI took over the case. In October 1992 Daye's attorney was notified that the original evidence from the trial was going to be destroyed. She filed for an evidentiary hearing to discuss release of the exhibits and DNA testing of any remaining semen stains. On September 17, 1993, the court of appeals denied Daye's request for an evidentiary hearing. The court, however, issued a writ making $2,000 available from the county for Daye to investigate the DNA issue and authorized release of evidence to an investigator working on Daye's case. Daye also received permission to seek habeas corpus relief after the completion of the DNA investigation.

DNA results. The report from Cellmark Diagnostics, completed on April 21, 1994, stated that DNA from the left leg of the victim's jeans and Daye's blood sample were amplified using PCR and typed for DQ alpha using an amplitype HLA DQ alpha forensic DNA amplification and typing kit. A denim cloth cutting of the right leg of the jeans was also sent but produced no PCR results. The sperm fraction on the jeans produced results, but they were too faint for interpretation. The results excluded Daye as the source of the DNA from both the nonsperm cell fraction and the sperm fraction found on the left leg of the jeans (see appendix for results).

Conclusion. After the results of the DNA testing provided exculpatory evidence for Daye, his new appellate defender filed a petition for writ of habeas corpus on June 3, 1994. Her petition was based on the new DNA evidence, which was not available at the time of the crime or at the time of Daye's appeal. It was also based on the declaration of the other defendant that Daye did not commit the crime and that, in fact, he did not even know Daye. Daye's conviction was overturned on September 27, 1994. He had served 10 years of his sentence.

Gary Dotson (Chicago, Illinois)

Factual background. On the evening of July 9, 1977, the complainant was walking home from work when two men forced her into the back seat of a car and raped her. She also testified that one of the men tried to write words on her stomach using a broken beer bottle. She was then pushed from the car onto the street.

In July 1979 Gary Dotson was convicted of aggravated kidnaping and rape. He was sentenced to not less than 25 and not more than 50 years.

Prosecutor's evidence at trial. The prosecution's case included the following evidence:

- A composite sketch of the defendant, which the complainant helped with, was prepared by the police.
- The victim identified Dotson from a police mug book.
- Dotson was identified by the victim from a police lineup.

- The State's expert serologist testified that the semen on the victim's undergarment came from a type B secretor and that the defendant was a type B secretor. (It was later reported that the State's serologist failed to disclose that the victim was also a type B secretor.)

- Testimony was presented that a pubic hair removed from the victim's underwear was similar to the defendant's and dissimilar to the victim's.

Postconviction challenges. In March 1985 the victim recanted her testimony. She said she had fabricated the rape to hide a legitimate sexual encounter with her boyfriend. Dotson contended that the victim's recantation of testimony constituted grounds to vacate the original sentence. At the hearing on Dotson's motion for a new trial, the same judge from the original trial refused to order a new trial. His reasoning was that the complainant was more believable in her original testimony than in her recantation.

The governor accepted authority for the case and held a session of the Illinois Prisoner Review Board. The governor stated that he did not believe the victim's recantation and refused to pardon Dotson. On May 12, 1985, however, the governor commuted Dotson's sentence to the 6 years he had already served, pending good behavior. In 1987 the governor revoked Dotson's parole after Dotson was accused by his wife of assaulting her. The Appellate Court of Illinois affirmed Dotson's conviction on November 12, 1987 (516 N.E.2d 718). On Christmas Eve 1987 the governor granted Dotson a "last chance parole." Two days later, Dotson was arrested in a barroom fight, and his parole was revoked. In 1988 Dotson's new attorney had DNA tests conducted that were not available at the time of the alleged rape.

DNA results. A sample of semen from the victim's underwear was sent to Dr. Alec Jeffreys in England for RFLP analysis. The sample was badly degraded, however, and results were inconclusive. Samples were then sent to Forensic Science Associates in Richmond, California. The lab performed PCR DQ alpha tests that showed that the semen on the victim's undergarments could not have come from Dotson but could have come from the victim's boyfriend.

Conclusion. The chief judge of the Cook County Criminal Court ruled that Dotson was entitled to a new trial. The State attorney's office, however, decided not to prosecute based on the victim's lack of credibility and the DNA test results. Dotson's conviction was overturned on August 14, 1989, after he had served a total of 8 years.

Edward Green (Washington, D.C.)

Factual background. The incidents occurred on July 3 and August 5, 1987. In the first, a young woman was raped near a footbridge at a high school. The second incident occurred at the same location, but the woman fled and found a police officer. Police picked up Green in the area of the two assaults.

Edward Green was arrested and tried for rape and assault with intent to rape (in two separate incidents). He was convicted by a jury of the rape and acquitted for the assault/attempted rape. The jury reached its verdict in 3 hours.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- The second victim identified Green in a "show-up" on the street.
- The first victim identified Green from a photo array and a formal lineup.
- Both victims made in-court identifications of Green.
- The blood type of the assailant was consistent with Green's.

Postconviction challenges. After conviction but prior to sentencing, the defense moved to delay sentencing pending the results of DNA testing. While waiting for the DNA results, the prosecution opposed several time extensions, which were granted by the judge.

DNA results. DNA tests were performed on an item of the victim's clothing and compared to the victim's and Green's blood. The report, issued in February 1990 from Cellmark Diagnostics, excluded Green as the source of the semen.

Conclusion. On the basis of the DNA results, the defense moved for a new trial. In a superior court hearing on March 19, 1990, the judge granted the defense motion. The U.S. attorney's office immediately moved to dismiss the indictment. Green remained in jail on unrelated drug charges after a pretrial confinement of 9 months in jail on the rape charges.

Ricky Hammond (Hartford, Connecticut)

Factual background. In the late afternoon of November 30, 1987, the victim was walking on a dark street when she was pushed off the sidewalk by an assailant. The man forced her into a car in a nearby parking lot. He drove for about 15 minutes, stopped on or near a dirt road, and sexually assaulted her. The assailant then drove the victim to an area with which the victim was unfamiliar and told her he would kill her if she told anyone about the incident. He then let her out of the car and drove away.

Ricky Hammond was convicted of kidnaping and sexual assault in March 1990 by a Hartford jury. Before sentencing, Hammond filed two motions: one for a new trial and another for further discovery using DNA and blood testing of the vaginal swabs and smears that were in evidence. The trial court denied both of these motions and sentenced Hammond to a prison term of 25 years, suspended after 23 years, and 3 years probation.

Prosecutor's evidence at trial. DNA and blood analyses were performed at the request of the State prior to trial. The results provided exculpatory results for Hammond. The prosecution argued to the jury that, in light of the remaining inculpatory evidence, the physical evidence must have been contaminated. The prosecution's case against Hammond relied on several points:

- The victim identified Hammond in a photo array.
- The victim made an in-court identification of Hammond.
- The victim identified various details about Hammond's car, including the make and model, scratches on the body, a ripped child seat, and a wristwatch hanging on the gearbox.
- Hammond's alibi was uncorroborated, and he also had altered several details of his alibi when originally interviewed.
- Forensic examination of hairs found in Hammond's car showed they were consistent with the victim's hair.

Postconviction challenges. Hammond appealed his conviction on three major grounds. Hammond claimed that (1) the trial court improperly denied his motion for a new trial because of exculpatory blood and DNA analysis, (2) the prosecution made improper statements to the jury and denied his right to

a fair trial, and (3) the trial court erred in not allowing his posttrial motion to have further testing of vaginal swabs from the victim.

On February 25, 1992, the Supreme Court of Connecticut ruled that the trial court and prosecution made several errors with regard to the DNA and blood evidence. The court also ruled that the trial court was not aware of "the logical inconsistencies in the prosecution's case, the evidence suggesting that the chemical alteration of the assailant's DNA was physically impossible, or the absence of any evidence that the defendant's scientific tests were unreliable" (604 A.2d 793).

Because Hammond's motion was for a new trial and not for acquittal, the State Supreme Court remanded the case to the trial court for further proceedings.

DNA results. The DNA results from this case were largely completed prior to trial. At the State's request, the FBI's DNA analysis unit tested the samples in May 1989. An FBI forensic analyst testified that the semen from the physical evidence could not have come from Hammond.

The victim's testimony indicated that she had not had sexual relations with anyone other than her assailant after putting on the clothes that were tested. Furthermore, blood tests performed by the State laboratory and the FBI lab revealed that the assailant had an A antigen in his blood. The victim, the victim's boyfriend, and Hammond all had type O blood. The secretions of blood type O contain the H antigen. Type O nonsecretors do not secrete the H antigen.

After the Connecticut Supreme Court's ruling, three more tests were performed on the vaginal swabs. Testing was not originally performed on the swabs because the State argued that it would be repetitive evidence. These results also showed no match to Hammond.

Conclusion. Hammond was granted a new trial and was acquitted. He had served 2 years of his sentence.

William O'Dell Harris (Charleston, West Virginia)

Factual background. On December 16, 1984, a nurse was walking home from work when she was grabbed from behind and sexually assaulted. On July 25, 1985, Harris was arrested and charged with first-degree sexual as-

sault. Harris was a juvenile at the time of the offense, but the State's motion to transfer the case to adult status was granted on May 16, 1986.

A Kanawha County jury deliberated for nearly 4 hours before convicting William O'Dell Harris of second-degree sexual assault. On October 18, 1987, Harris was sentenced to 10 to 20 years in prison, with 75 days credit for time served.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- A sheriff's deputy testified that the victim had positively identified Harris as her attacker.
- The victim lived near Harris and originally claimed to have been acquainted with him.
- The victim identified Harris in a police lineup and made an in-court identification of him.
- Police serologist Fred Zain (see also Glen Woodall and Gerald Wayne Davis cases) testified that the genetic markers in the semen left by the assailant matched those of Harris and only 5.9 percent of the population.
- Harris's alibi, that he was with his girlfriend at the time of the crime, was corroborated only by her.

Postconviction challenges. On November 10, 1993, the West Virginia Supreme Court of Appeals authorized special habeas corpus proceedings on any case involving the testimony of Zain (438 S.E.2d 501). One week later, Harris's attorneys filed a writ of habeas corpus, consenting to DNA testing of Harris as a condition of relief. On December 8, 1993, the State Supreme Court of Appeals issued the writ and remanded the case to the Circuit Court of Kanawha County for further proceedings. On December 29, 1993, the circuit court judge ordered prosecutors to release the trial evidence. More than a month later, the judge repeated his order.

The judge freed Harris to home confinement on $200,000 bond on June 21, 1994. At the same hearing, the judge again ordered the district attorney to release the evidence for DNA testing. At this time, the sheriff's department stated that all evidence from the trial had been lost. An investigator with the

public defender's office later found a slide containing semen evidence at the medical center originally used by the victim.

On September 13, 1994, the judge held a hearing on a prosecution motion to reconsider his order of release of evidence and then ordered for a fourth time that the evidence (the slide from the medical center and a sample of the victim's blood) be released for DNA testing. Harris's attorneys filed a contempt of court motion on the prosecutors on November 1, 1994. During these hearings, the district attorney stated that the victim was being uncooperative about giving a blood sample but had sent the evidence slide for DNA testing on November 2, 1994.

DNA results. On May 1, 1995, a report from Dr. David Bing of the Center for Blood Research Laboratories stated that DNA extracted from Harris's blood sample was inconsistent with DNA extracted from the semen on the evidence slide. Harris asked the circuit judge to dismiss the case against him. Prosecutors, however, requested that a second test be conducted by a court-approved laboratory, LabCorp in Research Triangle Park, North Carolina. This request was granted.

Conclusion. After the results of the second test also showed that Harris was not the donor of the semen on the evidence slide, the district attorney held a press conference on August 1, 1995, to state that Harris was innocent. On October 10, 1995, Harris's conviction was vacated. One month later, the court also dismissed the underlying indictment. Harris had served 7 years of his sentence and an additional year of home confinement. As an added note to this case, the detective who testified in this trial was later convicted for perjury.

Edward Honaker (Nelson County, Virginia)

Factual background. In the early morning of June 23, 1984, a woman and her boyfriend were sleeping in their car on a rural roadside when a man approached, pretending to be a police officer. He ordered the two out of the car, brandished a gun, and ordered the boyfriend to run into the woods. The assailant forced the woman into his truck, drove to a secluded area, and repeatedly raped her. The police compiled a composite sketch of the assailant from the victim and her boyfriend. A woman was later raped 100 miles away, near Edward Honaker's house. She said the assailant resembled Honaker, her neighbor. Honaker had an alibi and was never charged with

this second rape. The detective on the second rape case, however, took a picture of Honaker and showed it to the first victim and her boyfriend.

A Nelson County jury took 2 hours to convict Edward Honaker of seven counts of sexual assault, sodomy, and rape. The Nelson County Court sentenced Honaker to three life sentences plus 34 years.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- The victim and her boyfriend picked Honaker out of a photo lineup.
- The victim made an in-court identification of Honaker.
- The truck that Honaker drove was similar to the one driven by the assailant.
- Police found camouflage fatigues in Honaker's house, similar to those worn by the assailant.
- Honaker's alibi, which was corroborated by his brother, sister-in-law, owner of his trailer park, and mother's housemate, was called a "put-up job" by the prosecution.
- A State laboratory forensic specialist testified that hair found on the woman's shorts "was unlikely to match anyone" other than Honaker.

Postconviction challenges. Honaker made many written inquiries for any testing that could prove his innocence. Finally, Centurion Ministries (CM), a Princeton-based group that works to free the wrongfully imprisoned, agreed to work on Honaker's case. After CM discovered that some of the victim's and boyfriend's testimony was hypnotically induced, that the initial description given by the victim was inconsistent with Honaker's appearance, and that Honaker's 1976 vasectomy was barely mentioned in the trial (and not known by the prosecution's criminalist), the organization began working with the Innocence Project. Honaker's Innocence Project lawyers filed a motion with the State of Virginia to release evidence for DNA tests.

In the original trial, a forensics expert testified that sperm was present in the semen on the vaginal swab. The prosecution contended that the sperm was the boyfriend's, but they agreed to release the evidence to Honaker's lawyers. The Innocence Project, in turn, sent the evidence to Forensic Science Associates (FSA) for PCR testing.

The reason that FSA had to provide all the reports discussed below is that in June 1994 the victim claimed that she had a secret lover during the time of the original incident. This meant that DNA tests had to prove that one of the stains was not from Honaker or either boyfriend in order to establish Honaker's innocence.

DNA results. The first report from FSA, on January 13, 1994, showed DQ alpha typing of a vaginal swab from the rape kit, an oral swab from the victim, a semen stain from the victim's shorts, and a blood sample from Honaker.

This report indicated that there were two different seminal deposits (the one on the swab and the one from the shorts did not match). FSA requested blood samples from the victim and the boyfriend. The report stated, however, that even if Honaker were able to produce sperm, he was eliminated as the source of sperm from both deposits (see appendix for results).

The second report from FSA was written on March 15, 1994; it included the boyfriend's typing and verified the victim's DQ alpha. The boyfriend could not be eliminated as a potential source of the sperm on the shorts. Honaker and the boyfriend were both eliminated as the source of sperm on the vaginal swab.

The Virginia State laboratory tested the second boyfriend and could not exclude him as the sperm source on the vaginal swab.

FSA then repeated the DQ alpha typing of all the evidence and typed five additional polymarker genes. Their report from September 26, 1994, stated that these additional polymarker tests showed that neither the boyfriends nor Honaker could have accounted for the sperm from the vaginal swab.

Conclusion. Virginia law provides that no new evidence can be presented more than 21 days after a trial, so a pardon from the governor was necessary in this case. In June 1994 Honaker filed a clemency petition with the governor's office. The Commonwealth attorney's office joined the petition on June 29. The governor signed a pardon for Honaker on October 21, 1994. He had served 10 years of his sentence.

Joe C. Jones (Topeka, Kansas)

Factual background. Early in the morning of August 24, 1985, three women left a nightclub and sat talking in their cars. A man came between

the two cars and ordered a woman out of one of them. He then got into the car with the victim and ordered her to drive away. After driving to a different section of town, the assailant asked the woman for her name and address. She supplied him with a phony name and number; then the assailant raped her.

Joe Jones was convicted of rape, aggravated kidnaping, and aggravated assault on February 13, 1986, by a Shawnee County jury. He was given a life sentence for the kidnaping charge, with lesser concurrent sentences for the other charges.

Prosecutor's evidence at trial

The prosecution based its case on several points:

- The two witnesses identified Jones as the man at the nightclub.
- The victim picked out a different man in a photo lineup but identified Jones when she saw him face-to-face.
- Jones was a member of the same club and had actually been there the night of the incident.
- The police found a pair of jeans that resembled those of the assailant in Jones' house.

In Jones' defense, a market employee testified that Jones was in his store at the time of the attack and was wearing different clothing.

Postconviction challenges. An initial appeal by Jones was not disposed of before he combined that appeal with a motion of remand on February 2, 1987, with the Kansas Supreme Court. This latter motion asked for a new trial based on newly discovered evidence and ineffective counsel at trial.

The new evidence consisted of the following: another man who was later convicted of sexual assaults with identical modus operandi; expert witnesses who would testify that identifying Jones was unconscious transference on the part of the witnesses because they had seen him earlier in the evening and the identification was also weak because it was cross-racial; and a psychological exam showed that Jones did not have the capability to commit a violent act such as rape.

On February 13, 1987, the Kansas Supreme Court granted the motion for remand, but only in considering the evidence that the other man may have committed the crime. A hearing was held in which the other man denied any involvement with the crime, and the prosecution presented evidence that the other man's photograph was shown to the witnesses and they did not identify him as the assailant. The court denied the motion for a new trial.

Jones' attorney filed another appeal to the Kansas Supreme Court on the grounds that the defendant's homosexuality was not allowed as evidence at the trial, that the trial court refused to admit evidence about the other man, and that his client's Sixth Amendment rights were violated when the court limited the scope of his original remand. This motion was denied on March 3, 1989. Two years later, in 1991, the prosecution agreed to release evidence to the defense for DNA testing.

DNA results. The samples and evidence were sent to Cellmark Diagnostics for DNA testing, but Cellmark was unable to get any readings from the evidence in the rape kit. Cellmark recommended Forensic Science Associates (FSA) as a laboratory that might be able to analyze the vaginal swab. The evidence was sent to FSA, which determined, in a report dated October 25, 1991, that the semen on the vaginal swab could not have come from Jones (see appendix for results).

FSA was asked to retype Jones' blood, and on April 13, 1992, FSA said that it had replicated its findings and Jones could not have supplied the semen on the vaginal swab.

Conclusion. On December 18, 1991, the defense submitted a motion for a new trial on the basis of newly discovered evidence. On July 17, 1992, a judge ruled that the DNA evidence was admissible. The court vacated Jones' conviction and ordered a new trial. The prosecution immediately stated it would not refile charges, and Jones was released that day. Jones served 6½ years of his sentence.

Kerry Kotler (Suffolk County, New York)

Factual background. A woman accused Kotler of raping her twice, once in 1978 and again in 1981. In the first incident, the victim alleged that she arrived home and a man wearing a ski mask raped her and robbed her of jewelry at knife point. She was unable to identify her assailant and reported only the burglary to the police. In the second incident, the victim again ar-

rived home and an unmasked man was there. She said that the assailant claimed to be coming "back for another visit" and again raped her at knife point. He robbed her of jewelry and $343 and left through the back door. After 2 full days of deliberations, a Suffolk County jury convicted Kerry Kotler of two counts of rape in the first degree, two counts of burglary in the first degree, one count of robbery in the first degree, and two counts of burglary in the second degree. The court sentenced Kotler to 25 to 50 years.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- The victim identified Kotler from a group of 500 photographs.
- The victim's identified Kotler by sight and voice from a police lineup.
- County laboratory tests showed that Kotler had three non-DNA genetic markers (ABO, PGM, and GLO) that matched those of the semen stain left on the victim's underpants.

Postconviction challenges. Kotler brought a pro se motion to set aside the jury verdict prior to sentencing. In the motion, he alleged prosecutorial misconduct and deficiencies in the court's jury charge. The motion was denied on December 2, 1983.

In 1986 Kotler made a direct appeal to the Appellate Division. Among his claims in the appeal: erroneous admission of testimony, insufficient evidence to convict, and excessive sentencing. The judgment of conviction was affirmed on March 3, 1986.

On March 10, 1987, Kotler brought to the court a second motion to set aside the conviction. He based his motion on false testimony by a police detective, concealment of evidence, and improper cross-examination of Kotler regarding his prior criminal charges. This motion was denied on July 7, 1988. The court, however, ordered a hearing on whether certain documents had been concealed from the defense prior to trial. On January 8, 1990, after the hearing, the county court again denied Kotler's motion.

Upon hearing about DNA tests in September 1988, Kotler contacted the Legal Aid Society and asked for assistance in getting the tests performed. He secured funds from his father, and on February 15, 1989, the rape kit, the victim's underwear, and blood from the victim and Kotler were sent to Lifecodes, Inc. It found an insufficient amount of DNA for testing and returned the evidence. Another legal aid attorney, however, heard about

Kotler's case and advised him to try Forensic Science Associates (FSA) in California.

DNA results. In February 1990 all the evidence was sent to FSA. A PCR test showed that Kotler was not the source of the semen. The prosecution, however, posited that since DNA from both Kotler and the underwear yielded a similar allele, part of the semen could have come from a consensual partner and another part from Kotler.

Tests were then conducted by the Center for Blood Research (CBR) in Boston. They showed the same results as the first test. The defense then asked for a blood sample from the husband of the victim because he was the only sex partner the victim claimed to have had prior to the rape. After a sample from the husband was received by both laboratories, tests showed that he was also not the source of the semen. These results showed that the semen in the victim's underpants could not have come from either Kotler or the victim's husband. Both FSA and CBR issued a joint statement to the Suffolk County Court attesting to these facts on November 24, 1992 (see appendix for results).

Conclusion. On March 10, 1992, Kotler's attorneys filed a memorandum of law in support of Kotler's motion to vacate judgment. Their brief referred to the results of the original DNA tests as well as to the withholding of evidence by the prosecution, which included police reports showing that the victim's description differed from Kotler in age, height, and weight and that the victim's identification of Kotler was a "look-alike," not a positive identification. The district attorney's office filed a memo of opposition to vacate the conviction.

After the defense attorneys received the results of the final DNA tests, they went to the judge, who ordered a hearing on the results. The prosecution then agreed to issue a joint statement with Kotler's lawyers to vacate the conviction. The Court of Suffolk County ruled to vacate the conviction on December 1, 1992, and ordered Kotler to be released on his own recognizance.

On December 14, 1992, the prosecution sought the dismissal of all indictments, which the court granted. Kotler served 11 years of the sentence before he was released on December 1, 1992.[*] Subsequently, the chief pros-

[*]According to an April 9, 1996, *New York Times* account, Kotler was arraigned April 8, 1996, in Suffolk County, New York, on charges of first-degree rape and second-degree kidnaping. The charges stem from an alleged sexual assault on August 12, 1995, and the results of DNA tests on evidence taken from the victim's clothing.

ecution expert who conducted the serology tests pleaded guilty to perjury charges that alleged he lied about his qualifications and training.

Steven Linscott (Cook County, Illinois)

Factual background. On October 4, 1980, police found a woman dead in her apartment, face down and naked, except for a nightgown around her neck. Her head was covered with blood, and her body had many visible wounds. She had also been sexually assaulted.

Linscott was a neighbor of the victim and was questioned by police during a neighborhood canvass. He later remembered a dream he had the night of the murder, which seemed to parallel the incident. After reporting his dream to police, he gave several recorded interviews with police officers. He also gave saliva, blood, and hair samples to police.

Steven Linscott was arrested for murder and rape on November 25, 1980. In Cook County a circuit court jury took 10 hours to convict Linscott of murder and acquit him of rape. The judge sentenced Linscott to 40 years in prison.

Prosecutor's evidence at trial. The prosecution based its case against Linscott on several points:

- The dream that Linscott reported to police contained elements similar to those of the crime, including the following:

  1. The victim was beaten repeatedly both in the dream and in actuality.

  2. The victim was beaten in a downward motion both in the dream and in the actual crime.

  3. The weapon, in the dream, was long and thin; the actual weapon was a tire iron.

  4. The victim in the dream died passively; the actual victim was found with her hands formed in an "ommudra" sign used by Hindus to signify a passive acceptance of death.

- The results of blood-typing tests that showed that the semen from the crime scene could have come from Linscott.

- The results of head and pubic hair analyses showed that hairs found at the scene were "consistent" with Linscott's hair.

Postconviction challenges. Linscott appealed, and on August 7, 1985, the Appellate Court of Illinois overturned the conviction (482 N.E.2d 403). The court ruled that the State did not produce direct evidence of Linscott's guilt and that his "confession" contained no voluntary acknowledgment of guilt. The prosecution appealed this decision to the Illinois Supreme Court. While the State's appeal was pending, the Illinois Supreme Court ruled on October 31, 1985, that Linscott could be released on bond. On October 17, 1986, the Illinois Supreme Court ruled that there was enough evidence to convict and reversed the decision of the appellate court (500 N.E.2d 420). The Supreme Court, however, also ruled that there appeared to be issues from the trial that were not addressed in the appeal, and the case was remanded to the appellate court for further review.

The appellate court was asked to review issues involving the physical evidence. The State's expert on the hair examination testified that only 1 in 4,500 persons would have consistent hairs when tested for 40 different characteristics. He only tested between 8 and 12 characteristics, however, and could not remember which ones. The appellate court ruled on July 29, 1987, that this testimony, coupled with the prosecution's use of it at closing argument, constituted denial of a fair trial (511 N.E.2d 1303). The conviction was again overturned.

Leave to appeal was again granted to the prosecution by the Illinois Supreme Court. On January 31, 1991, the court vacated the judgment by the appellate court, reversed the judgment by the circuit court, and remanded the case for a new trial (566 N.E.2d 1355). A trial date was set for July 22, 1992.

DNA results. In preparation for the new trial, prosecutors attempted to bolster their case by submitting the physical evidence for PCR testing. The analysis by the Center for Blood Research (CBR) in Boston indicated that the semen could not have come from Linscott. DNA tests had been performed before the original trial, but the results were inconclusive and consumed all the swab material (see appendix for results).

Conclusion. On the basis of the results of the DNA analysis, the prosecutor decided that there were too many doubts to pursue the case any longer. On July 15, 1992, all charges against Linscott were dropped. He had served 3 years of his sentence and had been free on bond for 7 additional years.

Bruce Nelson (Allegheny County, Pennsylvania)

Factual background. Two men stole a van and drove to a parking garage in the hopes of committing a robbery. They accosted a woman when she came into the garage and forced her into the van. The two men allegedly sexually assaulted the woman repeatedly, pulled out a knife, and choked the woman to death with a piece of cloth.

Those details of the incident are available only through the testimony of Terrence Moore following his arrest for the rape-murder. He confessed but testified that Bruce Nelson was the one who initiated the crimes and forced the victim into the van and killed her.

Nelson, already in prison on unrelated charges, was arrested. Police had Moore confront Nelson with his confession. During this confrontation, Nelson reportedly asked Moore, "What did you tell them?" Moore reportedly responded, "I told them everything."

Bruce Nelson was convicted of rape and murder in an Allegheny County jury trial. The district court sentenced him to life in prison for the murder and 10 to 20 years for the rape, to run concurrently with the life sentence.

Prosecutor's evidence at trial. Evidence was provided at trial that showed Moore's fingerprints on the victim's purse. Saliva from the woman's breast and bra was consistent with Moore's saliva. Saliva found on a cigarette butt at the scene was also consistent with Moore's saliva. Hairs found on the victim and her clothing were consistent with Moore's. The hairs, saliva, and fingerprints were not consistent with those of Nelson. The prosecution based its case against Nelson on two points:

- The testimony of Terrence Moore named Nelson as the initiator of the crimes and as the murderer.
- The statement by Nelson, "What did you tell them?" was entered into evidence as a confession.

Postconviction challenges. Nelson filed a habeas corpus petition stating that the submittal of his confrontation with the other defendant, Terrence Moore, violated his Sixth Amendment right to counsel. Nelson also claimed a violation of his Fifth Amendment right to "restrictions on custodial interrogation of suspects who have invoked their right to silence." The district court denied his petition and his certificate for probable cause for appeal. The Pennsylvania Supreme Court declined to review the case.

The United States Court of Appeals for the Third Circuit granted Nelson's probable cause petition and reviewed his claims de novo. On August 17, 1990, the circuit court affirmed the district court's rejection of Nelson's Sixth Amendment claim but reversed its Fifth Amendment decision and remanded the case to the district court for further review (911 F.2d 928).

DNA results. On remand, the prosecution obtained DNA tests to prepare for a new trial. The results of DNA tests excluded Nelson as the assailant.

Conclusion. On the basis of the results of the DNA testing, Nelson was cleared of all charges on August 28, 1991. He had served 9 years of his sentence.

Brian Piszczek (Cuyahoga County, Ohio)

Factual background. In the early morning of July 29, 1990, the victim was at home alone when she heard a knock at her door. She looked through the peephole and asked the man to identify himself. The man said he was with the victim's friend, who was parking the car. When he said this, the victim thought she recognized his voice as belonging to a man named Tim or Tom, who had been in her house before. The victim let the man inside; he immediately pulled out a knife, cut the victim on the neck, breast, and stomach, and then raped her.

On June 25, 1991, after 1 day of deliberations, a Cuyahoga County jury convicted Brian Piszczek of rape, felonious assault, and burglary. The court sentenced him to 15 to 25 years.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- The victim identified Piszczek from a photo array 2 months after the incident.
- The victim made an in-court identification of Piszczek.
- Piszczek testified that he had, in fact, been in the victim's house once before with the mutual friend of the victim.
- Piszczek's alibi was corroborated only by his girlfriend.

Postconviction challenges. After Piszczek's conviction, a public defender took over his appeal. He filed an appeal on the basis of an improper photo

identification process and ineffective counsel at trial (trial counsel never requested DNA testing, which was available at the time of conviction, and he was alleged to be ineffective in cross-examination of witnesses).

After the appeal was denied, the Innocence Project became involved. Its lawyers filed a release of evidence motion with the Cuyahoga County Court of Common Pleas. The request was granted on March 11, 1994. All evidence was forwarded to Forensic Science Associates (FSA) for PCR testing.

DNA results. The report from FSA, issued on July 6, 1994, showed that PCR DQ alpha typing (as well as typing for five other polymarker genes) was performed on the blood of both Piszczek and the victim and on the sperm and nonsperm cell fractions of a vaginal swab, an anal swab, and a semen stain from a nightgown. The tests showed that Piszczek's DNA did not match the tested evidence (see appendix for results).

Conclusion. The day after receiving the DNA test results, the prosecutor's office asked a judge to overturn the conviction. On October 6, 1994, a Cuyahoga County judge declared Piszczek not guilty on all charges. Piszczek served 4 years in prison, including a period after his conviction was overturned.

Dwayne Scruggs (Indianapolis, Indiana)

Factual background. On the night of February 1, 1986, when the victim was walking home from a bus station, a man came behind her, held a knife to her throat, and forced her to a grassy area near a highway overpass. There the assailant, while attempting to hide his face, sexually assaulted the victim and forcibly took $6 from her. After telling the victim to roll away from him, the assailant left the area on foot.

On May 13, 1986, Dwayne Scruggs was convicted of rape and robbery in a jury trial in a Marion County Superior Court. He was sentenced to serve 40 years on the rape charge and 20 years on the robbery charge, with sentences to run concurrently.

Prosecutor's evidence at trial. The prosecution's main evidence consisted of the following:

- The victim identified Scruggs ("with 98 percent surety") from a sex crimes file of approximately 200 photographs.

- The victim identified Scruggs a second time from a different picture and made an in-court identification of him at trial.
- The victim identified Scruggs' boots as matching those worn by her assailant.
- Scruggs acknowledged being familiar with the area where the rape occurred.

Postconviction challenges. In August 1987 Scruggs' appeal was heard before the Supreme Court of Indiana (511 N.E.2d 1058). His petition was based on both a lack of evidence to convict and an "evidentiary harpoon" committed by a police officer who had testified before the jury that the victim had viewed photos of "individuals who have all been arrested for rape or a sexual assault." The jury was admonished to disregard his statement, but no mistrial was declared by the court. The supreme court affirmed the decision of the superior court.

On December 18, 1992, Scruggs' public defender submitted two motions on his behalf. The first was to amend the petition for postconviction relief. This motion stated that the defendant was denied due process of law when he was given a sentence that was not based upon the evidence in the case. Entering evidence of the petitioner's previous arrest for rape (for which he was not convicted) was also cited as a denial of due process. The motion also stated that the defendant was denied effective assistance of counsel at both the trial and appellate levels.

The second motion was for the release of all the State's evidence that contained biological samples of the victim for the purpose of performing DNA tests that were not available at the time of trial. On February 24, 1993, prior to a ruling on this motion, Scruggs' attorney filed a motion to allow production of laboratory reports that would analyze the evidence and blood samples from Scruggs. On April 26, 1993, the public defender also petitioned for blood samples to be drawn from the defendant.

The court held a hearing on all these motions on April 27, 1993, and ruled that the blood sample could be drawn and that the Indianapolis Police Department laboratory must release the vaginal swabs and slides. Those materials were sent to Cellmark Diagnostics in Maryland for DNA tests. The public defender's office paid for the testing.

DNA results. The report from Cellmark stated that DNA from all the items sent were amplified using PCR and typed for DQ alpha using an amplitype HLA DQ alpha forensic DNA amplification and typing kit. The results excluded Scruggs as the source of the DNA from both the nonsperm cell fraction and sperm fraction of the vaginal swabs as well as from a bloodstain obtained at the scene of the crime (see appendix for results).

Conclusion. After verifying the results of this test, the prosecutor's office joined the defender's office in filing a motion to vacate Scruggs' conviction and sentence. On December 17, 1993, the Superior Court vacated both the sentence and the conviction and ordered Scruggs released. Five days later, the prosecution declined to prosecute in a new trial and asked the court to dismiss all charges against Scruggs. The court sustained the motion.

On March 28, 1994, the prosecuting attorney and the public defender filed for expungement of Scruggs' record. The next day, the court so ordered. Scruggs had served 7 years and 7 months of his sentence before release.

David Shephard (Union County, New Jersey)

Factual background. On December 24, 1983, two men abducted a woman in the parking lot of a shopping mall. The victim was forced into the back seat of her car where one man pinned her arms and legs while the other drove. The driver stopped in a residential area where both men repeatedly assaulted her sexually. She was ordered out of her car, then the men drove away. The second assailant was never identified.

In September 1984 a Union County jury deliberated 1 day and found David Shephard guilty of rape, robbery, weapons violations, and terrorist threats. Shephard was sentenced to 30 years in prison.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- The victim identified Shephard by sight and voice at his work.
- The victim heard one of the attackers call the other man Dave.
- The victim's purse and car were found near the airport building where Shephard worked.

- Blood test results showed that Shephard's antigens and secretor type matched those of the assailant.
- Shephard's alibi was uncorroborated and was punctured by the prosecution in cross-examination.

Postconviction challenges. Shephard filed court papers in 1992 requesting that all evidence containing semen samples be released for DNA tests. The prosecution agreed.

DNA results. The first DNA test indicated that one discernible semen stain on the vaginal swab from the rape kit did not match Shephard's. But the defendant was not vindicated because there had been two rapists. A second test revealed a second DNA sample that was too faint to read.

Shephard's defense attorney then asked the laboratory if any samples could be found on the panty liner the victim was wearing at the time of the attack. This test found two distinct DNA patterns, neither of which matched Shephard's. Subsequent testing, at the prosecutor's request, of the victim's boyfriend (the only person she was having consensual sex with at the time) showed that the boyfriend did not match either of the samples from the panty liner.

Conclusion. The Union County Superior Court ordered a new trial on the basis of the DNA evidence. Moments later, the prosecutor declined to pursue another trial, and Shephard was released on May 18, 1994. Shephard had served almost 10 years of his sentence.

Walter Snyder (Alexandria, Virginia)

Factual background. In the early morning of October 28, 1985, a woman was raped and sodomized in her apartment by a man who had broken through her front door.

Walter Snyder was convicted of rape, sodomy, and burglary by an Alexandria, Virginia, jury on June 25, 1986. The jury recommended a sentence of 45 years, which the judge accepted and ordered Snyder to serve.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- The victim identified Snyder as a person who lived across the street from her.
- The victim identified Snyder in a police station "show-up."
- Police found red shorts in Snyder's house similar to those worn by the assailant.
- Standard blood typing showed Snyder and the assailant were type A secretors.
- Snyder's alibi, that he was at home sleeping during the time of the assault, was corroborated only by his mother.

Postconviction challenges. After Snyder's appeal of his conviction was denied, the Innocence Project agreed to defend him pro bono if his family could pay for any necessary forensic tests. In May 1992 prosecutors agreed to release the necessary evidence to the defense for DNA testing. The defense forwarded the evidence to the Center for Blood Research (CBR) in Boston.

DNA results. On October 28, 1992, CBR issued a report stating that Snyder's DNA did not match the DNA in semen found on a vaginal swab from the original rape kit. The prosecution asked CBR to repeat the test, which it did for free at the Innocence Project's request. CBR replicated its findings, and the prosecution asked the FBI to look at the results. The FBI agreed with the methodology and the results in CBR's report (see appendix for results).

Conclusion. Virginia has a 21-day rule for a motion for a new trial based on newly discovered evidence, so the only recourse for Snyder was to seek a pardon from the governor. The Commonwealth's attorney joined the defense in filing a request for a pardon. Two months later, on April 23, 1993, the governor granted an absolute pardon; Snyder was released the same day. After being freed, Snyder petitioned the Alexandria Circuit Court to expunge his record. On January 11, 1994, the court granted his petition. Snyder had served almost 7 years of the original sentence.

Snyder's civil suit against the city of Alexandria is pending at the time of this report. In addition to wrongful imprisonment, the suit alleges that Snyder was beaten and handcuffed during interrogation and that police claims that Snyder confessed were false.

David Vasquez (Arlington County, Virginia)

Factual background. In the early morning of January 24, 1984, a woman was sexually assaulted and murdered in her home by an assailant who had entered the home through the victim's basement window. The woman died from asphyxiation by hanging.

David Vasquez pleaded guilty to second-degree homicide and burglary (Alford plea) on February 4, 1985. He was sentenced to 35 years in prison. He had pled guilty to the crime after allegedly confessing to the crime and reporting details that were not released to the public. Vasquez, who is borderline retarded, later reported that he had only dreamed the crime.

Prosecutor's evidence. In addition to Vasquez's guilty plea, the prosecution proffered the following evidence to the court:

- Two witnesses placed Vasquez near the victim's house on the day of the crime.
- Vasquez could not provide an alibi.
- Hair analysis of pubic hairs found at the scene were consistent with Vasquez's hair.
- A guilty plea meant that Vasquez would not be subject to the death penalty upon conviction.

Postconviction challenges. There are no known postconviction challenges. Vasquez's defense attorneys, however, filed for a suppression of two of his confessions because they were issued without a Miranda warning.

DNA results. The Virginia State laboratory, Cellmark Diagnostics, and Lifecodes, Inc., performed DNA tests on the evidence from several rape/murders. All tests inculpated a man named Timothy Spencer as the assailant in rape-murders that were identical in modus operandi to the Vasquez incident.

Attempts by FSA to compare hair found at the scene with Vasquez's blood sample were inconclusive.

Conclusion. The Commonwealth's attorney and Vasquez's defense attorneys filed motions with the governor to grant Vasquez an unconditional pardon. The motions were based on the DNA tests of Spencer and an FBI report that indicated the Vasquez crime and the Spencer crimes were commit-

ted by the same person. The report also stated that the crimes "were not perpetrated by someone who was mentally deficient." The governor granted the pardon, and Vasquez was released on January 4, 1989. Vasquez had served 5 years of his sentence.

Timothy Spencer was arrested, tried, and convicted for two other rape-murders. He was never formally prosecuted in the Vasquez incident because he already had been sentenced to death. The United States Supreme Court denied Spencer's request for a new DNA test. On April 27, 1994, Spencer became the first person in the United States executed on the basis of DNA testing.

Glen Woodall (Huntington, West Virginia)

Factual background. Two women, in separate incidents, were abducted at knife point in a shopping mall parking lot. Both times the assailant wore a ski mask and forced the victims to close their eyes throughout the attack. In the first instance, the attacker drove around in the woman's car, repeatedly raped her, and stole a gold watch and $5. The victim opened her eyes briefly to note that the assailant wore brown pants and was uncircumcised. In the second case, the man repeatedly raped the woman and stole a gold watch. This woman was able to note the man's boots, jacket, and hair color. She also noted that he was uncircumcised.

On July 8, 1987, a jury found Glen Woodall guilty of first-degree sexual assault of one woman, first-degree sexual abuse of a second woman, kidnaping both women, and aggravated robbery of both women. He was sentenced by the circuit court to two life terms without parole and to 203 to 335 years in prison, to be served consecutively.

Prosecutor's evidence at trial. The prosecution based its case on several points:

- A State police chemist testified that Woodall's blood secretions matched secretions in a semen sample from the evidence.
- A comparison of body and beard hair from the defendant was consistent with hair recovered from a victim's car.
- Partial visual identification of the defendant was made by one of the victims.

- One victim identified clothing that matched clothing found in the defendant's house.
- Both victims testified that the assailant was not circumcised, in common with the defendant.
- A distinctive smell about the assailant was noted by both victims and also was found at the defendant's workplace.

During the pretrial hearing, the judge denied a defense request for an "experimental new" DNA test of the defendant's blood and semen samples from the victims' clothing. Denial was based on defense inability to offer any expert testimony on the test's validity or reliability. After trial, the defense raised this issue again, and a DNA test was finally performed. The court held that test results were inconclusive.

Postconviction challenges. On July 6, 1989, the West Virginia Supreme Court of Appeals affirmed Woodall's conviction (385 S.E.2d 253). Woodall continued to file motions to allow DNA testing of the evidence. He filed several appeal petitions and habeas corpus petitions with both the trial court and with the West Virginia Supreme Court. The State Supreme Court finally allowed the evidence to be released to the defense for additional DNA testing. This evidence was forwarded to Forensic Science Associates (FSA).

DNA results. FSA conducted PCR testing of the semen samples from the vaginal swabs from the original rape kits. FSA concluded that the assailant in both cases had the same DQ alpha type and neither matched Woodall's type. These results were reviewed and confirmed in testimony by several laboratories and forensics experts, including Dr. Alec Jeffreys and Dr. David Bing of the Center for Blood Research (CBR). CBR also conducted its own PCR analysis and arrived at the same results as FSA (see appendix for results).

Conclusion. Woodall submitted a habeas corpus petition based on the DNA test results. On July 15, 1991, the trial court held a hearing on the petition and vacated Woodall's conviction. Other relevant evidence included secret hypnosis of the two victims and a romantic relationship between one of the victims and an investigating officer. The court set bond at $150,000 for Woodall and ordered him placed on electronic home monitoring. CBR continued conducting RFLP analysis and eliminated three potential donors as sources of the sperm. This was to counter the prosecution's argument that

the stains may have come from consensual partners. The RFLP analysis also excluded Woodall, and the State conducted its own DNA test. The State's results also excluded Woodall, as noted in a report of April 23, 1992.

As a result of the additional testing, West Virginia moved to dismiss Woodall's indictment on May 4, 1992, and the trial court granted the motion. Woodall served 4 years of his sentence in prison and spent a year under electronic home confinement.

It is important to note that the State police chemist in this case, Fred Zain (see also Gerald Wayne Davis and William O'Dell Harris cases), was investigated by the West Virginia attorney general's office and the State Supreme Court of Appeals for providing perjured testimony in criminal cases. Glen Woodall was the first person whose conviction was overturned after Zain testified for the State. Over 130 cases in which Zain either performed lab tests or provided the testimony are being reviewed by the State attorney general's office. In addition, an investigation is ongoing in several Texas counties where Zain worked and testified as a laboratory expert.

Glen Woodall was awarded $l million from West Virginia for his wrongful conviction and false imprisonment.

GLOSSARY

Alleles. Alternate gene forms or variations, which are the basis of DNA testing.

Antigens. Any biological substance that can stimulate the production of, and combine with, antibodies. Variances in human antigens can be used to identify individuals within a population.

DNA. Deoxyribonucleic acid, which contains genetic material and whose shape resembles a rope ladder that has been twisted (the double helix). An individual's DNA is unique except in cases of identical twins.

DNA match. See *inclusion*.

DNA profiling. The process of testing to identify DNA patterns or types. In the forensic setting, this testing is used to indicate parentage or to exclude or include individuals as possible sources of body fluid stains (blood, saliva, semen) and other biological evidence (bones, teeth, hair).

DNA typing. See *DNA profiling*.

DQ alpha (DQα). An area (locus) of DNA that is used by the forensic community to characterize DNA. Because there exist seven variations (alleles) of DNA at this locus, individuals can be categorized into 1 of 28 different DQ alpha types. Determination of an individual's DQ alpha type involves a Polymerase Chain Reaction-based test.

Electrophoresis. A technique by which DNA fragments are placed in a gel and separated by size in response to an electrical field.

Epithelial cells. Membranous tissue forming the covering of most internal surfaces and organs and the outer surface of the body.

Epithelial cell fraction. One of two products from a differential extraction that removes DNA from epithelial cells before analysis of sperm DNA can be conducted. The other product is the sperm cell fraction.

Exclusion. A DNA test result indicating that an individual is excluded as the source of the DNA evidence. In the context of a criminal case, "exclusion" does not necessarily equate to "innocence."

Forensic science. The application of a field of science to the facts related to criminal and civil litigation.

Gene. A segment of a DNA molecule that is the biological unit of heredity and transmitted from parent to progeny.

Genotype. The genetic makeup of an organism, as distinguished from its physical appearance or phenotype.

Inclusion. A DNA test result indicating that an individual is not excluded as the source of the DNA evidence. In the context of a criminal case, "inclusion" does not necessarily equate to "guilt."

Inconclusive. The determination made following assessment of DNA profile results that, due to a limited amount of information present (e.g., mixture of profiles, insufficient DNA), prevents a *conclusive* comparison of profiles.

Marker. A gene with a known location on a chromosome and a clear-cut phenotype (physical appearance or observable properties) that is used as a point of reference when mapping another locus (physical position on a chromosome).

Polymerase Chain Reaction (PCR). A technique used in the process of DNA profiling.

Restriction Fragment Length Polymorphism (RFLP). A technique used in the process of DNA profiling.

Secretor. A person who secretes the ABH antigens of the ABO blood group in saliva and other body fluids.

Serologist. A forensic scientist who specializes in biological fluid analysis.

APPENDIX

DNA (PCR) Results

A detailed laboratory report was obtained in 12 of the study cases; the results are reported here. The following PCR results are the actual DQα types that laboratories found on evidence and blood samples. DQα (pronounced DQ alpha) is one of several polymarkers that are compared in PCR testing. Each DQα type is similar to blood type (e.g., O, A, B). One can see that many times the victim's DQα matches the nonsperm fraction in a semen stain. One also can see that the sperm fraction of the semen stain does not match the type of the defendant (except Chalmers, where the difference occurred in polymarkers other than DQα).

Kirk Bloodsworth

Sample	DQα Type
Victim's blood sample	1.3, 4
Panties—semen stain (nonsperm fraction)	1.1, 3 (Trace 1.3, 4)
Panties—semen stain (sperm fraction)	1.1, 3
Bloodsworth's blood sample	1.2, 4

Ronnie Bullock

Sample	DQα Type
Panties (nonsperm cell fraction)	1.1, 2, 3
Panties (sperm fraction)	3
Victim's blood sample	1.1,2
Bullock's blood sample	4

Terry Leon Chalmers

Sample	DQα Type
Victim's blood sample	1.1, 3
Chalmers' blood sample	1.2, 4

Vaginal swab—sperm cell	1.2, 4
Cervical swab—sperm cell	1.2, 4

Note: The epithelial cells from the two swabs were too weak to get accurate readings. Although the DQa of Chalmers and the semen matched, three other polymarkers did not match.

Frederick Daye

Sample	DQα Type
Blue jeans—left knee (nonsperm fraction)	1.2, 4
Blue jeans—left knee (sperm fraction)	1.2, 4
Daye's blood sample	4, 4

Edward Honaker (results of three tests)

Sample	DQα Type
Victim's oral swab	3, 3
Vaginal swab (nonsperm fraction)	3, 3
Vaginal swab (sperm fraction)	3,4
Shorts (nonsperm fraction)	3, 3
Shorts (sperm fraction)	1.2, 4
Honaker's blood sample	1.2, 3
Boyfriend's blood sample	1.2, 4
Secret lover's blood sample	4, 4

Joe Jones

Sample	DQα Type
Victim's blood sample	3, 4
Jones' blood sample	1.2, 3
Vaginal swab (sperm fraction)	1.1, 4
Vaginal swab (nonsperm fraction)	3, 4

Kerry Kotler

Sample	DQα Type
Underpants (sperm fraction)	1.1, 4
Victim's blood sample	4, 4
Kotler's blood sample	4, 4
Husband's blood sample	2, 3

Steven Linscott

Sample	DQα Type
Vaginal swab (sperm fraction)	3, 4
Vaginal swab (nonsperm fraction)	1.1, 3
Victim's blood sample	1.1, 3
Linscott's blood sample	4

Brian Piszczek

Sample	DQα Type
Nightgown (sperm fraction)	1.2, 4
Nightgown (nonsperm fraction)	2, 3
Vaginal swab (sperm fraction)	1.2, 4

Vaginal swab (nonsperm fraction)	2, 3
Victim's blood sample	2, 3
Piszczek's blood sample	4, 4

Dwayne Scruggs

Sample	DQα Type
Vaginal swab (nonsperm cell fraction)	2, 4
Vaginal swab (sperm fraction)	1.1, 4
Bloodstain	2, 4
Scruggs' blood sample	4, 4

Walter Snyder

Sample	DQα Type
Vaginal swab (sperm fraction)	1.2, 1.3
Vaginal swab (nonsperm fraction)	2, 4
Victim's blood sample	2, 4
Snyder's blood sample	1.2, 4

Glen Woodall

Sample	DQα Type
Underpants of victim 2 (sperm fraction)	3, 4
Underpants of victim 2 (nonsperm fraction)	1.2, 3
Denim skirt of victim 1 (sperm fraction)	3, 4
Denim skirt of victim 2 (nonsperm fraction)	1.2, 4
Victim 1's blood sample	1.2, 4
Victim 2's blood sample	1.2, 3
Woodall's blood sample	2, 3

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