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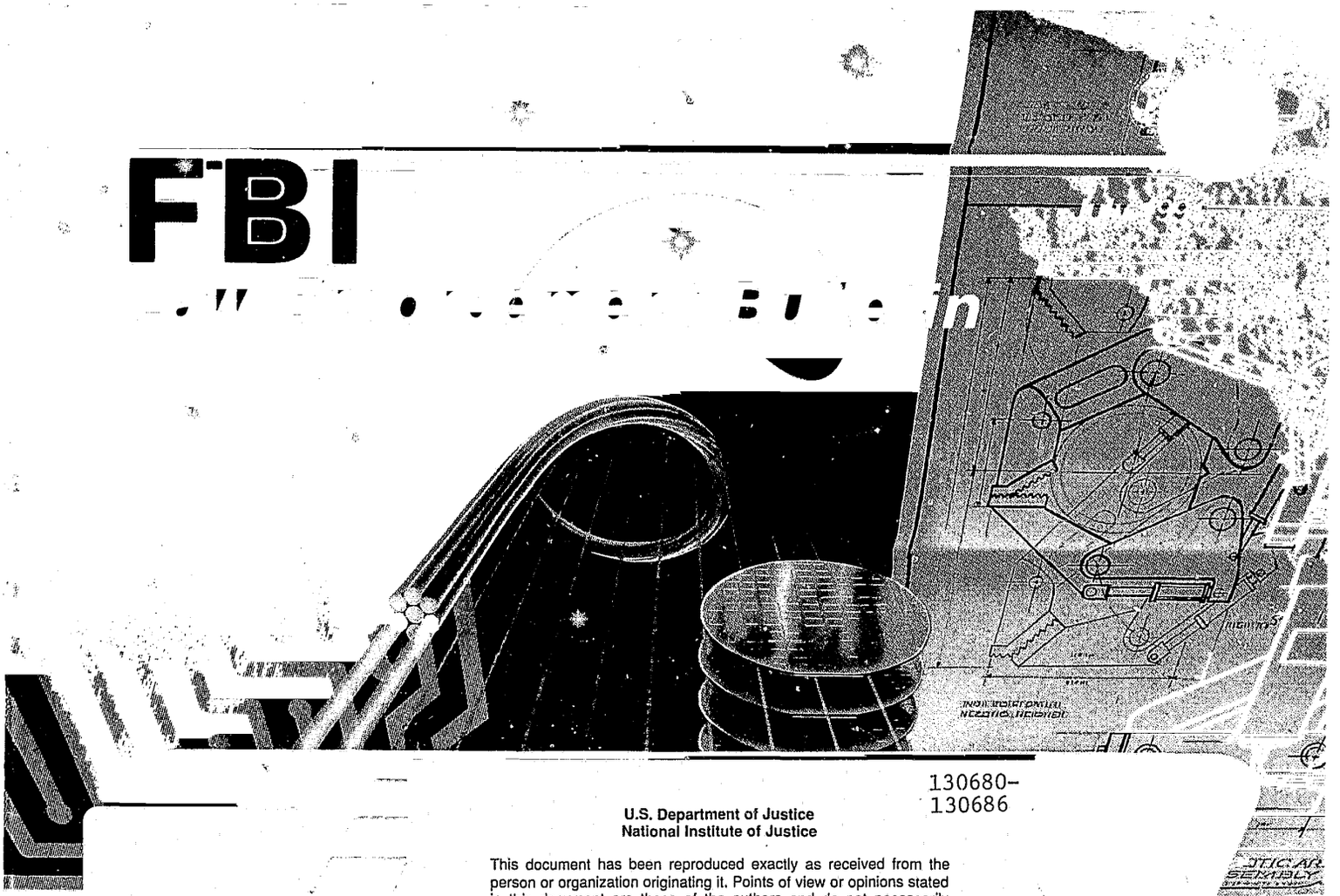

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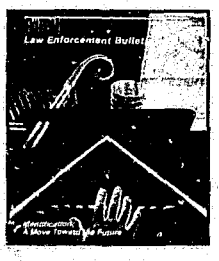

The Cover: *The "technology explosion" witnessed in recent years will have a dramatic impact on law enforcement in the years to come.*

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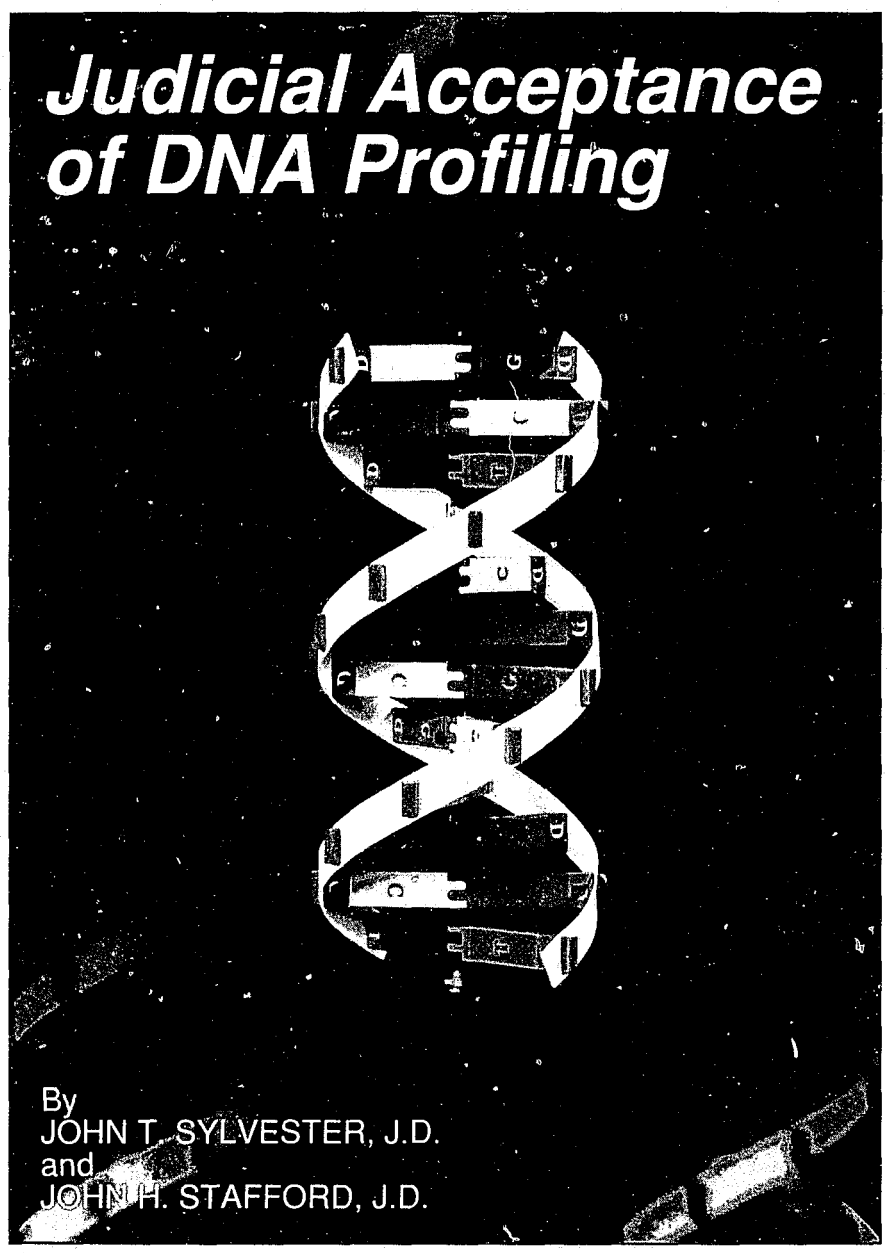
Judicial Acceptance of DNA Profiling



By
JOHN T. SYLVESTER, J.D.
and
JOHN H. STAFFORD, J.D.

Forensic DNA profiling has been under intense judicial scrutiny by the courts for over 2 years.[1] Even so, an overwhelming majority of the courts have admitted forensic DNA evidence after reviewing it under the varying standards traditionally afforded novel scientific evidence. In doing so, the courts have recognized in numerous decisions that genetic profiles developed from an individual's DNA are reliable, probative, and objective.[2]

However, despite the many favorable decisions, DNA evidence, if challenged, must continue to undergo a pre-trial review, at least until a court of appeals in the jurisdiction in which the evidence is offered addresses the question of whether DNA evidence is acceptable. At such hearings, challenges to the evidence place at issue the ability of the forensic laboratories to match similar DNA profiles reliably, and thereafter, the ability to assess the frequency that the matched profile is expected to occur in the U.S. population. However, it is anticipated that with the continued strong support of the scientific community, prosecuting attorneys, and investigators, DNA profiling will soon be accepted by trial courts as routine evidence.

ADMISSIBILITY STANDARDS

Traditionally, two standards have been used to admit novel scientific evidence in U.S. courts. Specifically, courts have adopted either the "*Frye* standard" or the "relevancy standard" when deciding whether novel scientific evidence, such as DNA profiling, will be admitted for use in court.[3]

The *Frye* Standard

Courts applying the *Frye* standard will admit novel scientific evidence only after it has gained general acceptance in the pertinent scientific community.[4] Accordingly, the court's role under *Frye* is more properly limited to an assessment of the extent to which the scientific community has embraced the technique as a whole.[5] The analysis performed in any particular case is not generally at

issue in a *Frye* hearing.[6] Rather, challenges pertaining exclusively to any one analysis are reserved for the jury, which may place less weight on the evidence if it concludes that the accepted testing procedures were not properly applied to the sample in the case.

The Relevancy Standard

As an alternative to the *Frye* standard, many courts have turned to the "relevancy standard" as the basis for determining whether the court will accept evidence that arises from new scientific techniques. The "relevancy standard" is based on the Federal Rules of Evidence and directs the court to consider the relevance,[7] the potential for unfair prejudice, and the reliability of the offered testimony.[8] The general acceptance of the technique by the scientific community is a factor in determining the admissibility of new scientific evidence, but it is not the overriding concern under this standard.

For example, evidence may be rejected under the relevancy standard, if the jury is asked to accept the expert's bare assertion on faith alone.[9] In DNA profiling, an autoradiogram produces a permanent record of the results of this procedure and is available for review by the defendant and jury. The danger of a jury being asked to accept a scientific opinion on faith alone is thereby minimized.[10]

The *Castro* Standard

Recently, a New York trial court in *People* v. *Castro*[11] expanded these traditional approaches during its review of DNA evidence. After determining that forensic DNA profiling met the standards established under *Frye*, the court established a new precedent for the admissibility of DNA profiling evidence, not just to determine whether the DNA profiling technique is generally accepted but also to determine whether the technique was properly applied in the specific case before the court.

The defendant Castro was accused of murder. During the investigation, investigators obtained a speck of blood from the suspect's watch. The subsequent DNA analysis performed by a private laboratory associated the blood with that of the victim's. However, defense experts disputed the laboratory's interpretation of the test results, contending that the profile was uninterpretable or inconclusive.

The court became convinced that the private laboratory did not properly apply the accepted technique for DNA profiling in this case and excluded the evidence of a match from use at trial. Interestingly, the defendant ultimately pled guilty, admitting the blood on his watch band was that of the victim's.

A few other courts have followed the approach of *Castro*.[12] A party introducing DNA evidence under this standard must now demonstrate at a pre-trial hearing that the laboratory properly performed the accepted scientific techniques in analyzing the forensic samples *in the particular case*.

JUDICIAL ACCEPTANCE

Forensic DNA profiling has been reviewed extensively by the courts under the varying standards afforded novel scientific evidence, and the number of favorable decisions is encouraging. An overwhelming majority of courts have admitted forensic DNA profiling results from the three major laboratories involved in forensic DNA analysis—the FBI, Cellmark, and Lifecodes. Courts in at least 49 States have admitted DNA evidence in over 417 hearings and

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trials.[13] The FBI Laboratory alone has accounted for admissions in over 120 trials and 85 separate admissibility hearings in 40 States.[14] Moreover, 23 appellate level courts, including eight State courts of last resort, have reported favorable decisions after reviewing DNA profiling under the varying standards of review.[15]

> **"With few exceptions, Federal and State courts...have overwhelmingly admitted DNA test results, regardless of the admissibility standard used...."**

Recently, however, a single State appellate court balked at recognizing DNA profiling, but left the door open to future admissions. In *Commonwealth* v. *Curnin*,[16] the Supreme Judicial Court of Massachusetts reversed the trial court's admission of the DNA evidence analyzed by a private laboratory. The court observed that the offer of population statistics, which convey to the jury how common or rare the reported DNA profile is in the U.S. population, was not supported by testimony from an expert on population genetics. In the absence of such testimony, the prosecution could not demonstrate the general acceptance of the private laboratory's statistical approach to DNA analysis.[17]

Moreover, the court concluded that without the population statistics, the jury could not assess the significance of a DNA profile match. Therefore, the court excluded the evidence of the match as well. However, the court stated that it will consider evidence derived from DNA profiling in the future, assuming the offer of the population statistics is properly supported by testimony from an expert qualified in the field of population genetics.[18]

A very few unreported trial court decisions have also rejected DNA profile evidence offered in a criminal proceeding.[19] These courts have rejected DNA evidence for differing reasons, to include the existence of some dissent in the scientific community over some aspects of the approach to population statistics and the complexity of the evidence. However, the rulings that reject DNA evidence because of some divergence in the scientific community are clearly not consistent with the standards established by *Frye*. Because *Frye* requires only that the scientific technique be *generally* accepted in the scientific community,[20] some divergence in the scientific community is expected.[21] These isolated adverse decisions have not generally been followed by other courts in the same jurisdictions that have admitted DNA evidence in criminal trials.[22]

In a few other cases, trial and appellate courts have accepted testimony that two DNA profiles are consistent or "matched," but then prevented the examiner from producing population statistics that would convey a sense of how rare the resultant profile is in the community in which the crime occurred. The examiner was allowed, however, to express an opinion on how rare or common the profile is based on the examiner's experience. These courts, in excluding testimony on population statistics, have voiced concern that such evidence might have a potentially exaggerated impact on the trier of fact.[23]

United States v. *Jakobetz*

While no Federal appellate court decisions currently address whether forensic DNA profiling is judicially accepted, two of the more significant challenges to the forensic use of DNA profiling have been heard by two U.S. district courts.[24] The first published Federal opinion addressing the admissibility of the FBI's DNA test results was in *United States* v. *Jakobetz*.[25]

In *Jakobetz*, the suspect was charged with kidnaping in the U.S. District Court in Vermont after he abducted the victim from an interstate rest area in Vermont, raped her, and then released her in New York. The DNA profile of semen obtained from the victim matched the DNA genetic profile of the suspect.

The defense in *Jakobetz* raised a substantial challenge to the admissibility of the forensic DNA evidence, attacking the reliability of the FBI Laboratory's procedure, as well as the use of population statistics in

the interpretation of the match. The population statistics produced by the FBI Laboratory indicated that the DNA profile of the defendant was extremely rare and was expected to occur only once in every 300 million persons. In a 35-page opinion finding general acceptance of the FBI's entire approach to forensic DNA testing, the court admitted the DNA profile for use by the jury, noting that the FBI used "fail-safe" characteristics in its approach to the population statistics that "redound to the defendant's benefit."[26]

United States v. *Yee*

The most hotly contested DNA admissibility hearing held to date occurred in *United States* v. *Yee*.[27] The victim in *Yee* was shot 14 times at close range in his own van. He was apparently mistaken by his assailants as the leader of a rival gang. Blood enzyme tests on blood stains recovered from the van revealed that some of the blood was not consistent with that of the victim's, leading investigators to theorize that one or more of the rounds fired into the van ricocheted, hitting one of the attackers.

A DNA profile analysis performed by the FBI Laboratory comparing the blood recovered from the van and that of one of the defendant's resulted in a match. After a 6-week hearing, the U.S. magistrate issued a 120-page opinion recommending that the FBI's DNA test results be admitted.

The magistrate based his decision on the requirements of the *Frye* standard, finding that there is "general acceptance in the pertinent scientific community that the procedures developed and implemented by the F.B.I. for determining that the DNA patterns from a known [i.e., a criminal suspect] source match with DNA patterns from a 'questioned' [i.e., crime scene] source are reliable."[28] He concluded also that there is general acceptance in the pertinent scientific community of the process used by the FBI in estimating the probability that such a match would randomly be encountered in the Caucasian population of the United States.[29]

The U.S. District Court for the Northern District of Ohio subsequently adopted the magistrate's recommendation, recognizing the reliability of the evidence.[30] Several States have also recognized the inherent reliability and probative value of forensic DNA evidence and have passed statutes deeming it admissible in criminal prosecutions.[31]

> **"Courts in at least 49 States have admitted DNA evidence in over 417 hearings and trials."**

DEFENSE CHALLENGES TO ADMISSIBILITY

Major defense challenges are mounting in duration and magnitude as defense attorneys seek to counter the potential impact on the jury of forensic DNA profiling. These challenges focus on bias, matching, and population statistics.

Bias

A few defense experts contend that the forensic test is biased against the suspect, since the examiner is aware of which samples the contributor expects will match. However, the fact is the FBI's DNA test results actually exclude the named suspects in about one-third of the submitted cases, often when traditional serological examinations had included the suspect as the potential source of the sample.[32] These statistics are similar to those reported by other laboratories performing forensic DNA analysis.

Matching

Experts for the defense still challenge the ability of the forensic DNA laboratories to determine reliably a match given the deteriorated or degraded condition of most forensic samples. They contend that degraded samples cause the markers to shift during the processing of the sample to an unknown degree, possibly resulting in a false matching of samples. No court, however, has found these criticisms to be valid.

Population Statistics

The principle focus of current attacks is on the population statistics reported by the laboratory after a match has been established. Because the current application of the technology does not yet exclude one profile from that of every other person in the world, DNA profiling laboratories sample a portion of the population to determine how

common or rare certain DNA profiles occur in the population. From these data, the laboratory then develops a statistical estimate of how frequently a particular DNA profile is likely to appear in the U.S. population.

A few scientists have testified that the FBI has not sufficiently addressed the differences among ethnic subpopulations within a race, and therefore, cannot properly assess the resultant effect upon the statistical calculations provided for a match. However, only two trial courts have accepted the opinions of these experts in FBI Laboratory cases as representative of any significant part of the scientific community, and therefore, rejected the population data estimates provided by the FBI.[33]

However, this objection is not expected to persist. The great majority of courts reviewing DNA profiling evidence under the differing standards of review have considered the challenges to forensic DNA profiling and now recognize the technique as reliable and generally accepted by the scientific community. Moreover, the scientific community and the FBI Laboratory have developed and continue to develop data that are directly responsive to the issues raised in the pre-trial hearings.

This information continues to be disseminated to the appropriate community of scientists. As this information is disseminated more fully, the consensus of the community should be manifestly more apparent in favor of the FBI Laboratory's conservative use of population statistics in DNA profiling.

INVESTIGATIVE CONSIDERATIONS

While DNA profiling is fast gaining acceptance by the courts, investigators should be mindful that forensic DNA evidence does not yet positively identify the depositor of a biological sample. It is but one factor of identification and cannot be relied upon alone to support a determination of innocence or guilt.

> ***"...DNA profiling is...but one factor of identification and cannot be relied upon alone to support a determination of innocence or guilt."***

Given the current state of the technology, forensic DNA analysis is limited to determining whether the known biological sample from an individual is genetically similar to a questioned biological sample. Moreover, the relevance of a match or an exclusion varies depending on the circumstances in each case.

For example, if the statistical probability arrived at by the examining laboratory is 1 in 70 (i.e., the odds that someone other than the defendant is the contributor of the sample in a particular case), the jury will be informed that the DNA profile, while a match to the defendant, is fairly common in the sampled community. The inference is that someone other than the defendant, even in a small community, could have been the contributor of the sample. Therefore, the association of the suspect and the crime scene sample will not be as strong as when the statistics indicate the profile is more rare. Accordingly, investigators cannot discount the need for traditional investigation to support a case for prosecution.

Also, investigators must be aware of the limitations of DNA analysis that will impact on the decision of whether a person should be excluded as a suspect in the crime. For example, a woman is raped, and some semen is recovered. But, suppose the DNA profile of the semen recovered does not match the DNA profile of the suspect. Is the suspect exonerated? Perhaps not.

Consider, for example, that the victim may have had recent, consensual sexual relations with her husband or a boyfriend before the rape occurred. The husband or boyfriend of the victim may be the sole contributor of the sample taken from the victim immediately after the rape, if the person responsible for the rape did not contribute a semen sample of evidentiary value. Consequently, the forensic DNA profile will not match the suspect's profile, but the absence of the sus-

pect's DNA does not exclude the suspect.

Accordingly, when additional (non-DNA) evidence gives the investigator cause to believe that a particular suspect is responsible for the crime, despite the DNA test results that suggest the exclusion of the suspect, it is essential for the investigator to determine whether the victim had consensual sexual relations before the rape occurred. If so, a DNA sample should be obtained from that person for comparison to the forensic sample.

A match between the forensic profile and the husband's and/or boyfriend's profile indicates only that the DNA of the person believed responsible for the crime was not recovered from the victim. It follows that the principal suspect cannot be exonerated as the one who committed the crime on the basis of the DNA test results.

CONCLUSION

With few exceptions, Federal and State courts throughout the United States have overwhelmingly admitted DNA test results, regardless of the admissibility standard used by the particular jurisdiction. The RFLP (Restriction Fragment Length Polymorphism) technique, along with other newly emerging DNA technologies, has already begun to revolutionize personal identification in criminal cases.

As the courts continue to recognize the reliability and probative value of DNA evidence, the public will benefit greatly from increased efficiency of criminal investigations and trials. At some point in the not too distant future, DNA evidence will be routinely admitted in criminal trials and will become as common as the use of fingerprints.

> **"Major defense challenges...focus on bias, matching, and population statistics."**

Moreover, advances in technology will allow for unique identification of suspects based on their genetic profiles, putting to rest entirely many of the criticisms based on the limitations of the current technology.

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Footnotes

[1] *See People* v. *Wesley*, 533 N.Y.S.2d 643 (Sup. Ct. 1988) (the first reported decision passing on the admissibility of forensic DNA profiling).

[2] *State* v. *Wimberly*, 467 N.W. 2d 499 (S.D. 1991); *State* v. *Smith*, 807 P.2d 144 (Kansas 1991); *State* v. *Pennington*, 327 N.C. 89, 393 S.E.2d 847 (1990); *Caldwell* v. *State*, 260 Ga. 278, 393 S.E.2d 436 (1990); *State* v. *Ford*, 392 S.E. 2d 781 (S.C. 1990); *Spencer* v. *Commonwealth*, 240 Va. 78, 393 S.E.2d 609 (1990)(Spencer IV)(PCR); *Spencer* v. *Commonwealth*, 238 Va. 563, 385 S.E.2d 850 (1989)(Spencer III); *Spencer* v. *Commonwealth*, 238 Va. 295, 384 S.E.2d 785 (1989) (Spencer II), *cert. denied*, ___ U.S.___, 110 S.Ct. 1171, 107 L.E.2d 1073 (1990); *Spencer* v. *Commonwealth*, 238 Va. 275, 384 S.E.2d 775 (1989) (Spencer I), *cert. denied*, ___ U.S. ___, 110 S.Ct. 759, 107 L.E.2d 775 (1990); *State* v. *Schwartz*, 447 N.W.2d 422 (Minn. 1989); *State* v. *Woodall*, 385 S.E.2d 253 (W.Va. 1989); *State* v. *Blair*, No. 2659, Slip op., unpublished (Ohio App. December 24, 1990); *State* v. *Lee*, No. 90CA004741, Slip. op., unpublished (Ohio App. December 5, 1990); *Vickers* v. *State*, 801 S.W.2d 214 (Tex. App. 1990); *Snowden* v. *State*, 574 So.2d 960 (Ala. Crim. App. 1990); *Mandujano* v. *State*, 799 S.W.2d 318 (Tex. App. 1990); *Lopez* v. *State*, 793 S.W.2d 738 (Tex. App. 1990); *State* v. *Pierce*, No. 89-CA-30, unpublished (Ohio App. July 9, 1990); *Kelly* v. *State*, 792 S.W.2d 579 (Tex. App. 1990); *Perry* v. *State*, 568 So.2d 339 (Ala. Crim. App. 1990); *Glover* v. *State*, 787 S.W.2d 544 (Tex. App. 1990); *Andrews* v. *State*, 533 So.2d 841 (Fla. 5th Dist. Ct. App. 1988); *Martinez* v. *State*, 549 So.2d 694 (Fla. 5th Dist. Ct. App. 1989); *Cobey* v. *State*, 80 Md. App. 31, 559 A.2d 391 (1989), *cert. denied*, 317 Md. 542, 565 A.2d 670 (1989); *United States* v. *Yee*, 134 F.R.D. 161 (N.D. Ohio 1991); *United States* v. *Young*, 754 F.Supp. 739 (D.S.D. 1990); *United States* v. *Jakobetz*, 747 F.Supp. 250 (D.Vt. 1990); *State* v. *Pennell*, 584 A.2d 513 (Del. Super. Ct., 1989); *People* v. *Shi Fu Huang*, 145 Misc.2d 513, 546 N.Y.S.2d 920 (Sup. Ct., 1989); *People* v. *Castro*, 144 Misc.2d 956, 545 N.Y.S.2d 985 (Sup. Ct., 1989); *People* v. *Wesley*, 533 N.Y.S.2d 643 (Sup. Ct., 1988).

[3] *See* Giannelli, "The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later," 80 Colum.L.Rev. 1197, 1200-01 (1980); *United States* v. *Downing*, 753 F.2d 1224, 1234 (3d Cir. 1985).

[4] *Frye* v. *United States*, 293 F. 1013, 1014 (D.C. Cir. 1923).

[5] *Id.*

[6] *United States* v. *Gwaltney*, 790 F.2d 1378, 1382 (9th Cir. 1986).

[7] *See* Fed. R. Evid. 401-403, 702-704.

[8] *United States* v.*Williams*, 583 F.2d 1194, 1198 (2d Cir. 1978), *cert. denied*, 439 U.S. 1117, (1979); *United States* v. *Jakobetz*, 747 F.Supp. 250, 254-55 (D. Vt. 1990).

[9] *United States* v. *Downing*, 753 F.2d 1224, 1234 (3d Cir. 1985).

[10] *People* v. *Castro*, 144 Misc. 2d 956, 545 N.Y.S. 2d 985 (Sup. Ct. 1989).

[11] *Id.* at 987.

[12] *State* v. *Schwartz*, 447 N.W.2d 422 (Minn. 1989); *Caldwell* v. *State*, 260 Ga. 278, 393 S.E.2d 436 (1990).

[13] *See* Congress of The United States, Office of Technology Assessment, Genetic Witness Forensic Uses of DNA Tests, July 1990, at 157 (hereinafter referred to as OTA).

[14] Personal communication, DNA Analysis Unit, FBI Laboratory Division, April 30, 1991.

[15] *Supra* note 2.

[16] *Commonwealth* v. *Curnin*, 409 Mass. 218, 565 N.E.2d 440 (1991).

[17] *Id.* at 443.

[18] *Id.*

[19] *See, e.g., State* v. *Wheeler*, No. C89-0901 (Or. Super. Ct., Washington County, March 8, 1990); State v. Despain, No. 15589, slip op. (Ariz. Cir. Ct., Yuma County, February 12, 1991); *State* v. *Fleming*, No. 90-CR-2716, slip op. (Ill. Cir. Ct., Cook County, March 12, 1991) (the decision is a consolidation of two rape cases *Fleming* and *State* v. *Watson*, No. 90-CR-5546, where the DNA admissibility hearings were combined).

[20] *People* v. *Castro*, 144 Misc. 2d 956, 545 N.Y.S.2d 920; *see also United States* v. *Yee*, 134 F.R.D. 161 (N.D. Ohio 1991).

[21] *United States* v. *Yee*, 134 F.R.D. 161; *Commonwealth* v. *Lykus*, 327 N.E. 2d 671 (Mass. Sup. Ct. 1975).

[22] Subsequent to *Wheeler*, *supra* note 19, FBI DNA test results were admitted in the same county in *State* v. *Herzog*, Nos. C89-0738, C890739, C890691 (Or. Super. Ct., Washington County, admitted on May 4, 1990). Prior to *Despain*, *supra* note 19, FBI DNA test results were admitted in *State* v. *Medina-Gonzalez*, No. CR27078 (Ariz. Super. Ct., Pima County, admitted on November 27, 1990). Since *Fleming*, *supra* note 19, FBI test results were admitted in Illinois in *People* v. *Stremmel*, No. 90-CF-1024 (Ill. Cir. Ct., Winnebago County, admitted on May 2, 1991); *See also State* v. *Mehlberg*, No. 89-CF-61 (Ill. Cir. Ct., Montgomery County, admitted on August 31, 1990); *State* v. *Smith*, No. 90-CF-42 (Ill. Cir. Ct., Ogle County, December 6, 1990). DNA test results have also been admitted in Oregon, Arizona, and Illinois by Lifecodes and Cellmark. *See* OTA, *supra* note 13, at 158-172 for listing of State DNA admissions.

[23] *See, e.g., Caldwell*, *supra* note 12 (Lifecodes' statistics reduced); *State* v. *Pennell*, 584 A.2d 513 (Del. Super. Ct. 1989) (Cellmark's statistics excluded); *People* v. *Wesley*, 140 Misc.2d 306, 533 N.Y.S.2d 643 (1988)(Lifecodes' statistics reduced); *United States* v. *Martinez*, No. CR90-10021-01,(D.S.D., testimony on January 9, 1991) (statistics prejudicial based on prongs set forth in the now vacated *Two Bulls* decision); *State* v. *Nelson*, No. IK89-09-0882 slip op. (Del. Super. Ct., Kent County, December 4, 1990)(statistics potentially prejudicial and confusing to jury); *State* v. *Jobe*, No. 88903565, slip op. (Dist. Ct., Hennepin County, Minn., September 6, 1990)(statistics of individual allele frequencies admitted but statistics derived from multiplication of frequencies disallowed because of previous State supreme court decision discouraging the use of statistics because of their prejudicial effect).

[24] *United States* v. *Yee*, *supra* note 2; *United States* v. *Jakobetz*, *supra* note 2; *but see United States* v. *Two Bulls*, 918 F.2d 56 (8th Cir. 1990)(ruling vacated 2-21-91 *en banc* review granted) rejected DNA evidence using the criteria from the *Castro* decision. However, as noted, the Eighth Circuit Court of Appeals has since vacated the opinion. Moreover, no review of the decision will be forthcoming from the court as Mr. Two Bulls recently died.

[25] *United States* v. *Jakobetz*, 747 F. Supp. 250, 254-55 (D.Vt. 1990).

[26] *Id.* at 256.

[27] *United States* v. *Yee*, 134 F.R.D. 161 (N.D. Ohio 1991)(order affirming magistrate's recommendation, with addendum for magistrate's recommendation); *United States* v. *Yee*, No. 3:89CR720, slip op. (N.D. Ohio, February 1, 1991)(order denying defendant's motion for rehearing on DNA admissibility); *United States* v. *Yee*, 129 F.R.D. 629 (N.D. Ohio 1990)(magistrate's discovery order).

[28] *Id.*

[29] *Id.*

[30] *United States* v. *Yee*, 134 F.R.D. 161.

[31] Ind. Code § 35-37-4-10 (1990); La. Rev. Stat. Ann. § 15:441.1 (West 1991); Nev. Rev. Stat. § 56.020 (1989); Md. Cts. & Jud. Proc. Code Ann., § 10-9 (1989); Minn. Stat. § 634.25-.26 (1990); Va. Code Ann. § 19.2-270.5 (1990).

[32] Personal communication, DNA Analysis Unit, FBI Laboratory, May 4, 1991.

[33] *See State* v. *Despain*, No. 15589, Slip. op. (Cir. Ct. Yuma County, Ariz. February 12, 1991) and *State* v. *Watson*, No. 90-CR-5546, Slip. op. (Cir. Ct. Cook County, Ill. March 12, 1991).

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