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JUNK SCIENCE, DAUBERT, AND OHIO RULE 702

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Currently, the role of expert witnesses is under vigorous attack. Peter Huber coined the phrase "junk science" to describe judicial acceptance of unreliable expert testimony. Huber, *Galileo's Revenge: Junk Science in the Courtroom* (1991). Huber's most sensational example involved a "soothsayer" who "with the backing of expert testimony from a doctor and several police department officials" won a million dollar jury award for the loss of her "psychic powers following a CAT scan." *Id.* at 3-4.

Huber is by no means alone in his criticism. Articles such as Fanning, "Experts up to here," *Forbes*, July 13, 1987, at 378, and Olson, "The Case Against Expert Witnesses," *Fortune*, Sept. 25, 1989, at 133, are not uncommon. Moreover, judicial opinions contain similar censure. One court argued that "it is time to take hold of expert testimony in federal trials" and "experts whose opinions are available to the highest bidder have no place testifying in a court of law." *In re Air Crash Disaster at New Orleans*, 795 F.2d 1230, 1234 (5th Cir. 1986).

The "junk science" controversy even became a political issue. President Bush's Council on Competitiveness, chaired by former Vice President Quayle, established a Federal Civil Justice Reform Task Force. "Agenda For Civil Justice Reform in America," reprinted in 60 U. Cin. L. Rev. 977 (1992). Among other things, the Task Force targeted expert testimony. Quayle declared: "We think it is time to reject the notion that 'junk science' is truly relevant evidence." "Junk Science or Junk Law?," 3 *The Expert Witness J.* (Aug./Sept. 1991). Following the recommendation of the Task Force, President Bush imposed, by executive order, stringent requirements for the admissibility of expert testimony on government attorneys in civil cases. Civil Justice Reform, Exec. Order No. 12,778, 56 Fed. Reg. 55,195 (1991). Under this order, to be admissible a scientific theory must be "widely accepted," which is defined as acceptance by at least a substantial minority of experts in the relevant field.

CRIMINAL CASES

For the most part, the "junk science" debate has ignored criminal litigation. Giannelli, "The 'Junk Science Debate': The Criminal Cases," 84 *J. Crim. L. & Criminology* 105 (1993). The failure to take account of criminal

prosecutions led to some remarkable results. While President Bush's executive order required U.S. attorneys in civil cases to meet a heightened admissibility standard ("wide acceptance") when introducing scientific evidence, federal prosecutors were left free in the DNA cases to argue for a lower standard, "urg[ing] that Rule 702 creates a liberal rule of admissibility which now supersedes *Frye*." *United States v. Two Bulls*, 918 F.2d 56, 59 (8th Cir. 1990), reh'g granted, vacated (en banc) after death of defendant, 925 F.2d 1127 (8th Cir. 1991). See also *United States v. Yee*, 134 F.R.D. 161, 188 (N.D. Ohio 1991) (prosecutors argued that *Frye* has been displaced), aff'd sub nom., *United States v. Bonds*, 1993 U.S. App. Lexis 32574 (6th Cir. Dec. 15, 1993).

Similarly, while Vice President Quayle was championing the virtues of expanded discovery in civil litigation, federal prosecutors were opposing discovery in the first major DNA case using the FBI procedure. In *United States v. Yee*, 129 F.R.D. 629 (N.D. Ohio 1990), the government opposed discovery of matching criteria, environmental insult studies, population data, and proficiency tests.

DAUBERT v. MERRELL DOW PHARMACEUTICALS

In June 1993, the U.S. Supreme Court in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 113 S. Ct. 2786 (1993), waded into this controversy. The Court rejected the "general acceptance" test, as set forth in *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923), as the admissibility standard for scientific evidence. In its place, the Court substituted a reliability analysis. The initial commentary on the decision suggests that the controversy surrounding the *Frye* rule will not subside in the near future:

"Astonishingly, all parties expressed satisfaction with the *Daubert* decision — the lawyers for the plaintiff and defense, and scientists who wrote amicus briefs." Foster et al., "Policy Forum: Science and the Toxic Tort," 261 *Science* 1509, 1614 (Sept. 17, 1993).

"The catch . . . is that no one is exactly sure what the new standard is." Stewart, "A New Test: Decision Creates Uncertain Future for Admissibility of Expert

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Testimony," A.B.A. J. 48, 48 (Nov. 1993).

"[T]he opinion of the court, in rejecting the existing standard, has created considerable confusion." Dyk & Castanias, "Daubert Doesn't End Debate on Experts," Nat'l L.J. 17, 17 (Aug. 2, 1993).

This article examines one aspect of the controversy over scientific evidence — the evidentiary standard for admitting novel scientific evidence.

SCIENTIFIC EVIDENCE

The reliability of evidence derived from a scientific theory or principle depends upon three factors:

- (1) the validity of the underlying theory,
- (2) the validity of the technique applying that theory, and
- (3) the proper application of the technique on a particular occasion. 1 Giannelli & Imwinkelried, *Scientific Evidence* § 1-1 (2d ed. 1993).

The first two factors — the validity of the underlying theory and the validity of the technique — are distinct issues. One could accept, for example, the validity of the premise underlying "voiceprint" identification — voice uniqueness — but still question whether the voiceprint technique can identify that uniqueness. Similarly, the underlying psychological and physiological principles of polygraph testing could be acknowledged without endorsing the proposition that a polygraph examiner can detect deception by means of the polygraph technique.

The third requirement — the proper application of a scientific technique on a particular occasion — raises a number of issues: (a) the condition of any instrumentation used in the technique, (b) adherence to proper procedures, and (c) the qualifications of both the person conducting the procedure and the person interpreting the results. The courts are divided over whether the proponent of scientific evidence must establish these factors as a condition of admissibility. *Id.* § 1-8.

The validity of a scientific principle and the validity of the technique applying that principle may be established in a number of ways: judicial notice, legislative recognition, stipulation, or the presentation of evidence.

Judicial Notice

The principles underlying many scientific techniques, including radar, intoxication tests, fingerprints, palm prints, firearms identification, handwriting comparisons, as well as other procedures, have all been recognized by judicial notice. *Id.* § 1-2. See also *Daubert*, 113 S. Ct. at 2796 n. 11 (1993) ("[T]heories that are so firmly established as to have attained the status of scientific law, such as the laws of thermodynamics, properly are subject to judicial notice under Fed. Rule Evid. 201.').

Courts, however, do not always use the term "judicial notice" to express acceptance of a scientific technique. For example, in *State v. Pierce*, 64 Ohio St.3d 490, 597 N.E.2d 107 (1992), the Ohio Supreme Court upheld the admissibility of DNA evidence. At one point, the Court wrote: "No pretrial evidentiary hearing is necessary to determine the reliability of the DNA evidence." *Id.* at 501. The Court, in effect, is taking judicial notice of the reliability of DNA evidence, which means that the general validity of DNA typing need not be proved in future cases.

Statutory Recognition

In some cases the validity of a scientific technique is recognized by statute. At one time most of these provisions involved motor vehicle codes and paternity cases; for example, radar, intoxication tests, and blood tests are often subject to legislative regulation. These techniques are typically subject to judicial notice as well.

Recent enactments, however, have extended legislative recognition to more controversial techniques — for example, polygraph, hypnosis, DNA, rape trauma syndrome, and battered wife syndrome evidence. Many of these techniques would not be subject to judicial notice. Giannelli & Imwinkelried, *supra*, § 1-3.

The interpretation of these statutes may raise constitutional questions. For example, in *State v. Vega*, 12 Ohio St. 3d 185, 465 N.E.2d 1303 (1984), the Ohio Supreme Court held that once a scientific technique (intoxilyzer) has been legislatively recognized "an accused may not make a general attack upon the reliability and validity of the breath testing instrument." *Id.* at 190. *Accord* *Columbus v. Day*, 24 Ohio App. 3d 173, 174, 493 N.E.2d 1002, 1003 (1985).

This is wrong. It is one thing to legislate the admission of a certain type of evidence, it is quite another thing to preclude the accused from attacking such evidence. Federal and Ohio Evidence Rule 104(e) provide that a judge's ruling on admissibility does not limit the "right of a party to introduce before the jury evidence relevant to weight or credibility." In *Crane v. Kentucky*, 476 U.S. 683 (1986), the U.S. Supreme Court cited Rule 104(e) in holding that a trial judge's decision to admit a confession does not deprive an accused of the right to contest the reliability of the confession before the jury. According to the Court, a contrary rule deprives the accused of a fair trial: "Whether rooted directly in the Due Process Clause . . . or in the Compulsory Process or Confrontation Clauses of the Sixth Amendment . . . , the Constitution guarantees criminal defendants 'a meaningful opportunity to present a complete defense.'" *Id.* at 690 (quoting *California v. Trombetta*, 467 U.S. 479, 485 (1984)).

Several courts have accepted this constitutional argument in scientific evidence cases. *E.g.*, *Barcott v. Dept. of Public Safety*, 741 P.2d 226, 228-29 (Alaska 1987); *People v. Thompson*, 265 Cal. Rptr. 105, 109 (Cal. App. 1989); *State v. Lowther*, 740 P.2d 1017, 1021 (Hawaii 1987). See also Imwinkelried & Scofield, "The Recognition of an Accused's Constitutional Right to Introduce Expert Testimony Attacking the Weight of Prosecution Science Evidence: The Antidote for the Supreme Court's Mistaken Assumption in *California v. Trombetta*," 33 *Ariz. L. Rev.* 59 (1991).

Stipulation

The validity of a scientific technique also may be established by stipulation. For example, many courts admit polygraph evidence if the prosecution and defense stipulate prior to trial that the results of the polygraph examination are admissible. *State v. Souel*, 53 Ohio St.3d 123, 372 N.E.2d 1318 (1978).

As one court has noted: "[T]he primary effect of the stipulation is that it operates as a waiver of objection or challenge to the validity of the basic theory of polygraph testing and eliminates the necessity of or the

opportunity for the parties to establish a foundation in each case to satisfy the trial court of the basic theory and validity of polygraphs." *State v. Dean*, 307 N.W.2d 628, 637 (Wis. 1981).

Evidence

A novel scientific technique is rarely so well established that a court would take judicial notice of its validity the first time evidence derived from the technique is offered at trial. Statutory recognition or stipulation are even less likely. Accordingly, the validity of a new technique is typically established through the introduction of evidence, including expert testimony. Offers of proof, affidavits, stipulations, and learned treatises may also be considered. *United States v. Downing*, 753 F.2d 1224, 1241 (3d Cir. 1985).

Courts have employed several different tests to determine admissibility in this context. In addition to *Frye* and *Daubert*, some courts have adopted a "relevancy" approach, while others have adopted a "*Frye* plus" test.

FRYE: THE GENERAL ACCEPTANCE TEST

In *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923), the D.C. Circuit considered the admissibility of polygraph evidence as a case of first impression. The court wrote:

Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while the courts will go a long way in admitting expert testimony deduced from a well recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs. *Id.* at 1014.

The court went on to hold that the polygraph had "not yet gained such standing and scientific recognition among physiological and psychological authorities." *Id.* Thus, it is not enough that a qualified expert, or even several experts, testifies that a particular technique is valid. *Frye* imposes a special burden: the technique must be generally accepted by the relevant scientific community.

Majority Rule

In the ensuing years, *Frye's* general acceptance standard became the majority rule in this country. See *United States v. Skeens*, 494 F.2d 1050, 1053 (D.C. Cir. 1974) (*Frye* "has been followed uniformly in this and other Circuits."); *Reed v. State*, 391 A.2d 364, 368 (Md. 1978) ("This criterion of 'general acceptance' in the scientific community has come to be the standard in almost all the courts in the country which have considered the question of the admissibility of scientific evidence.").

In addition to polygraph evidence, *Frye* has been used to determine the admissibility of evidence derived from fingerprint analysis, neutron activation analysis, gunshot residue tests, bite mark comparisons, psycholinguistics, truth serum, scanning electron microscopic analysis, hypnosis, blood analysis, hair analysis, intoxication testing, DNA profiling, rape trauma syndrome, and numerous other forensic techniques.

The principal justification for the general acceptance standard is that it tends to ensure the reliability of scien-

tific evidence. The D.C. Circuit has stated: "The requirement of general acceptance in the scientific community assures that those most qualified to assess the general validity of a scientific method will have a determinative voice." *United States v. Addison*, 498 F.2d 741, 743-44 (D.C. Cir. 1974). See also *People v. Barbara*, 255 N.W.2d 171, 194 (Mich. 1977) (*Frye* "permits the experts who know most about a procedure to experiment and to study it. In effect, they form a kind of technical jury, which must first pass on the scientific status of a procedure before the lay jury utilizes it in making its findings of fact.").

Criticism

Notwithstanding its widespread judicial adoption, commentators have criticized *Frye*. Professor Strong commented that *Frye* "tends to obscure . . . proper considerations by asserting an undefinable general acceptance as the principal if not sole determinative factor." Strong, "Questions Affecting the Admissibility of Scientific Evidence," 1970 U. Ill. L.F. 1, 14. Another commentator identified *Frye's* "main drawbacks [as] its inflexibility, confusion of issues, and superfluity." McCormick, "Scientific Evidence: Defining a New Approach to Admissibility," 67 Iowa L. Rev. 879, 915 (1982).

Accordingly, in recent years an increasing number of courts rejected the general acceptance test. The federal cases include: *United States v. Jakobetz*, 955 F.2d 786, 794 (2d Cir. 1992) (DNA evidence), cert. denied, 113 S. Ct. 104 (1992); *United States v. Ferri*, 778 F.2d 985, 988 (3d Cir. 1985) (innersole shoe comparison), cert. denied, 476 U.S. 1172 (1986); *United States v. Downing*, 753 F.2d 1224, 1238 (3d Cir. 1985) (psychological testimony on eyewitness identifications); *United States v. Williams*, 583 F.2d 1194, 1198 (2d Cir. 1978) (voiceprints), cert. denied, 439 U.S. 1117 (1979).

A number of state courts have also rejected *Frye*. *E.g.*, *Prater v. State*, 820 S.W.2d 429, 431 (Ark. 1991) (DNA evidence); *Whalen v. State*, 434 A.2d 1346, 1354 (Del. 1980) (semen test), cert. denied, 455 U.S. 910 (1982); *State v. Montalbo*, 828 P.2d 1274, 1280 (Hawaii 1992) (DNA evidence); *State v. Rodgers*, 812 P.2d 1208, 1210 (Idaho 1991) (blood spatter analysis); *State v. Hall*, 297 N.W.2d 80, 85 (Iowa 1980) (blood flight characteristics), cert. denied, 450 U.S. 927 (1981); *State v. Williams*, 388 A.2d 500, 504 (Me. 1978) (voiceprints); *Kelly v. State*, 824 S.W.2d 568, 571-72 (Tex. Crim. App. 1992) (DNA evidence); *O'Dell v. Commonwealth*, 364 S.E.2d 491, 504 (Va.) (multisystem electrophoretic blood test), cert. denied, 488 U.S. 871 (1988).

The U.S. Supreme Court joined this trend in *Daubert*. According to the Court, "[t]hat austere standard [*Frye*], absent from and incompatible with the Federal Rules of Evidence, should not be applied in federal trials." 113 S. Ct. at 2794.

Ohio Rule on Scientific Evidence

Ohio was also one of these states. In *State v. Williams*, 4 Ohio St.3d 53, 446 N.E.2d 444 (1983), a case involving the admissibility of voiceprints, the Ohio Supreme Court rejected the *Frye* test. According to the Court, "the Rules of Evidence establish adequate preconditions for admissibility of expert testimony, and we leave to the discretion of this state's judiciary, on a case by case basis, to decide

whether the questioned testimony is relevant and will assist the trier of fact to understand the evidence or to determine a fact in issue.” *Id.* 58. This leaves the trial court without much guidance.

The Court recently reaffirmed this position in *State v. Pierce*, 64 Ohio St.3d 490, 597 N.E.2d 107 (1992), which admitted DNA evidence: “This court in *Williams* rejected the *Frye* standard, preferring a more flexible approach.” *Id.* at 496. The Court elaborated:

The standard for the admissibility of scientific evidence in Ohio as found in *State v. Williams* is whether the questioned evidence is relevant and will assist the trier of fact in understanding evidence presented or in determining a fact in issue. . . . Any rebuttal evidence goes to weight rather than admissibility. We, therefore, hold that the trial court did not abuse its discretion in admitting the DNA evidence in this case. *Id.* at 497.

RELEVANCY TEST

Jettisoning *Frye* is one thing; replacing it with something that works is another. As Professor Rossi has noted, “even if a court abandons the *Frye* test, the reliability issue must still be faced.” Rossi, *Expert Witnesses* 34 (1991).

One alternative to *Frye* is to treat scientific evidence in the same way as other evidence, weighing its probative value against countervailing dangers and considerations. Professor McCormick advocated this position. In his 1954 text, he wrote:

“General scientific acceptance” is a proper condition upon the court’s taking judicial notice of scientific facts, but not a criterion for the admissibility of scientific evidence. *Any relevant conclusions which are supported by a qualified expert witness should be received unless there are other reasons for exclusion.* Particularly, its probative value may be overborne by the familiar dangers of prejudicing or misleading the jury, unfair surprise and undue consumption of time. McCormick, *Evidence* 363-64 (1954) (emphasis added).

This approach is not without problems. The probative value of scientific evidence depends on its reliability. See *United States v. Ridling*, 350 F. Supp. 90, 94-95 (E.D. Mich. 1972) (“The acceptance of the basic theory [of the polygraph] is a part of the process of making the evidence relevant.”).

However, since most trial judges do not possess the scientific background to determine relevance/reliability, the judge “will generally be forced to accept the probative value of the evidence as what a qualified expert testifies it to be.” Strong, *supra*, at 22. In effect, qualifying the expert presumptively qualifies the technique. Such an approach provides an insufficient threshold standard for admissibility. “[I]t seems questionable whether the relevancy approach will adequately protect against the misuse of unreliable scientific evidence.” Giannelli, “The Admissibility of Novel Scientific Evidence: *Frye v. United States*, a Half-Century Later,” 80 Colum. L. Rev. 1197, 1245 (1980).

Daubert implicitly rejects this approach.

DAUBERT: THE RELIABILITY APPROACH

In *Daubert* the Supreme Court replaced *Frye* with a

reliability analysis. The Court based its decision on Rule 702 of the Federal Rules of Evidence, which is identical to the Ohio rule. It reads:

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

As noted above, the Court found the rule inconsistent with *Frye*. However, the Court did not adopt McCormick’s lax relevancy standard. Instead, the Court derived a reliability test from the phrase “scientific knowledge” in Rule 702. The Court commented:

[I]n order to qualify as “scientific knowledge,” an inference or assertion must be derived by the scientific method. Proposed testimony must be supported by appropriate validation — i.e., “good grounds,” based on what is known. In short, the requirement that an expert’s testimony pertain to “scientific knowledge” establishes a standard of evidentiary reliability. 113 S. Ct. at 2795.

Under the *Daubert* analysis, the trial court determines admissibility, a task that “entails a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue.” *Id.* at 2796.

Enumerated Factors

According to *Daubert*, in performing this “gatekeeping function,” the trial court may consider a number of factors. First, the court should determine whether the scientific theory or technique has been tested. To support its position, the Supreme Court cited authorities on the philosophy of science: “[T]he statements constituting a scientific explanation must be capable of empirical test.” Hempel, *Philosophy of Natural Science* 49 (1966). “[T]he criterion of the scientific status of a theory is its falsifiability, or refutability, or testability.” Popper, *Conjectures and Refutations: The Growth of Scientific Knowledge* 37 (5th ed. 1989).

Second, whether a theory or technique has been subjected to peer review and publication is “a relevant, though not dispositive, consideration in assessing the scientific validity.” *Daubert*, 113 S. Ct. at 2797. The peer review and publication process increases the likelihood that flaws will be discovered.

Third, a technique’s “known or potential rate of error” is also a relevant factor. *Id.* As an example the Supreme Court cited *United States v. Smith*, 869 F.2d 348, 353-54 (7th Cir. 1989) (surveying studies of the error rates for “voiceprints”).

Fourth, the “existence and maintenance of standards controlling the technique’s operation” is another indicium of trustworthiness. 113 S. Ct. at 2797. As an example the Court cited *United States v. Williams*, 583 F.2d 1194, 1198 (2d Cir. 1978) (noting professional organization’s standards governing “voiceprints”), cert. denied, 439 U.S. 1117 (1979).

Finally, “general acceptance” remains a factor in assessing reliability. Although the Court rejected “general acceptance” as the sole criterion for admissibility, it

recognized its relevance in assessing the reliability of scientific evidence: "Widespread acceptance can be an important factor in ruling particular evidence admissible, and 'a known technique that has been able to attract only minimal support within the community' . . . may properly be viewed with skepticism." 113 S. Ct. at 2797 (citation omitted).

Other Factors

The Supreme Court emphasized, however, that the Rule 702 standard is "a flexible one." *Id.* The enumerated factors are neither dispositive nor exhaustive. The Court stated: "Many factors will bear on the inquiry, and we do not presume to set out a definitive checklist or test." *Id.* at 2796. In an accompanying footnote, the Court wrote: "A number of authorities have presented variations on the reliability approach, each with its own slightly different factors. . . . To the extent that they focus on the reliability of evidence as ensured by the scientific validity of its underlying principles, all these versions may well have merit, although we express no opinion regarding any of their particular details." *Id.* at 2797 n. 12.

In that footnote, the Court cited Judge Weinstein and Professor Berger's treatise; those authors list the following factors:

- (1) the technique's general acceptance in the field,
- (2) the expert's qualifications and stature,
- (3) the use which has been made of the new technique,
- (4) the potential rate of error,
- (5) the existence of specialized literature,
- (6) the novelty of the new invention, and
- (7) the extent to which the technique relies on the subjective interpretation of the expert. 3 Weinstein & Berger, Weinstein's Evidence 702-41 to -42 (1993).

The Court also cited McCormick, "Scientific Evidence: Defining a New Approach to Admissibility," 67 Iowa L.Rev. 879, 911-12 (1982) (listing 11 factors).

FRYE "PLUS"

Some commentators have argued there is a fourth approach. They cite several DNA cases that have engrafted an additional requirement onto the *Frye* standard. This approach has been labeled "*Frye* Plus." Goldberg, "A New Day for DNA?," 78 A.B.A.J. 84, 84 (Apr. 1992).

DNA Cases

For example, in *People v. Castro*, 545 N.Y.S.2d 985 (Sup. Ct. 1989), the court set forth a three-pronged analysis. According to the court, the admissibility of DNA evidence depends upon a showing that (1) the underlying theory has been generally accepted, (2) the procedures implementing the theory have been generally accepted, and (3) the testing laboratory has followed these procedures. *Id.* at 987. Because of the "complexity" of DNA analysis and its "powerful impact" on a jury, the court held that "passing muster under *Frye* alone is insufficient." *Id.*

The court further concluded that the prosecution had satisfied the first two prongs but not the third: "In a piercing attack upon each molecule of evidence presented, the defense was successful in demonstrating to this court that the testing laboratory failed in its responsibility to perform the accepted scientific techniques and experi-

ments in several major respects." *Id.* at 996.

In *United States v. Two Bulls*, 918 F.2d 56 (8th Cir. 1990), reh'g granted, vacated en banc as moot after defendant's death, 925 F.2d 1127 (8th Cir. 1991), the Eighth Circuit adopted the *Castro* approach:

Because DNA evidence is so new and the resulting prejudice to the defendant is sufficiently great, it is imperative that the court satisfy itself that there exists a sufficient foundational basis as to the overall admissibility of the evidence. This must be done before the government exposes the jury to the lab results. *Id.* at 60.

The Second Circuit, however, rejected this approach in *United States v. Jakobetz*, 955 F.2d 786 (2d Cir.), cert. denied, 113 S. Ct. 104 (1992). The court referred to this "elevated standard" as "even more stringent than that in *Frye*." *Id.* at 794-95.

Misleading Label

As noted in the beginning of this article, the third prong in *Castro* is a logical step in establishing the reliability of scientific evidence. A valid technique improperly applied will produce erroneous results. This requirement, however, predates the DNA cases. A number of courts had held that the failure to establish adherence to proper procedures results in the exclusion of evidence: "It is widely recognized that the party offering the results of laboratory tests must . . . vouch for its correct administration in the particular case." *United States v. Bruno*, 333 F. Supp. 570, 574 (E.D. Pa. 1971) (chromatographic analysis of ink). See also 1 Giannelli & Imwinkelried, *supra*, at 36 (listing cases involving polygraph, voiceprint, as well as other types of scientific evidence that adopt this position).

Radar evidence is a good example. The reliability of radar evidence depends on (1) the validity of the underlying theory (e.g., the Doppler effect), (2) the validity of the technique applying that theory (e.g., the particular model of radar), and (3) the proper application of the technique on a particular occasion (e.g., use of tuning forks to calibrate).

Furthermore, this requirement need not be tied to the *Frye* test. It could be required in a jurisdiction that rejects *Frye*. Indeed, even after *Daubert* the Eighth Circuit continued to impose this requirement:

We believe that the reliability inquiry set forth in *Daubert* mandates that there be a preliminary showing that the expert properly performed a reliable methodology in arriving at his opinion. . . . In order to determine whether scientific testimony is reliable, the court must conclude that the testimony was derived from the application of a reliable methodology or principle in the particular case.

Thus, we conclude that the court should make an initial inquiry into the particular expert's application of the scientific principle or methodology in question. The court should require the testifying expert to provide affidavits attesting that he properly performed the protocols involved in DNA profiling. *United States v. Martinez*, 3 F.3d 1191, 1197-98 (8th Cir. 1993), cert. denied, 126 L.Ed.2d 697 (1994).

Compliance with the third prong can be decided only on a case by case basis. See National Academy of Sciences, *DNA Technology in Forensic Science* 134

(1992) (This assumption — “that the analytical work done for a particular trial comports with proper procedure — can be resolved only case by case and is always open to question, even if the general reliability of DNA typing is fully accepted in the scientific community”). This issue, therefore, is never subject to judicial notice.

DAUBERT’S EFFECT ON THE STATES

Daubert’s effect on state jurisdictions depends on several factors. *Daubert* rests on an interpretation of the Federal Rules of Evidence, a federal statute. The Court stated: “We interpret the legislatively-enacted Federal Rules of Evidence as we would any statute.” *Daubert*, 113 S. Ct. at 2793.

Frye Jurisdictions

As a statutory rather than a constitutional case, *Daubert* is not binding on the states, which are therefore free to continue to follow *Frye*. This is true even in the 35 jurisdictions that have adopted evidence rules based on the Federal Rules. See Joseph & Saltzburg, *The Federal Rules of Evidence in the States* iii (1992) (preface).

Two post-*Daubert* opinions illustrate this point. In one case, the New Mexico Supreme Court rejected *Frye* in favor of the *Daubert* approach. *State v. Alberico*, 861 P.2d 192 (N.M. 1993). In the other, the Arizona Supreme Court declined to follow *Daubert*, noting that it was “not bound by the United States Supreme Court’s non-constitutional construction of the Federal Rules of Evidence when we construe the Arizona Rules of Evidence.” *State v. Bible*, 858 P.2d 1152, 1183 (Ariz. 1993) (excluding DNA probability evidence).

It would not be difficult for a state supreme court that favored *Frye* to reject *Daubert’s* statutory analysis. In *Bible* the Arizona Supreme Court also remarked: “Our rules . . . are court-enacted. While the United States Supreme Court considers congressional purpose, this court — when construing a rule we have adopted — must rely on text and our own intent in adopting or amending the rule in the first instance.” *Id.*

In addition, the U.S. Supreme Court has adopted an unpersuasive and much-criticized “plain meaning” construction in interpreting the Federal Rules. See Becker & Orenstein, “The Federal Rules of Evidence After Sixteen Years — The Effect of ‘Plain Meaning’ Jurisprudence, The Need for an Advisory Committee on the Rules of Evidence, and Suggestions for Selective Revision of the Rules,” 60 *Geo. Wash. L. Rev.* 857, 863 (1992) (commenting on “the potential mischief that can result from a rigid plain meaning analysis of the Rules”); Jonakait, “The Supreme Court, Plain Meaning, and the Changed Rules of Evidence,” 68 *Tex. L. Rev.* 745, 786 (1990) (“Inevitably, . . . the plain-meaning standard will produce worse evidence law by freezing evidence into a literalistic mold, by eliminating its dynamism, and by mandating results without any attempt to satisfy the policy goals of evidence law.”).

Non-Frye Jurisdictions

Daubert’s influence on jurisdictions that had previously jettisoned *Frye* is also uncertain. As noted earlier, a substantial number of jurisdictions, including Ohio, had abandoned *Frye* before *Daubert* was decided. If such a

jurisdiction had adopted McCormick’s relevancy approach, a shift to *Daubert’s* reliability approach would presumably result in a more demanding inquiry. The Ohio Supreme Court seemed to make an independent analysis of the reliability of DNA in *Pierce*, which would be consistent with *Daubert*. It is less than clear, however, that the Ohio Supreme Court intended the type of reliability inquiry envisioned by the U.S. Supreme Court.

No Difference

Finally, even if a jurisdiction adopts *Daubert*, a scientific technique’s admissibility status may not change. Some commentators have argued that “[i]n practice . . . courts today all tend to admit the same evidence whether or not they purport to apply the *Frye* standard.” Weinstein, “Improving Expert Testimony,” 20 *U. Rich. L. Rev.* 473, 478 (1986).

This view, however, is suspect. *Frye* played a determinative role in the voiceprint cases. As several courts have observed: “[W]hen the *Frye* test has been applied, courts have tended to exclude expert voice identification evidence based on spectrography. The courts are equally likely to admit the evidence when the *Frye* test is not applied.” *State v. Free*, 493 So. 2d 781, 785 (La. App. 1986), cert. denied, 499 So.2d 83 (1987). See also *State v. Gortarez*, 686 P.2d 1224, 1236 n.6 (Ariz. 1984) (“Some courts following the *Frye* rule, refuse to allow spectrographic evidence . . . Other courts, generally following modifications of *Frye* or not mentioning it at all, have allowed spectrographic evidence.”).

With other techniques, however, the admissibility standard has not made a difference. For example, no reported case has excluded bite mark comparisons, including courts that applied the general acceptance standard, e.g., *United States v. Martin*, 13 M.J. 66, 67-68 (C.M.A. 1982); *People v. Middleton*, 429 N.E.2d 100, 103-04 (N.Y. 1981), and those courts that employed other analyses. E.g., *Handley v. State*, 515 So. 2d 121, 130-31 (Ala. Crim. App. 1987); *Spence v. State*, 795 S.W.2d 743, 750-52 (Tex. Crim. App. 1990), cert. denied, 499 U.S. 932 (1991).

Similarly, courts in non-*Frye* jurisdictions have excluded evidence based on controversial techniques. For example, in *State v. Brown*, 687 P.2d 751 (Or. 1984) (en banc), the Oregon Supreme Court rejected the *Frye* test, but then went on to exclude polygraph evidence under the Oregon Rules of Evidence. The court wrote: “Notwithstanding the usual deference to trial court discretion, we as an appellate court retain our role to determine the admissibility of scientific evidence under the Oregon Evidence Code.” *Id.* at 775.

The Delaware Supreme Court spurned *Frye* but nevertheless excluded hypnotically-refreshed testimony under the Delaware Rules. *State v. Davis*, 490 A.2d 601, 605 (Del. 1985) (“[T]he State has not demonstrated that hypnotic recall is sufficiently reliable to be admitted as evidence. . .”).

The same result has occurred in several truth serum cases. See *Zeigler v. State*, 402 So. 2d 365, 373 (Fla. 1981), cert. denied, 455 U.S. 1035 (1982); *Harper v. State*, 292 S.E.2d 389, 395-96 (Ga. 1982) (rejecting *Frye* rule but nevertheless excluding truth serum evidence as unreliable).

CODIFICATION

Daubert may provide the impetus to amend Federal Rule 702 or its state counterparts. One commentary

observed: "*Daubert* does not provide the easily applied, objective and consistent test that many courts and litigants had hoped it would. This may well create pressures to amend the Federal Rules of Evidence." Dyk & Castanias, "Daubert Doesn't End Debate on Experts," Nat'l L.J. 17, 20 (Aug. 2, 1993).

The Federal Rules

In 1986 several commentators proposed amendments to Rule 702. Professor Lederer proposed adding the word "reliable" before the phrase "scientific, technical, or other specialized knowledge" in Rule 702. Lederer, "Resolving the Frye Dilemma: A Reliability Approach," 26 *Jurimetrics J.* 240 (1986).

Professor Berger proposed adding a second sentence to the rule: "When the witness seeks to testify about a scientific principle or technique that has not previously been accorded judicial recognition, the testimony shall be admitted if the court determines that its probative value outweighs the dangers specified in Rule 403." Berger, "A Relevancy Approach to Novel Scientific Evidence," 26 *Jurimetrics J.* 245 (1986).

Professor Starrs proposed adding a second sentence to Rule 702: "In the case of expert testimony based upon a scientific theory or technique, the court shall find that the theory or technique in question is scientifically valid for the purposes for which it is tendered." Starrs, "Frye v. United States Restructured and Revitalized: A Proposal to Amend Federal Evidence Rule 702," 26 *Jurimetrics J.* 249 (1986). See also "Rules for Admissibility of Scientific Evidence," 115 F.R.D. 79 (1987).

In 1991 the Civil Rules Committee proposed its own amendment, which required expert testimony to be based on "reasonably reliable" information. "Preliminary Draft of Proposed Amendments to the Federal Rules of Civil Procedure and the Federal Rules of Evidence," 137 F.R.D. 53, 156 (1991). This provision apparently embodies a modified *Frye* rule. The drafting committee note states: This standard "does not mandate a return to the strictures of *Frye v. United States*. . . . However, the court is called upon to reject testimony that is based upon premises lacking any significant support and acceptance within the scientific community. . ." *Id.* at 157.

The Bush Administration also proposed an amendment to Rule 702. Its Task Force recommended three changes: (1) expert testimony must "substantially" assist the trier of fact (currently, it need only "assist"); (2) expert testimony must be "based on a widely accepted explanatory theory"; and (3) experts are prohibited from accepting contingent fees. "Agenda for Civil Justice Reform in America," *supra*, at 1049.

State Rules of Evidence

There are few models in other jurisdictions. State adoptions of the Federal Rules are simply "silent regarding the viability of *Frye*." 2 Joseph & Saltzburg, *supra*, Rule 702, at 17. Only Michigan has addressed the issue explicitly in the text of Rule 702; that rule requires expert testimony be based on "recognized" scientific, technical, or other knowledge. Mich. R. Evid. 702.

A proposed New York rule provides the most detailed example, even though New York has yet to adopt the Federal Rules. Proposed N.Y. R. Evid. 702(b) reads:

Scientific testimony. Testimony concerning scientific matters, or testimony concerning the result of a scientific procedure, test or experiment is admissible provided:

- (1) there is general acceptance within the scientific community of the validity of the theory or principle underlying the matter, procedure, test or experiment;
 - (2) there is general acceptance within the relevant scientific community that the procedure, test or experiment is reliable and produces accurate results; and
 - (3) the particular test, procedure or experiment was conducted in such a way as to yield an accurate result.
- Upon request of a party, a determination pursuant to this subdivision shall be made before the commencement of trial. New York State Law Revision Comm'n, *A Code of Evidence for the State of New York* (1991) (submitted to the 1991-92 session of the Legislature by Gov. Mario Cuomo).

In effect, this proposal codifies the *Castro* case; it adopts the "*Frye plus*" approach.

Proposed Ohio Rule 702

A recent proposed amendment to Ohio Rule 702 tracks the New York format, but does not adopt *Frye*. It reads:

Rule 702. Testimony by Experts. A witness may testify as an expert if:

- (A) the witness' testimony relates to matters beyond the knowledge or experience possessed by lay persons or dispels a misconception common among lay persons;
 - (B) the witness is qualified as an expert by specialized knowledge, skill, experience, training, or education regarding the subject matter of the testimony; and
 - (C) the witness' testimony is based on reliable scientific, technical, or other specialized information. To the extent that the testimony reports the result of a procedure, test, or experiment, the testimony is reliable only if:
 - (1) the theory upon which the procedure, test, or experiment is based is objectively verifiable or is validly derived from widely accepted knowledge, facts, or principles;
 - (2) the design of the procedure, test, or experiment reliably implements the theory; and
 - (3) the particular procedure, test, or experiment was conducted in a way that will yield an accurate result.
- 66 Ohio Bar J. xliii (Oct. 18, 1993).

Rule 702(C)(1) of this proposal offers alternative ways to establish the validity of a scientific theory; it may either be "objectively verifiable" or "widely accepted." Rule 702(C)(3) addresses the "*Frye plus*" issue; the proponent must establish that the technique was applied correctly in the particular case.

PRETRIAL DISCOVERY

The *Frye-Daubert* controversy should be understood in a larger context. Another important development concerning scientific evidence relates to a procedural, rather than an evidentiary, rule. A recent amendment to the Federal Rules of Criminal Procedure (effective Dec. 1, 1993) expands pretrial discovery by requiring the prosecution to disclose a written summary of an expert's testimony, including the expert's opinion, the bases for the opinion, and the witness' qualifications. Fed. R. Crim.

P. 16(a)(1)(E) now reads:

(E) Expert Witnesses: At the defendant's request, the government shall disclose to the defendant a written summary of testimony the government intends to use under Rules 702, 703, or 705 of the Federal Rules of Evidence during its case in chief at trial. This summary must describe the witnesses' opinions, the bases and the reasons therefor, and the witnesses' qualifications.

As a matter of reciprocity, the amendment also applies to the defense. Fed. R. Crim. P. 16(b)(1)(C).

The necessity for discovery has long been recognized. The ABA Standards note: "The need for full and fair disclosure is especially apparent with respect to scientific proof and the testimony of experts. . . . [I]t is virtually impossible for evidence or information of this kind to be distorted or misused because of its advance disclosure."

ABA Standards Relating to Discovery and Procedure Before Trial 66 (Approved Draft 1970). Similarly, the National Academy of Sciences DNA report states: "The prosecutor has a strong responsibility to reveal fully to defense counsel and experts retained by the defendant all material that might be necessary in evaluating the evidence." National Research Council, *DNA Technology in Forensic Science* 146 (1992).

No longer will the prosecution be able to disclose only a laboratory report providing a mere summary of "the results of an unidentified test conducted by an anonymous technician." *United States v. Bentley*, 875 F.2d 1114, 1123 (5th Cir. 1989) (Williams, J., dissenting). For a further discussion of discovery, see Giannelli, "Criminal Discovery, Scientific Evidence, and DNA," 44 *Vand. L. Rev.* 791 (1991).