btlionline
BERKELEY TECHNOLOGY LAW JOURNAL
University of California, Berkeley, Boalt Hall School of Law

BOOK REVIEW

DNA in the Courtroom: A Trial Watcher's Guide

by Howard C. Coleman & Eric D. Swenson
GeneLex Press, Seattle, WA; 131 Pages; $12.95

Reviewed by Jasmine Samrad †

Scientific technologies have expanded exponentially in our century, leaving virtually no aspect of our lives unaffected. Nowhere is this more obvious than in our courtrooms, which have turned into science battlegrounds where ever more complex technologies are introduced as evidence. These new technologies challenge us not only to grasp their scientific complexity but also to evaluate their reliability as evidence. One of the seminal challenges in the field of scientific evidence has been the struggle to assimilate the revolutionary new DNA technologies, especially DNA fingerprinting, into the legal system. Nevertheless, until the O.J. Simpson trial drew the nation's attention to the controversy, few people outside the relevant legal and scientific fields were aware of its scope and significance.

The much-publicized battle between Simpson's defense team and prosecutors regarding DNA evidence was, however, only a relatively minor skirmish in an ongoing "DNA War" over the introduction of this revolutionary forensic technology into our courtrooms. Since soon after the technique's discovery in 1985, proponents of DNA fingerprinting have battled critics who questioned the reliability of the technique, the interpretation of results and their admissibility in criminal trials. Many of the criticisms initially raised, such as proper testing procedures and statistical analysis methods, have since been addressed or refuted, and the technology has gathered widening support in the scientific community. Nevertheless, some critics have persisted in their attacks, perpetuating the confusion and controversy. The debates have highlighted not only the complexities of DNA fingerprinting evidence, but also the difficulty of incorporating scientific evidence into our present judicial structure.

DNA in the Courtroom: A Trial Watcher's Guide[1] *by Howard Coleman and Eric Swenson is a handy primer on the DNA controversy, covering the technology of DNA fingerprinting and the legal treatment of DNA evidence. Coleman is president of GeneLex Corporation, a nationally recognized laboratory that performs DNA testing for both forensic analysis and determination of parentage.*[2] *Swenson is a professional writer and teacher of technical writing. The collaboration of these two authors results in a thorough, technically accurate yet eminently readable work that will be of interest to a broad audience. The book's original purpose, to provide a technical guide for reporters covering the Simpson trial, evidences itself in the lucidity and accessibility of its presentation. The work is a welcome resource in this highly charged area of both scientific and legal complexity. Although the book is especially appropriate for those with no scientific or legal background who need a clear and concise introduction to DNA fingerprinting, the book is comprehensive enough to offer insights even to those with strong knowledge in the field.*

SYNOPSIS

DNA in the Courtroom: A Trial Watcher's Guide contains six short chapters that provide a historical account of the major battles in the DNA war, explain the science and technology of forensic DNA fingerprinting and discuss treatment of DNA under the law of scientific evidence. The book includes a chapter specifically on the Simpson trial, which is not as superfluous as one might think even at this late date, and a useful appendix listing the status of DNA fingerprinting in forty-seven states with relevant case law.

Chapter One chronicles the major battles of the DNA controversy and is one of the most intriguing and entertaining sections of the book. Coleman, himself a DNA expert with extensive experience testifying and teaching about forensic and parentage DNA testing, provides a blow-by-blow, front-line view of the DNA controversy. His account mirrors other reports[3] in portraying the controversy as unusually acrimonious, with both proponents and opponents of DNA evidence often resorting to attacking the qualifications and the character of opposing experts, rather than attacking the evidence itself. Coleman attributes the contentiousness of the DNA fingerprinting controversy to several factors: the commercial motives of the labs that developed the technologies, the "contentious and fragmented nature of our legal system," and inaccurate media coverage.[4]

The introduction of this revolutionary technology into the courtroom by private companies, an element unique in the history of forensic science, played a key role in creating and perpetuating the controversy. These companies' pursuit of commercial goals created an environment unfavorable to the introduction of a technology with such vast potential for changing the criminal justice system.[5] The major private laboratories were engaged in a race to the courtroom, attempting to license their procedures and sell their products to as many forensic laboratories as possible.[6] The companies strove to gain a competitive advantage by keeping their products and technologies secret.[7] The normal procedures for validating new scientific methods, such as publication, peer review and standardization, were bypassed in the commercial laboratories' rush to get a return on their substantial investment and start-up costs.[8] Moreover, companies used different tools and procedures, which precluded easy comparison of results between companies.[9]

This commercially competitive climate delayed the development of adequate quality control and validity standards.[10] Meanwhile the private companies, aided by "an adulatory press," avidly promoted the new technology to the bench, the bar and law enforcement.[11] Thus DNA fingerprinting initially enjoyed a nearly meteoric rise to stardom in the forensic science landscape. Courts and commentators almost universally accepted and hailed DNA fingerprinting as a reliable and accurate identification tool that promised to revolutionize the criminal justice system.[12] A stunned defense bar, caught unawares, made few objections and viewed the new technology as virtually impossible to defend against.[13] Soon, however, defense attorneys rallied and delivered their first major victory against the admissibility of DNA fingerprints in the landmark case *People v. Castro*.[14] Thus began the so-called "DNA Wars."

Coleman and Swenson deliver a succinct summary of *Castro* and the major arguments propounded against admitting the DNA fingerprinting evidence. Jose Castro was charged with the murder of a pregnant women and her daughter after DNA from blood found on Castro's watch was found to match the woman's DNA. The trial court in *Castro* excluded the DNA evidence inculpating Castro after experts from *both* the prosecution and defense testified that the DNA fingerprints were obtained under flawed conditions and were therefore unreliable.[15] No appellate opinion on whether flawed DNA testing conditions preclude admissibility ever materialized since, soon after the DNA evidence was excluded, Castro confessed to the crime and pled guilty.[16] Nevertheless, *Castro*'s impact remained substantial; DNA evidence and the laboratories that performed them could no longer be viewed as infallible.

Castro was the spark igniting the powder keg of controversy that became known as the "DNA Wars." *DNA in the Courtroom* describes the DNA battles as they were fought in the courts, in academic circles and in the media, where the press had a field day bashing the technology it had previously called a miracle.

Coleman and Swenson claim the media fueled the DNA controversy through sensational, misleading or downright inaccurate reporting.[17] One example comes from the *New York Times*'s coverage of the important National Research Council report, *DNA Technology in Forensic Science*.[18] The report explicitly recommended the *continued use* of DNA fingerprints in court, emphasizing only the need to apply adequate quality control protocols and recommending a conservative (pro-defendant) method of statistical analysis.[19] However, the *Times* completely misrepresented the report's findings as advocating a *ban* on DNA evidence until the scientific basis was stronger.[20]

In addition to irresponsible media coverage and the commercial interests of the private companies, other elements also played a role in perpetuating the confusion and controversy regarding DNA fingerprints. The authors mention as exacerbating factors the strategies and politics of both the prosecution and defense bar,[21] and the expert witnesses who often have a vested interest in perpetuating the controversy so their services will still be needed.[22] The authors plainly believe that the DNA controversy was largely overblown and unnecessarily exacerbated by all of these factors. However, one of the book's weaknesses is its failure to acknowledge the benefits resulting from the controversy. The authors do seem to concede that focusing national attention on the importance of standardization and quality control did provide some gains. For example, the authors note that the FBI's creation of a national DNA laboratory caused the "standardization of a chaotic industry."[23] However, they fail to analyze the possible connection between the rising tide of criticism against DNA fingerprints, defense victories like *Castro* and the development of such national DNA laboratories.

Coleman and Swenson expressly state in their preface that they are strong proponents of admitting DNA evidence. Perhaps because of this perspective, the general tone of the book seems to blame the perpetuation of the controversy largely on the defense bar and its experts. The authors seem to suggest that the defense bar sometimes went beyond proper zealous advocacy to the point of intentionally muddying the waters and confusing the issues. If this is their view, they are by no means alone. Nonetheless, the authors make an obvious attempt to present a balanced view, identifying errors by all involved parties, including the prosecution, the media, the judiciary and the scientific community.

The remaining chapters of the book describe the science behind DNA fingerprinting and the use of DNA evidence in the courtroom. In chapters Two and Three, the authors provide an explanation of the theory and practice of DNA fingerprinting; these two chapters are exemplary in their thoroughness and accessibility. Readers need no scientific literacy whatsoever to grasp the explanations offered

here. The authors supplement their descriptions with helpful lay analogies and extremely useful charts and diagrams.

Chapter Two describes DNA evidence as a tool in the field of forensic serology, explaining the possible sources of DNA, such as blood, semen, or hair roots,[24] and comparing DNA typing with the other major types of serological evidence such as traditional blood typing and human leukocyte antigen (HLA) analysis. DNA evidence presents several advantages over traditional types of blood analysis. For example, DNA is very durable, being less susceptible to environmental degradation and physical and biological contamination than other components of blood evidence. DNA testing can also indicate when a crime scene sample is a mixture from several sources, and can often separate out different individuals' DNA from the mix. Of course, DNA can identify or exclude a suspect with much higher confidence than any other available test because it provides more precise information.[25]

Chapter Three details the scientific underpinnings and technical procedures for obtaining a DNA fingerprint. DNA fingerprinting allows highly accurate identification of individuals by isolating and identifying certain sequences of DNA whose length and number vary greatly from person to person, and comparing the pattern of these DNA sequences found in crime samples with a suspect's pattern to determine if the DNA patterns match.[26] The authors explain the basic genetic principles which allow DNA fingerprinting to work and thoroughly cover the various steps performed in obtaining a DNA fingerprint and declaring a match. The discussion includes an extensive description of what promises to be the foremost DNA analysis technique in the near future, PCR-based typing. PCR typing is based on a procedure, called polymerase chain reaction amplification, that increases the amount of available DNA by duplicating it over and over. PCR analysis presents several advantages over traditional (RFLP) analysis, being a faster and relatively simpler operation that can be performed on even minute amounts of DNA.[27]

Once one of these testing methods yields a match between the suspect's DNA pattern and the pattern found in the crime scene sample, the suspect is said to be "included" in the class of possible perpetrators of the crime. An inclusion does not, however, automatically mean that the suspect committed the crime, since someone else with the same DNA pattern may have been the actual perpetrator. The likelihood that someone else with the same DNA pattern may have been the source of the crime scene sample is determined by statistical analysis of the occurrence of that particular DNA pattern in the general population. Thus if a DNA pattern appears with high frequency in the population, a match between a suspect and a crime scene sample will be less significant than if the pattern appears infrequently. Moreover, DNA fingerprints usually test for several different DNA sequences. Each DNA sequence has its own frequency of occurrence in the general population. The overall frequency for a DNA fingerprint that tests multiple sequences is calculated by multiplying the individual frequencies of each DNA sequence.[28] This frequency calculation method is called the product rule.

Statistical analysis methods such as the product rule are at the center of a maelstrom of controversy in the DNA wars. Critics argue that the product rule underestimates the frequency of the suspect's DNA pattern in the general population, thus overestimating the likelihood that the suspect is the source of the crime scene sample DNA. These critics argue that analysis of the frequency of DNA patterns in the general population, or even in specific ethnic populations, ignores the possibility of smaller subpopulations in which the frequency of the suspect's DNA pattern may occur with greater frequency than in the larger population.[29] Proponents of DNA evidence counter that no evidence shows that the existence of subpopulations significantly alters the frequency calculations.[30] Furthermore, proponents have proposed alternatives to the product rule that are conservative (pro-defendant) methods of statistical analysis that more than account for any unknown bias such as the subpopulation problem.[31] Critics have responded by attacking these alternative methods as inaccurate calculations that violate population genetics principles.[32] Some renowned scientists, attempting to quiet the storm of controversy, point out that although the alternative methods may not be the *best* statistical evaluation method, they are so conservative that no one could argue that their inaccuracy harms the defendant.[33]

One weakness of the book is its relatively cursory treatment of this statistical analysis controversy. A satisfactory overview of this issue and the complex field of population genetics is an admittedly difficult task given the scope of the book. Nevertheless the importance of this element of DNA evidence and its starring role in the current DNA debates calls for more comprehensive coverage than the authors provide.

The authors next include a short chapter on DNA parentage testing. Although they have received far less press and have not figured significantly in the debates on DNA fingerprinting reliability, parentage testing cases are the most common application of the technology.[34] DNA parentage testing applications include child support enforcement, criminal paternity, identifying human remains and medical genetics.[35] Parentage DNA testing, like forensic DNA analysis, has considerable advantages over conventional blood analysis, but also shares with forensic DNA testing the same difficulties that can affect reliability, such as proper performance of testing procedures, chain of custody, degraded samples, laboratory quality control and statistical population analysis. Interestingly, opponents of forensic DNA testing have not been as vocal in attacking the reliability of DNA testing for parentage purposes.[36] This is true even though parentage tests often provide evidence in criminal cases, for example by identifying human remains or testing fetuses for proof of criminal activity such as rape or child molestation.[37] The lack of opposition is even more surprising considering that the

proficiency of testing laboratories is less closely scrutinized and more susceptible to variations in quality in parentage testing than in the forensic setting.[38] This selectivity in criticism may, as the authors point out, provide insight into the true significance of many of the objections to forensic DNA testing.

The discussion then moves from the complexities of DNA technology in the laboratory to the complexities of DNA technology in the courtroom. In chapter Five the authors reach the crux of the DNA controversy: the difficulties of incorporating complex scientific evidence into our legal system. In their description of the relevant legal rules governing DNA admissibility, the authors conscientiously explain all legal provisions in lay terms. They succinctly describe the nature of evidence, including rules on opinion testimony and expert opinions, as well as basic principles of discovery.[39] The authors describe how discovery has sometimes been a source of contention, but focus on admissibility as the central legal issue in DNA fingerprinting.[40]

The DNA controversy centers on the admissibility of DNA fingerprints at trial. Scientific evidence, such as DNA fingerprints, must meet a certain reliability threshold before it can be admitted.[41] The rationale for this special evidentiary standard is that scientific evidence, by its very nature, is not susceptible to the adversarial system's traditional measures for ensuring reliability, such as cross-examination and opposing evidence. Factfinders, whether judge or jury, do not have the requisite technical knowledge to evaluate the reliability of the scientific evidence. In fact, this is the very reason such evidence is needed in the first place, to provide the factfinder with technical knowledge and information it does not itself possess. In addition, such evidence can often have an aura of infallibility that can so overwhelm factfinders, especially lay juries, that they may afford the evidence disproportionate weight.[42]

Courts have applied various standards to measure the reliability of scientific evidence. The authors provide a concise account of these standards and their historical development. Courts today determine admissibility using either the *Frye* rule, which requires that scientific evidence must be "generally accepted" by the scientific community before being admitted, [43] or the Federal Rules of Evidence (FRE) which require that scientific evidence be relevant[44] and helpful. [45]

Until 1993 it was unclear whether the FRE, which nowhere mention general acceptance, had superseded the *Frye* rule. Some federal circuits held that the FRE abolished *Frye*, while others read the FRE as incorporating the *Frye* rule into their reliability requirement.[46] The United States Supreme Court resolved the split in the recent landmark case *Daubert v. Merrell Dow Pharmaceuticals*, holding that *Frye* did not survive the enactment of the FRE that scientific evidence is to be evaluated using the FRE's relevance and helpfulness standard.[47]

In addition to covering these various evidentiary rules, the authors note two additional legal standards affecting DNA admissibility, the emergence in some states of legislated admissibility and the role of expert witnesses. Several states have enacted statutes mandating the admissibility of DNA evidence without antecedent expert testimony on the technique's reliability.[48] This legislated admissibility applies only to the underlying theories and technology of DNA fingerprinting, not issues such as statistical evaluation methods or proper performance of testing protocols that currently are the primary points of contention.[49] Nor do the statutes apply to subsequently developed DNA analysis methods.[50] Nevertheless, legislated admissibility promises to be a growing trend in the field.[51]

Our legal system's reliance on partisan experts to bring scientific evidence to the courtroom also has a profound effect on DNA admissibility. Coleman and Swenson make note of the proliferation of "professional experts" who are not always well-qualified or impartial enough to be relied on to provide the court with such complex and often outcome-determinative material as DNA evidence. Some suggestions for curtailing this phenomenon include implementing rigorous academic, professional and ethical qualification requirements for expert witnesses and increased use of court-appointed experts to promote impartiality.[52]

The authors next present a section, highly useful to practitioners, describing defense strategies and the main lines of attack on forensic DNA testing. The authors survey the primary points of contention, including experts' conflicts of interest, unreliable chain of custody, technical inaccuracies (such as improper procedures or contamination of samples) and unreliable statistical analysis methods.[53] Unfortunately, as in the technical chapters, the authors provide insufficient coverage of the now-dominant statistical analysis controversy.

The authors briefly survey the trial and appeals processes. They review several appellate-level decisions regarding DNA admissibility. The authors also survey several California appellate decisions, concluding that California courts unanimously accept the theory and methods of RFLP testing, but differ in their rulings on admissibility of statistical analysis results.[54]

Finally, the authors discuss the role of DNA fingerprints in providing relief from erroneous convictions. The authors state that about a dozen men have had convictions reversed and been released from prison when DNA evidence excluded them as the perpetrators of the crime for which they had been convicted.[55] According to the authors, an additional thousand men annually are arrested as crime

suspects and then released without being charged when DNA evidence exonerates them.[56] The authors note that also some of the most vociferous objectors to admitting *inculpatory* DNA evidence ardently advocate use of DNA evidence to *exculpate* the accused.[57] This dichotomy is certainly interesting. The point would be even more telling if the authors critically evaluated the justifications put forth by those who propose this dual standard, an evaluation the authors do not undertake.

With regard to inculpatory evidence, the authors note that, despite the contention surrounding DNA fingerprinting, the injustices predicted by opponents of the evidence have failed to materialize. For example, the record shows no re-test of DNA evidence resulting in inconsistent conclusions from the original analysis.[58]

The final chapter of the book covers the early stages of the Simpson trial, as the prosecution and defense teams were gearing up for the battle over DNA evidence. While one might be tempted to dismiss this chapter as irrelevant now that the trial is over, the discussion is actually an absorbing case study of the contours of a DNA battle. The authors present an analysis of defense and prosecution strategies, as well as detailed commentary regarding the experts lined up on either side. The description of the experts, their backgrounds, qualifications and personalities, enlivens the discussion and illuminates how these elements impact the experts' testimony and contribute to the contentious nature of the DNA controversy. This perspective is particularly relevant since the experts employed in the Simpson case are some of the main players in the DNA controversy and will continue to figure prominently as the debates continue.

CONCLUSION

The authors, in their afterword, conclude that "the prospects for ending the DNA War quickly are dim."[59] Although they believe that developments in the technology will eventually compel complete acceptance of DNA evidence, they oppose deferring the use of such a powerful tool until absolutely no scientific disagreements exist. They note that "[t]he DNA revolution has brought into sharp focus how hard it is for the judicial system to evaluate and incorporate new scientific technologies,"[60] and posit that the DNA controversy "speak[s] more to the nature of our legal system and the politics and economics of the scientific community than to the soundness of the technology."[61]

Knowledge and information are the key to a better understanding of these revolutionary technologies. Jurists can no longer afford the scientific illiteracy that so characterizes the legal field. *DNA in the Courtroom* counteracts this phenomenon of illiteracy by providing a concise, yet comprehensive, introduction to the complex scientific and legal issues of DNA fingerprinting. The work is worthwhile, entertaining and accessible reading for jurists, journalists and the general public alike.

---

† J.S.D. Candidate, 1997, LL.M., 1995, Boalt Hall School of Law, University of California, Berkeley. J.D., School of Law, 1993, B.S., 1989, University of California, Davis.

1. HOWARD C. COLEMAN & ERIC D. SWENSON, DNA IN THE COURTROOM: A TRIAL WATCHER'S GUIDE (1994).

2. Determination of paternity, maternity, or other kinship is referred to as "parentage testing."

3. *See, e.g.*, William C. Thompson, *Evaluating the Admissibility of New Genetic Identification Tests: Lessons from the "DNA War,"* 84 J. CRIM. L. & CRIMINOLOGY 22, 100-03 (1993).

4. COLEMAN & SWENSON, *supra* note 1, at 1.

5. *Id.* at 4.

6. *Id.*

7. *Id.*

8. *Id.*

9. *Id.*

10. *See id.* at 5.

11. *Id.*

12. *See id. See also* THOMPSON, *supra* note 3, at 22; ANDRE A. MOENSSENS ET AL., SCIENTIFIC EVIDENCE IN CIVIL AND CRIMINAL CASES 938 (4th ed. 1995).

13. COLEMAN & SWENSON, *supra* note 1, at 5.

14. 144 Misc. 2d 956 (N.Y. 1989).

15. *See* COLEMAN & SWENSON, *supra* note 1, at 6. The court found that the theories underlying DNA fingerprinting were reliable enough to render DNA evidence generally admissible, but that inaccuracies in performance of the tests rendered these particular match results too unreliable to be admitted. These inaccuracies included the laboratory's apparent inculpatory bias when drawing conclusions from ambiguous data, failure to use adequate controls to verify that interpretations were correct, ignoring the failure of some controls that were used, THOMPSON, *supra* note 3, at 43, and failure to adequately correct for bacterial contamination, Thomas M. Fleming, Annotation, *Admissibility of DNA Identification Evidence,* 84 A.L.R. 4th 313, 331-32 n.56 (1991). Courts today continue to split over the significance of proper performance of testing procedures. Some hold that performance of the technique goes to the weight, rather than the admissibility, of the test results, while other courts require proper performance of tests before the DNA evidence can be admitted. MOENSSENS, *supra* note 12, at 942-43.

16. COLEMAN & SWENSON, *supra* note 1, at 6.

17. *See id.* at 13-14.

18. *Id.*

19. *Id. See generally* COMMITTEE ON DNA TECHNOLOGY IN FORENSIC SCIENCE, NATIONAL RESEARCH COUNCIL, DNA TECHNOLOGY IN FORENSIC SCIENCE (1992).

20. COLEMAN & SWENSON, *supra* note 1, at 13.

21. *See id.* at 16-18. The authors also argue that the DNA controversy has been exacerbated by a "politicization" of the judicial process, where prosecutors "adopt a bunker mentality when under attack while doing their job of protecting us from criminals, [while defense attorneys] feel under siege because they usually have even fewer resources. . . . than does the prosecution" and must fulfill their role of safeguarding individual liberties. *Id.* at 16-17.

22. *Id.* at 18.

23. *Id.* at 7.

24. *Id.* at 20-22.

25. *See id.* at 25-27.

26. In the procedure called RFLP (Restriction Fragment Length Polymorphism) analysis, these DNA fragments are separated by size using an electrical current which pulls smaller fragments farther through a porous gel than larger fragments. The resulting series of DNA bands are radioactively tagged and then made visible by exposure to a sheet of film. The resulting "picture" is a column of bands positioned according to size and superficially resembling the UPC bar code found on commercial goods. By comparing the band pattern of a crime scene sample with the patterns from the victim and any suspects, technicians will determine if any of the DNA in the

sample matches that of a suspect. Once a match, or inclusion, is declared, the statistical likelihood that the defendant is not the source (i.e., that the match occurred randomly) is evaluated using population databases which estimate the frequency of the tested DNA fragments in the population.

27. *See* MOENSSENS, *supra* note 12, at 910-12.

28. Thus, if a DNA fingerprint tests for sequence A and sequence B, and the individual frequency of sequence A in the general population is 1 in 100, or .01, and the frequency of sequence B is 1 in 1000, or .001, the frequency of a DNA fingerprint showing both A and B will be .001 x .01 = .00001 or 1 in 100,000. Clearly, as more sequences are tested for, the frequency for the overall DNA pattern can quickly reach one in millions or even billions.

29. *See* MOENSSENS, *supra* note 12, at 924-25.

30. *See id.* at 925-26.

31. *See id.* at 926-27.

32. *See id.* at 927-28.

33. *See, e.g.*, Eric S. Lander & Bruce Budowle, *DNA Fingerprinting Dispute Laid to Rest*, 371 NATURE 735 (1994).

34. COLEMAN & SWENSON, *supra* note 1, at 62.

35. *Id.* at 64.

36. The same conspicuous silence is evident when forensic DNA testing is used to exculpate the defendant.

37. *See* COLEMAN & SWENSON, *supra* note 1, at 66-67.

38. *Id.* at 70-71.

39. *Id.* at 75-77.

40. *Id.* at 77.

41. *See id.*

42. DNA fingerprints clearly carry this aura since the match frequencies are so astronomical that they seem to prove indisputably the defendant's guilt.

43. COLEMAN & SWENSON, *supra* note 1, at 77. The *Frye* rule originated in a 1923 federal court of appeals decision that excluded the results of a primitive lie-detector test as too unreliable. Frye v. United States, 293 F. 1013 (D.C. Cir. 1923). In a much-quoted statement, the court declared:

> Just when a scientific principle or discovery crosses the line between experimental and demonstrable stages is difficult to define. Somewhere in the twilight zone the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from 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.

Frye, 293 F. at 1014.

44. FED. R. EVID. 402.

45. FED. R. EVID. 702 ("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."). Helpfulness incorporates reliability since unreliable evidence will not be helpful. *See Daubert v. Merrell Dow Pharmaceuticals, infra* note 47. The FRE are directly applicable only to federal courts, but many states have evidence codes patterned after, and identical in relevant part, to the FRE.

46. States with evidence codes patterned after the FRE were similarly struggling to reconcile the FRE and *Frye*. Like the federal courts, these states split on whether their evidence codes superseded *Frye.*

47. 113 S. Ct. 2786, 2794 (1993). Like the FRE, *Daubert* does not automatically control state evidentiary law, but since many state codes are identical to the FRE in relevant part, such states may choose to follow the U.S. Supreme Court's interpretation of the FRE and *Frye*. Some of these states had already abandoned *Frye* for the federal approach pre-*Daubert*. *See, e.g.*, Prater v. State, 820 S.W.2d 429 (Ark. 1991); Santiago v. State, 510 A.2d 488 (Del. 1986); Rivera v. State, 840 P.2d 933 (Wyo. 1992). Others have since adopted the *Daubert* reasoning and abolished *Frye.* S*ee, e.g.*, City of Fargo v. McLaughlin, 512 N.W.2d 700 (N.D. 1994); State v. Alberico, 861 P.2d 192 (N.M. 1993). The remainder have yet to reject *Frye* in favor of *Daubert.*

48. COLEMAN & SWENSON, *supra* note 1, at 80. In their appendix, the authors list these states, which include Alabama, Connecticut, Indiana, Louisiana, Maryland, Minnesota, Nevada, Tennessee, Virginia, and West Virginia. *See id.* at 113-20.

49. *Id.*

50. *Id.*

51. *Id.*

52. *Id.* at 81-82.

53. *Id.* at 82-86.

54. *See id.* at 88-89.

55. *Id.* at 89.

56. *See id.* at 112.

57. *Id.* at 90.

58. *Id.* at 90.

59. *Id*. at 111.

60. *Id.* at 112.

61. *Id.*