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SCIENTIFIC EVIDENCE—AN INTRODUCTION

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"Scientific evidence" has a ring of impressive probative force, a ring that would appear to find a receptive ear in a public blasé with technological achievement. Exposed by prime time television to crack medical examiners, youthful computer wizards, and experts of every kind, many members of the public may assume that scientific evidence is the mainstay of forensic investigation. Although scientific evidence occupies a significant place in contemporary litigation,[1] the use of novel or particularly sophisticated scientific evidence is far less commonplace or decisive than the entertainment media suggest.

Despite its comparatively limited role, the use of sophisticated scientific evidence is increasing at a rapid rate.[2] To many legislators, judges, and lawyers, scientific evidence is an Aladdin's lamp: used properly, scientific evidence promises great benefit; used im-

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1. "In a recent survey of judges and attorneys by the National Center for State Courts, forty-four percent of those responding stated that they encountered scientific evidence in at least thirty percent of their cases." Imwinkelried, *A New Era in the Evolution of Scientific Evidence—A Primer on Evaluating the Weight of Scientific Evidence*, 23 WM. & MARY L. REV. 261 (1981) (citing *Study to Investigate Use of Scientific Evidence*, NAT'L CENTER ST. CTS. REP., Aug. 1980, at 1).

2. This is particularly true, of course, in the numerous administrative and civil cases growing out of attempts to protect both the environment and the consumer. *See generally* Markey, *Jurisprudence or "Juriscience"?*, 25 WM. & MARY L. REV. 525 (1984).

properly, it threatens not only individual cases, but potentially the entire judicial system.

In the past, science fiction authors often predicted a future in which criminal trials would be replaced by some form of scientific factfinder, often a computerized lie detector. Perhaps we should be encouraged that we have reached the milestone year of 1984 without having relegated our counsel and judges to the technological breadlines. The dilemma of how to handle scientific evidence in the courtroom, however, remains real. Indeed, as our technology advances, resolution of the problems posed by novel scientific evidence becomes increasingly important.

Scientific evidence has been unevenly received. In an increasing number of civil and administrative cases, scientific evidence is not only material, but critical. In criminal cases, however, an apparent dichotomy is present. Although many courts have accepted not only recent developments, such as neutron activation analysis,[3] but even the polygraph,[4] other courts have refused to avail themselves of such fruits of contemporary science as the psychology of eyewitness identification.[5] Under these circumstances, a Symposium on scientific evidence is particularly appropriate. The unusually broad and far reaching scope of this Symposium airs many of the problems presented by scientific evidence.

The threshold issue in any exploration of scientific evidence is the jurisprudential role of science. In *Jurisprudence or "Juriscience"?*,[6] Chief Judge Howard Markey of the United States Court of Appeals for the Federal Circuit reflects upon what he views as a national tendency for legislators and courts to abdicate their policymaking and interpretative duties in favor of often ill-defined, value-free scientific principles. Judge Markey emphasizes two distinct concerns. The first is the tendency of Congress and many

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3. *See* A. MOENSSENS & F. INBAU, SCIENTIFC EVIDENCE IN CRIMINAL CASES § 9.03 (2d ed. 1978).

4. *See* State v. Dorsey, 88 N.M. 184, 539 P.2d 204 (1975); State v. Renfro, 28 Wash. App. 187, 622 P.2d 1295 (1981). New Mexico even admits evidence of the results of psychological stress evaluators. Simon Neustadt Family Center v. Bludworth, 97 N.M. 500, 641 P.2d 531 (Ct. App. 1982).

5. *See, e.g.*, Brooks v. United States, 448 A.2d 253, 258 (D.C. 1982); Johnson v. State, 438 So. 2d 774, 777 (Fla. 1983).

6. 25 WM. & MARY L. REV. 525 (1984).

state legislatures to legislate broad social goals, such as clean air, without adequately addressing the ultimate need to balance those goals against numerous competing policy considerations. As a result, the courts must grapple with fundamental policy questions that are more properly resolved by the legislature.[7] Judge Markey's second concern is with the judicial tendency to accept scientific evidence uncritically—a tendency due to an unwarranted belief in science per se, or to the present nature of the adversarial system which, complicated by the limited scientific education of many judges, makes obtaining and evaluating a sufficient quantity of accurate and intelligible evidence difficult. An abdication of a court's interpretative and factfinding roles in favor of scientific experts will indeed yield "juriscience" and is improper. Such a result is difficult to forestall, however, given the courts' frequent need to determine scientific "truth" in order to apply the law properly.[8]

At the same time, lawyers generally lack significant scientific training. This educational deficiency often places lawyers at a disadvantage when confronted with scientific evidence. As Judge Markey notes, lawyers—whether serving as counsel or judges—often fail to ask the right questions and uncritically accept scientific assertions.[9] In *Scientific Evidence and the Question of Judicial Capacity*,[10] one of two student contributions to this Symposium, the author addresses judicial competency to deal with sci-

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7. Judge Markey also despairs of the judicial refusal to make policy judgments when forced to resolve litigation involving such statutes. Although policy considerations cannot be avoided in all cases, the function of a court is not to substitute its judgment for that of the legislature. In addressing the various state laws requiring the wearing of motorcycle helmets, for example, Judge Markey effectively commends those courts that considered whether the "underlying values of our jurisprudence" supported those statutes rather than merely accepting statistical evidence concerning potential injuries to helmetless riders. *Id.* at 531-33. Such an inquiry, however, is the function of the legislature in considering and enacting a statute. Absent constitutional implications, the proper function of a court is not to determine whether fundamental principles of jurisprudence should invalidate a statute regardless of the potentially inadequate legislative policy consideration. The court's function is to determine whether the statute is constitutional, not whether it is desirable.

8. When a statute mandates a general goal such as clean water, for example, the only question theoretically before the court is whether a given technological approach is scientifically justified.

9. *Id.* at 529-32. Rejecting other proposed solutions, Judge Markey suggests a revision of prelaw and science curricula and the promulgation of "Rules of Technological Adjudication". *Id.* at 539-42.

10. 25 WM. & MARY L. REV. 675 (1984).

entific evidence and the related topic of making scientific evidence intelligible to a jury.[11]

If scientific evidence is desirable or inevitable, one must define the standard and procedure for determining its admissibility. Merely making such a statement, however, poses the basic problem. Should scientific evidence be evaluated under the normal standards of logical relevancy,[12] or should special rules apply? In resolving this issue, one must distinguish between novel scientific evidence and scientific evidence of proven validity. Any consideration of the admissibility of novel scientific evidence necessarily requires a discussion of the *Frye* rule,[13] which prohibits the admission of novel scientific evidence unless its underlying principle "is sufficiently established to have gained general acceptance in the particular field in which it belongs."[14] Although in decline, the *Frye* rule clings tenaciously to life and has been the subject of great scholarly debate.[15] Professor Andre Moenssens, one of the nation's leading scientific evidence experts, contributes to that debate in *The Admissibility of Scientific Evidence—An Alternative to the* Frye *Rule.*[16] Concluding that the *Frye* rule should be abandoned, Professor Moenssens advises the courts to take an approach that concentrates on assessing, in an effective and realistic manner, the *reliability* of a technique and proposes a new *procedure* to facilitate the court's reliability determination.[17]

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11. *Id.* Professor Doyle, however, suggests that juries may not be as easily swayed or confused as conventional wisdom would suggest. Doyle, *Applying Lawyers' Expertise to Scientific Experts: Some Thoughts About Trial Court Analysis of the Prejudicial Effects of Admitting and Excluding Expert Scientific Testimony*, 25 WM. & MARY L. REV. 619 (1984). He observes:

> Ironically, the expert scientific witness, characterized in judicial opinions as the invulnerable magician, Merlin, often appears in the memoirs of legendary trial lawyers exposed as either Rube Goldberg, fabricating ever more fantastic devices, or Dr. Pangloss, pompously offering increasingly inane opinions.

Id. at 640 (footnotes omitted). *See generally* Imwinkelried, *The Standard for Admitting Scientific Evidence: A Critique from the Perspective of Juror Psychology*, 28 VILL. L. REV. 554 (1983).

12. *See, e.g.*, FED. R. EVID. 401, 402.

13. Frye v. United States, 293 F. 1013 (D.C. Cir. 1923).

14. *Id.* at 1014.

15. *See, e.g.*, Giannelli, *The Admissibility of Novel Scientific Evidence:* Frye v. United States, *A Half-Century Later*, 80 COLUM. L. REV. 1197 (1980).

16. 25 WM. & MARY L. REV. 545 (1984).

17. *Id.* at 567-68.

Focusing on a different aspect of the same problem, Professor Edward Imwinkelried, a noted and prolific commentator on the subject of scientific evidence, explores the effects of the possible demise of the *Frye* rule. In *Judge Versus Jury: Who Should Decide Questions of Preliminary Facts Conditioning the Admissibility of Scientific Evidence?*,[18] he concludes that absent the *Frye* rule, the Federal Rules of Evidence would require the *factfinder* to determine the validity[19] of the novel scientific evidence. Like Professor Moenssens, Professor Imwinkelried believes that, although the *Frye* rule should be abolished, the court should continue to determine the preliminary issue of the validity of the underlying scientific theory. Accordingly, he proposes that the Federal Rules of Evidence be amended to ensure that result.[20] Professor Imwinkelried's analysis and evidentiary conclusions are convincing.[21] Exposing jurors to a new theory at the cutting edge of science or technology while asking them both to determine its validity and to ignore the evidence should they find it invalid appears far too dangerous—at least in criminal cases.[22] Professor Imwinkelried's proposed amendment to the Federal Rules of Evidence, therefore, seems well taken. What is not clear is whether his amendment goes far enough. Professor Giannelli has proposed that "[t]he prosecution in a crimnal case should be required to establish the validity of a novel scientific technique beyond a reasonable doubt. Civil litigants and criminal defendants, on the other hand, should estab-

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18. 25 WM. & MARY L. REV. 577 (1984).

19. Although courts use the terms "validity" and "reliability" interchangeably, the terms have distinct meanings in scientific jargon. "Validity" refers to the ability of a test procedure to measure what it is supposed to measure—its accuracy. "Reliability" refers to whether the same results are obtained in each instance in which the test is performed—its consistency. Validity includes reliability, but the converse is not necessarily true.

Giannelli, *supra* note 15, at 1201 n.20.

20. Interestingly, Professor Imwinkelried's evidentiary proposal and the procedural suggestions made by Professor Moenssens complement each other. If implemented, they would greatly assist the court in determining the preliminary question of a scientific theory's validity.

21. To the best of my knowledge, scholarly writing lacks a formal conflict of interest disclosure rule. Notwithstanding the nonapplication of rule 10(b)(5) or any equivalent, the reader may wish to note E. IMWINKELRIED, P. GIANNELLI, F. GILLIGAN & F. LEDERER, CRIMINAL EVIDENCE (1979).

22. *But see* Doyle, *supra* note 11, at 636 (reasoning that juors may be able to evaluate scientific evidence with a degree of skepticism ignored by conventional wisdom).

lish the validity of a novel technique by a preponderance of the evidence."[23] Professor Giannelli's position is somewhat demanding of the prosecution, but does have the virtue of protecting a defendant from a conviction based upon invalid scientific theories.

New evidentiary tests and procedures for the admission of novel scientific evidence may not solve all problems. One also must consider the direct and indirect costs that will arise from the increasingly routine resort to scientific evidence. Also worth considering is whether the adversary system presently provides adequate alternatives to the use of expert testimony. In *Applying Lawyers' Expertise to Scientific Experts: Some Thoughts About Trial Court Analysis of the Prejudicial Effects of Admitting and Excluding Expert Scientific Testimony*,[24] Professor James Doyle considers the extent to which counsel may clarify or control the use of scientific evidence in court, as well as the extent to which counsel may substitute more customary procedures for scientific evidence. Professor Doyle performs a valuable service because trial lawyers often tend to seek expert testimony when counsels' skills alone might be of at least equal value.

Professors Doyle, Moenssens, and Imwinkelried all note the problems that have occurred with various forms of scientific evidence in even routine cases. In his earlier article in this Review, *A New Era in the Evolution of Scientific Evidence—A Primer on Evaluating the Weight of Scientific Evidence*,[25] Professor Imwinkelried summarized the results of the Law Enforcement Assistance Administration's Proficiency Testing Program of over 200 forensic laboratories in the United States by stating: "It is an understatement to say that the findings . . . are alarming. 'Shocking' would be more precise."[26] The degree of error found in the testing program for many forms of routine analysis makes clear the need for concern not only with novel scientific evidence, but with the more customary forms as well. In *Capabilities of Modern Forensic Laboratories*,[27] therefore, Dr. I.C. Stone not only offers an insightful view of the capabilities of forensic laboratories, which

23. Giannelli, *supra* note 15, at 1248 (footnotes omitted).
24. 25 WM. & MARY L. REV. 619 (1984).
25. Imwinkelried, *supra* note 1.
26. *Id.* at 268 (footnote omitted).
27. 25 WM. & MARY L. REV. 659 (1984).

play an integral role in the presentation of scientific evidence, but also illustrates the demands placed on forensic laboratories—demands that may be unreasonable in some cases. Similarly, the second student contribution to this Symposium, *Seeing Can Be Deceiving: Photographic Evidence in a Visual Age—How Much Weight Does It Deserve?*,[28] illustrates the difficulties that can arise with noncontroversial and routine forms of evidence, such as photographs, movies, and videotapes. The point should not be ignored. Despite the importance of novel scientific evidence, the great majority of cases using scientific evidence involve more customary forms, and the use of even this type of scientific evidence leaves much to be desired.[29]

Scientific evidence is a fascinating area that combines traditional evidentiary questions with new and complex scientific problems. It poses fundamental jurisprudential issues and hard questions of trial practice. The questions are clear; the solutions are not. This Symposium will facilitate the process of reaching those solutions.

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28. 25 WM. & MARY L. REV. 705 (1984).

29. Both Professor Moenssens' proposals for improvement and Professor Imwinkelried's earlier suggestions for evaluating the weight of scientific evidence are helpful in this area. *See* Imwinkelried, *supra* note 1; Moenssens, *supra* note 24. Professor Moenssens' suggestion that forensic laboratory reports be expanded in criminal cases to include such information as the identity and qualifications of the forensic examiners, the nature of the tests applied and the results obtained, as well as the examiners' conclusions, could substantially improve counsels' ability to cope with scientific evidence in criminal cases. *See id.* at 568-69. The effect of limited conclusory laboratory reports is difficult to overestimate in jurisdictions that permit the reports to be admitted in criminal cases as exceptions to the hearsay rule. *See, e.g.*, MIL. R. EVID. 803(6), 803(8).