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COMING TO GRIPS WITH SCIENTIFIC RESEARCH
IN *DAUBERT'S* "BRAVE NEW WORLD": THE
COURTS' NEED TO APPRECIATE THE
EVIDENTIARY DIFFERENCES BETWEEN VALIDITY
AND PROFICIENCY STUDIES*

Edward J. Imwinkelried†

"If the law supposes that," said Mr. Bumble . . . "the law is a
ass, a idiot."

—Charles Dickens, *Oliver Twist*

INTRODUCTION

For decades, the courts have regarded scientific testimony with suspicion. Their fear was that jurors would uncritically accept such testimony at face value and assign it undue weight. In one case, the California Supreme Court voiced the fear that science is "a veritable sorcerer in our computerized society," a sorcerer who can "cast a spell" over the trier of fact.¹ In another decision, the same court expressed concern about the "misleading aura of certainty which often envelops a new scientific process."² For its part, the District of Columbia Court of Appeals asserted that jurors often attribute a "mystic infallibility" to scientific evidence.³ In a similar vein, the Maryland Court of Appeals has stated that jurors routinely overestimate the probative worth and certainty of scientific testimony.⁴ For that matter, several courts have declared that it is doubtful that even legally trained judges are competent to

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¹ *People v. Collins*, 438 P.2d 33, 33 (Cal. 1968).

² *People v. Kelly*, 549 P.2d 1240, 1245 (Cal. 1976).

³ *United States v. Addison*, 498 F.2d 741, 744 (D.C.Cir. 1974).

⁴ *Reed v. State*, 391 A.2d 364, 370 (Md. 1978).

pass on essentially scientific questions; in their view, scientists are far better "qualified to assess the general validity of a scientific method."⁵

Given these assumptions, it was perhaps to be expected that the courts would turn to the traditional, general acceptance test as the standard determining the admissibility of scientific evidence.⁶ Under this standard—sometimes dubbed the *Frye* test after the 1923 case announcing the standard⁷—a scientific theory or technique may not serve as a basis for testimony until the theory or technique has gained general acceptance among the members of the relevant scientific field or specialty.⁸ Given courts' fears, the *Frye* test had two obvious virtues. First, the test is "essentially conservative,"⁹ striking a note of "judicial caution." Again, the courts assumed that lay jurors ascribe excessive weight to scientific testimony and naively expect it to be virtually infallible.¹⁰ The general-acceptance test helped to ensure that the only testimony admitted would be testimony measuring up to that expectation.

Second, in applying the test, the trial judge does not have to reach the merits of the scientific dispute. Under *Frye*, judges "could avoid coming to grips with science."¹¹ The test focuses on an indirect indicator of scientific validity,¹² namely, the popularity of the theory or technique in the specialty field. The existence of a certain degree of popularity is the type of historical, nontechnical issue which judges are accustomed to deciding. General acceptance serves as a surrogate¹³ for a direct evaluation of the scientific research underpinning the theory or technique. The test not only permits the trial judge

⁵ *E.g., Kelly*, 549 P.2d at 1244-45.

⁶ 1 PAUL C. GIANNELLI & EDWARD J. IMWINKELRIED, *SCIENTIFIC EVIDENCE* §§ 1-5 (2d ed. 1993).

⁷ *Id.*

⁸ *Id.*

⁹ *People v. Kelly*, 549 P.2d 1240, 1244-45 (Cal. 1976).

¹⁰ Edward J. Imwinkelried, *The Standard for Admitting Scientific Evidence: A Critique from the Perspective of Juror Psychology*, 28 VILL. L. REV. 554, 562 (1983).

¹¹ Bert Black et al., *Science and the Law in the Wake of Daubert: A New Search for Scientific Knowledge*, 72 TEX. L.REV. 715, 718 (1994).

¹² RONALD L. CARLSON ET AL., *EVIDENCE IN THE NINETIES: CASES, MATERIALS AND PROBLEMS* 289 (3d ed. 1991).

¹³ Black et al., *supra* note 11, at 721, 725.

to "hid[e] from science;"¹⁴ but it also in effect delegates the decision on admissibility to the scientific community.¹⁵

At one time, the *Frye* test was controlling in forty-five states and in all the federal circuits.¹⁶ In 1993, however, the United States Supreme Court jettisoned *Frye*. In that year, the Court handed down its decision in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*¹⁷ Mr. Justice Blackmun authored the majority opinion. The majority initially ruled that the general-acceptance test is no longer good law in federal court. Justice Blackmun pointed out that under Federal Rule of Evidence 402, logically relevant evidence is "admissible, except as otherwise provided by the Constitution of the United States, by Act of Congress, by these rules, or by other rules prescribed by the Supreme Court pursuant to statutory authority."¹⁸ Although the exceptive language in Rule 402 lists the Constitution, statutes, the Federal Evidence Rules, and rules such as the Rules of Civil Procedure "prescribed by statutory authority," Rule 402 makes no mention of case or decisional law. In the past, the Court had held that Rule 402 has the effect of abolishing uncodified exclusionary rules of evidence.¹⁹ Adhering to that holding, Justice Blackmun reasoned that the enactment of the Federal Rules implicitly overturned the *Frye* test; although the test enjoyed widespread support at common law, the majority stated that there was no language in the text of the Federal Rules which could reasonably bear the interpretation that it codified a general-acceptance standard. The general-acceptance test is a creature of case law.

The majority next ruled that the statutory language of Federal Rule of Evidence 702 supplies a new, empirical

¹⁴ Black et al., *supra* note 11, at 722.

¹⁵ *People v. Kelly*, 549 P.2d 1240, 1244-45 (Cal. 1976).

¹⁶ Betty R. Steingass, *Changing the Standard for the Admissibility of Novel/Scientific Evidence: State v. Williams*, 40 OHIO ST. L.J. 757, 769 (1979).

¹⁷ 113 S. Ct. 2786 (1993).

¹⁸ FED. R. EVID. 402.

¹⁹ See generally Edward R. Becker & Aviva 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 (1992); Randolph N. Jonakait, *The Supreme Court, Plain Meaning, and the Changed Rules of Evidence*, 68 TEX. L. REV. 745 (1990); Glen Weissenberger, *The Supreme Court and the Interpretation of the Federal Rules of Evidence*, 53 OHIO ST. L.J. 1307 (1992).

validation test to replace *Frye*. Rule 702 reads, "If scientific . . . 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."²⁰ According to Rule 702, the witness's possession of "scientific . . . knowledge" is what qualifies the witness as an expert; and the witness must testify "thereto." Parsing the language of Rule 702, Justice Blackmun concluded that the rule requires the substance of the expert's testimony to qualify as "scientific . . . knowledge."

The question then became defining that term. According to Justice Blackmun, that term does not equate with a particular body of substantive propositions. Rather, it denotes a proposition "derived by the scientific method."²¹ The justice described that method as the process of formulating hypotheses and empirically falsifying or validating the hypotheses.²² A theory or technique constitutes "scientific . . . knowledge" within the intendment of Rule 702 if it rests on sound scientific methodology. When testimony satisfies this empirical validation test, the testimony is admissible even if the witness's conclusion is novel and controversial.²³ By opening the door to the introduction of testimony about novel scientific theories and techniques, the United States Supreme Court liberalized the standard for introducing scientific testimony.

In contrast, the California Supreme Court has long been considered a bastion of the traditional, general-acceptance test. The California Supreme Court adopted the test in 1976.²⁴ The court emphasized that the "conservative nature" of the test was its "primary advantage."²⁵ The court favored the *Frye* test because that test "assigned the task of determining reliability of the evolving technique to the members of the scientific community from which the new method emerges."²⁶ In 1994, the

²⁰ FED. R. EVID. 702.

²¹ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 113 S. Ct. 2786, 2795 (1993).

²² *Id.* at 2795-96.

²³ Edward J. Imwinkelried, *The Daubert Decision: Frye Is Dead, Long Live the Federal Rules of Evidence*, 29 TRIAL 60, 64 (Sept. 1993).

²⁴ *Kelly*, 549 P.2d 1240.

²⁵ *Id.* at 1244.

²⁶ *Id.*

court reaffirmed its commitment to the general-acceptance test in *People v. Leahy*.²⁷ The court adamantly refused to embrace the *Daubert* test.

While *Leahy* ruled that the controlling standard in California state court is still the general-acceptance test, the court modified—and arguably liberalized—the test in an important respect. The court acknowledged that some critics of the *Frye* test have charged that the test reduces the trial judge's determination to a crude "nose count."²⁸ The court made it clear, however, that it did not want trial judges to administer the test in that fashion. Rather, the court declared that "trial courts, in determining the general acceptance issue, must consider the quality, as well as quantity, of the evidence supporting or opposing a new scientific technique. Mere numerical majority support or opposition by persons minimally qualified to state an authoritative opinion is of little value."²⁹ The court instructed trial judges to attach greater weight to the views of the "major voices" in the specialty field.³⁰

Prior to *Leahy*, several intermediate appellate courts in California had ruled DNA testimony inadmissible.³¹ However, seizing upon the language in *Leahy*, several lower California courts already have ruled that DNA evidence is now admissible in that jurisdiction.³² (Those rulings might well have influenced the *Simpson* defense team's decision to stipulate initially to the admission of the DNA test results in that case.) As a practical matter, *Leahy* has relaxed the admissibility standard in California. The lower courts are reading *Leahy* as a signal that they are free to admit testimony about a scientific theory or technique even in the face of numerically substantial opposition to that theory or technique—so long as the opponents can be characterized as mavericks rather than "major voices" in

²⁷ 882 P.2d 321 (Cal. 1994).

²⁸ *Id.* at 330.

²⁹ *Id.* at 336-37.

³⁰ *Id.*

³¹ *E.g.*, *People v. Barney*, 10 Cal. Rptr. 2d 731 (Cal. Ct. App. 1992).

³² *People v. Taylor*, 40 Cal. Rptr. 2d 132 (Cal. Ct. App. 1995); *People v. Marlow*, 39 Cal. App. 4th 343, 41 Cal. Rptr. 2d 5 (Cal. Ct. App.), *superseded by grant of review*, 899 P.2d 65 (Cal. 1995); *People v. Wilds*, 37 Cal. Rptr. 2d 351 (Cal. Ct. App.), *superseded by grant of review*, 890 P.2d 1115 (Cal. 1995); *People v. Soto*, 35 Cal. Rptr. 2d 846 (Cal. Ct. App. 1994), *superseded by grant of review*, 890 P.2d 1115 (Cal. 1995).

the mainstream of the discipline.

In the words of Judge Alex Kozinski, decisions such as *Daubert* propel the legal system into a brave new world.³³ *Daubert* certainly thrusts trial judges into a new world. Justice Blackmun's opinion directs trial judges to eschew surrogates and apply scientific standards in determining the admissibility of proffered expert testimony.³⁴ In deciding whether to admit the testimony, trial judges must use the same standards scientists employ in evaluating the empirical validation of the underlying theory or technique.³⁵ If the expert's hypothesis does not lend itself to empirical testing, a scientist would not accept the hypothesis, and under *Daubert*, neither should a trial judge permit the introduction of testimony about the hypothesis.³⁶ Similarly, when the expert has not gone to the length of engaging in experimentation or observation to test the hypothesis, a scientist would not regard the hypothesis as validated; and a trial judge should refuse to allow testimony about the hypothesis to be submitted to the jury.³⁷ Shortly after the rendition of the *Daubert* decision, the Federal Judicial Center released the *Reference Manual on Scientific Evidence*.³⁸ The manual's chapters review the rudiments of such scientific specialties as DNA testing,³⁹ epidemiology,⁴⁰ statistical analysis,⁴¹ and toxicology.⁴² As the Introduction written by Judge William W. Schwarzer explains, the Center concluded that trial judges needed such a manual because the *Daubert* "standard demands an understanding by judges of the principles and methods that underlie scientific studies."⁴³

Like judges, jurors are being thrust into Judge Alex

³³ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 43 F.3d 1311, 1315 (9th Cir.), cert. denied, 116 S. Ct. 189 (1995).

³⁴ Bert Black, *The Supreme Court's View of Science: Has Daubert Exorcised the Certainty Demon?*, 15 CARDOZO L. REV. 2129 (1994).

³⁵ Black, *supra* note 34, at 2131.

³⁶ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 113 S. Ct. 2786, 2796-97 (1993).

³⁷ *Id.*

³⁸ FED. JUD. CTR., *REFERENCE MANUAL ON SCIENTIFIC EVIDENCE* (1994) (hereinafter "REFERENCE MANUAL").

³⁹ *Id.* at 273.

⁴⁰ *Id.* at 121.

⁴¹ *Id.* at 331.

⁴² *Id.* at 181.

⁴³ REFERENCE MANUAL, *supra* note 38, at 2.

Kozinski's brave new world.⁴⁴ By liberalizing admissibility standards, decisions such as *Daubert* and *Leahy* shift the focus to the question of the weight of the scientific testimony.⁴⁵ To attack the weight of scientific testimony, the opponent can proffer studies documenting weaknesses in the underlying technique⁴⁶ or the analyst's incompetence in applying the technique.⁴⁷ In its highly publicized 1992 report on DNA evidence, the National Research Council ("N.R.C.") urged that proficiency studies of DNA laboratories be conducted⁴⁸ and that laboratory error rates be disclosed to the jury.⁴⁹ Citing the N.R.C. report, the *Simpson* defense team argued that the jurors in that case should be informed of the studies "estimat[ing] frequency of laboratory errors that might cause a false match between samples from different people."⁵⁰

It is evident that in the future, scientific research studies can play an important role in both judges' admissibility decisions and jurors' determinations of the weight of scientific testimony. However, two other things have become painfully clear in the past few years. First, most judges and attorneys do not appreciate the distinctions among the various types of scientific studies. Second, and worse still, they do not yet realize that there are differing evidentiary hurdles to the introduction of the various types of studies.

Numerous types of scientific research studies can become relevant at trial.⁵¹ Unfortunately no universally accepted ter-

⁴⁴ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 43 F.3d 1311, 1315 (9th Cir.), cert. denied, 116 S. Ct. 189 (1995).

⁴⁵ Edward J. Imwinkelried, *A New Era in the Evolution of Scientific Evidence—A Primer on Evaluating the Weight of Scientific Evidence*, 23 WLM. & MARY L. REV. 261 (1981).

⁴⁶ EDWARD J. IMWINKELRIED, *THE METHODS OF ATTACKING SCIENTIFIC EVIDENCE* § 10-6 (2d ed. 1992).

⁴⁷ *Id.* at Ch. 12.

⁴⁸ COMM. ON DNA TECHNOLOGY IN FORENSIC SCIENCE, NTL RESEARCH COUNCIL, *DNA TECHNOLOGY IN FORENSIC SCIENCE* S-14, S-15, 2-5, 3-23 (1992).

⁴⁹ *Id.* at 3-17, 3-25.

⁵⁰ Notice of Objections to Testimony Concerning DNA Evidence and Memorandum in Support Thereof, *People v. Simpson*, Case No. BA 097211, 1995 WL 126286 at *9 (Super. Ct., L.A. County, March 20, 1995).

⁵¹ The terminology for describing the various types of studies is not particularly well settled. See Bert Black, *A Unified Theory of Scientific Evidence*, 56 *FORDHAM L. REV.* 595, 599, 612 (1988). However, one leading commentator, Professor Paul C. Giannelli, states:

Although courts use the term "validity" and "reliability" interchangeably,

minology describes the various types of studies.⁵² Consequently, we must heed Voltaire's imperative and first "define [our] terms."⁵³ In particular, we need to define a validity study and a proficiency study for purposes of this Article.

A validity study is designed to measure the accuracy of a scientific technique.⁵⁴ The study attempts to identify and quantify the inherent margin of error in the technique;⁵⁵ the researcher inquires how often the technique will yield inaccurate results even when the analyst strictly follows proper test procedure. By way of example, suppose that the hypothesis is that a new type of breathalyzer validly measures a person's blood alcohol concentration ("BAC"). The researcher could test that hypothesis by using the instrument to gauge the BAC of a number of persons who had consumed alcohol and comparing

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.

Paul C. Giannelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later*, 80 COLUM. L. REV. 1197, 1201 n. 20 (1980). As Professor Giannelli uses the term "reliability," a reliability study is designed to assess consistency. If the objective were to measure a particular analyst's consistency, the study would require the analyst to repeat essentially identical forensic tasks, and the researcher would gauge the probability that the analyst would reach the same findings. If the objective were to measure interanalyst consistency, the study would require different analysts to perform the same forensic tasks, and the researcher would measure the probability that the various analysts would reach the same findings. An interanalyst reliability study could be highly relevant in a professional negligence action. Assume, for instance, that the plaintiff filed an action against a laboratory for alleged negligence in conducting a test. The plaintiff introduces the testimony of an analyst from another laboratory who retested the sample and arrived at diametrically opposed findings. The defending laboratory might even concede that its test outcome was in error but argue that they were nevertheless not guilty of negligence. To support their argument, they might proffer an interanalyst reliability study indicating that even the state-of-the-art scientific technique which they used can produce inconsistent results in the hands of equally well-qualified, meticulous analysts.

⁵² Black, *supra* note 51, at 599, 612; James E. Starrs, *Frye v. United States Restructured and Revitalized: A Proposal to Amend Federal Evidence Rule 702*, 26 JURIMETRICS 249, 255-58 (1986).

⁵³ Quoted in THE HOME BOOK OF QUOTATIONS: CLASSICAL AND MODERN 428 (10th ed. 1967).

⁵⁴ Giannelli, *supra* note 51.

⁵⁵ Edward J. Imwinkelried, *Judge Versus Jury: Who Should Decide Questions of Preliminary Facts Conditioning the Admissibility of Scientific Evidence?*, 25 WM. & MARY L. REV. 577, 601 (1984).

the instrument's readouts with direct blood tests of the same persons. Since direct blood testing has already been established as a valid method of measuring BAC,⁶⁵ a coincidence between the readings and the direct blood test results would tend to verify the hypothesis. However, the readings might disagree with the direct blood alcohol test results to an extent. The degree of disagreement would indicate how frequently the new technique yields inaccurate results⁶⁷ even when the analyst follows correct test procedures.

A proficiency study is radically different. While a validity study tests a scientific technique, in a proficiency study the object of the test is a particular analyst or laboratory. The validity test is designed to ensure to the extent possible that correct test procedures are used; in a validity test, the researchers attempt to eliminate any concern about the use of a proper test procedure because they want to reach the central question of how often the scientific technique itself will produce inaccurate results despite proper test protocol. In contrast, a proficiency study endeavors to measure the analyst's proficiency in the sense of the probability that he or she will consistently use proper test procedure. Assuming the validity of the technique, the researcher inquires into the probability that while using the technique, the analyst will "mistakenly use[] the wrong materials [or] ma[k]e the wrong measurement. . . ." ⁶⁸ Even when the analyst is utilizing a valid technique, the analyst might commit a "performance-type error[]". ⁶⁹

The thesis of this Article is that validity and proficiency studies differ both in their scientific nature and their evidentiary admissibility. The post-*Daubert* commentary has generally recognized that judges and juries must now learn to come to grips with scientific studies.⁶⁰ The commentary has overlooked, however, both the distinction between these types of studies and the evidentiary issues which they pose. The NRC's report urged the admission of testimony about proficiency

⁶⁵ 2 PAUL C. GIANNELLI & EDWARD J. LWINKELRIED, *SCIENTIFIC EVIDENCE*, at § 22-3(B), at 205-07 (2d ed. 1993).

⁶⁷ Black, *supra* note 51, at 637-38.

⁶⁸ Black, et al., *supra* note 11, at 775.

⁶⁹ Black, et al., *supra* note 11, at 775.

⁶⁰ See *supra* note 44 and accompanying text.

studies without a glimmer of recognition that there might be serious evidentiary hurdles to the admission of the testimony.⁶¹ For that matter, in the *Simpson* case, testimony about proficiency studies was elicited without objection. The implicit assumption seems to be that these studies are so highly probative in *Daubert's* brave new world that to paraphrase Mr. Bumble, it would be asinine and idiotic to bar testimony about such studies.

On closer scrutiny, though, it develops that there are substantial, potential evidentiary objections to be made. Part I of this Article is devoted to validity studies. After describing the nature of validity studies, this Part discusses the application of the hearsay rule and the character evidence prohibition to the introduction of testimony about such studies. This Part concludes that although the character evidence prohibition should not bar the introduction of the testimony, in many cases the hearsay rule will have precisely that effect. Part II turns to proficiency studies. As in the case of validity studies, this Part initially describes the essential methodology of proficiency studies. Part II then analyzes their admissibility in terms of the same exclusionary rules discussed in Part I, namely, hearsay and character. This Part demonstrates that in an evidentiary sense, proficiency studies are the mirror image of validity studies; although the hearsay rule will rarely block the admission of testimony about a proficiency study, in some instances the character-evidence prohibition will prove to be an insuperable barrier to admission. Again, there appears to be consensus that judges and juries need the benefit of these studies to cope with scientific evidence in *Daubert's* brave new world. The Conclusion therefore calls for revising the hearsay and character doctrines.

I. VALIDITY STUDIES

A. *The Scientific Nature of a Validity Study*

As noted above, no universally accepted terms of art describe the various types of scientific studies.⁶² For that mat-

⁶¹ See *supra* notes 48-49 and accompanying text.

⁶² See *supra* note 52 and accompanying text.

ter, a particular scientific research project can be designed to pursue several different objectives. As the terminology is employed in this Article, however, in a validity study, the researchers' objective is to assess the accuracy of a scientific technique.⁶³ If properly used, does the technique accurately measure "what it is supposed to measure"?⁶⁴

What is the logical relevance of a validity study at trial? To answer that question, we must consider the typical structure of a scientist's direct examination. In most cases, the structure is syllogistic.⁶⁵ Consider, for example, a case such as the *Simpson* prosecution in which the government offers DNA evidence. After qualifying an expert in molecular biology, the direct examiner usually organizes the balance of the scientist's testimony along the lines of a syllogism. The expert's major premise would be that when the DNA fragments on two autoradiograms are of the same length and in the same position, the match indicates that the sources of the two samples share certain DNA markers.⁶⁶ The expert's minor premise is the case-specific information. When the scientific testimony is a DNA analysis, the minor premise would be testimony about the two autoradiograms in the case. When the expert applies the major premise to the minor, the result is a conclusion, an opinion relevant to material facts of consequence in the pending case. If the DNA bands on the two autorads matched, the expert would opine that the sources of the two samples had at least those DNA markers in common.

This syllogistic model holds true for "soft" mental-health testimony as well as "hard" instrumental scientific techniques such as DNA analysis. Assume, for instance, that a psychiatrist contemplated testifying that a particular individual was mentally incompetent. After testifying to her credentials, the

⁶³ Giannelli, *supra* note 51. See also Annot. Daniel A. Klein, *Reliability of Scientific Technique and Its Acceptance Within Scientific Community, as Affecting Admissibility, at Federal Trial, of Expert Testimony as to Result of Test or Study Based on Such Technique—Modern Cases*, 105 A.L.R. FED. 299, 319 (1991) ("experiments to verify the accuracy of [the] technique").

⁶⁴ Giannelli, *supra* note 51.

⁶⁵ Edward J. Imwinkelried, *The Educational Significance of the Syllogistic Structure of Expert Testimony*, 87 NW. U. L. REV. 1148 (1993); Edward J. Imwinkelried, *The "Bases" of Expert Testimony: The Syllogistic Structure of Scientific Testimony*, 67 N.C. L. REV. 1 (1988).

⁶⁶ 2 GIANNELLI & IMWINKELRIED, *supra* note 56, at 1-39.

expert would state her major premise. The premise would be a theory about symptomatology: If a person displays symptoms *A* and *B*, they suffer from mental illness *C*. The minor premise would be case-specific information about the symptoms displayed by the individual in question. The expert might rely on reports from a treating physician and family members. When the expert applies the major premise to the minor, again the application will yield a conclusion or opinion relevant to the competency dispute.

This model enables us to identify the logical relevance of a validity study. The study relates directly to the scientist's major premise. In the case of DNA analysis, the hypothesis is that when the DNA fragments on two autoradiograms match, the match indicates identical DNA markers. A validity investigation of that hypothesis would attempt to establish the probability that matching fragments accurately indicate matching DNA markers. In the case of mental-health testimony, the hypothesis is that the presence of symptoms *A* and *B* in the patient's case history indicates that the patient suffers from mental illness *C*. In a validity study of that hypothesis, the researcher would endeavor to identify the probability that the concurrence of symptoms *A* and *B* accurately predicts the existence of mental disorder *C*.

When the focus is on the expert's major premise, neither the expert's proponent nor the opponent should be limited to validity studies personally conducted by the testifying expert. In this context, the issue is the validity of the theory, not the competence of the testifying expert. Even if the expert is competent, the theory or technique can suffer from an inherent margin of error. To assess the validity of the technique used by the testifying expert, it would also be pertinent to consider studies conducted by other scientists. In the scientific tradition, after conducting a validity study, the scientist publishes his or her findings to enable other scientists to replicate the experiment.⁶⁷ Indeed, in many cases, the testifying expert personally has not conducted any validity study; rather, he or she

⁶⁷ ERNEST E. SNYDER, *HISTORY OF THE PHYSICAL SCIENCES* 38-39 (1969); André A. Moenssens, *Admissibility of Scientific Evidence—An Alternative to the Frye Rule*, 25 WM. & MARY L. REV. 545, 556 (1984); James W. Osterburg, *The Scientific Method and Criminal Investigation*, 9 J. POL. SCI. ADMIN. 135 (1981).

is simply relying on earlier studies—studies which are perhaps decades old—that validate the hypothesis upon which he or she is relying. The question is the validity of the theory or technique; and whether the study is conducted by the testifying expert or a third party, a validity study sheds light on that question. In this respect, a validity study differs fundamentally from a proficiency study. The whole point of the latter study is to assess the competence of a particular analyst or laboratory; the performance of another analyst or laboratory under even the same conditions does not answer the question of how proficient *this* analyst or laboratory is.

The two types of studies differ in a further respect. In a validity study, the researcher is comparing the results of properly using the proposed technique with the results yielded by properly using an already validated methodology. Suppose, for example, that the question is the validity of a new drug identification technique.⁶⁸ The researcher would employ the new technique to test a number of samples and then compare those test results with results generated by an established methodology such as gas chromatography/mass spectrometry (“GC/MS”).⁶⁹ GC/MS is the “gold standard” in drug identification technology.⁷⁰ In a validity test, the essential terms of the comparison are the results yielded by proper use of the new technique with the results generated by using a proven technique. In contrast, a proficiency test involves a different comparison. Now the question is the probability that a particular analyst or laboratory uses a particular technique properly. To do so, the researcher compares test results generated by a laboratory correctly using the procedure with results reported by the laboratory whose proficiency is being investigated.

The two types of studies differ in still another respect. If the researcher administers a series of proficiency tests to the same analyst or laboratory to chart their proficiency over time, on each occasion the test conditions should be identical. Otherwise, the researcher is comparing apples and oranges. In contrast, although all the validity studies testing a particular

⁶⁸ 2 GIANNELLI & IMWINKELRIED, *supra* note 56, at 271-339.

⁶⁹ 2 GIANNELLI & IMWINKELRIED, *supra* note 56, at 313-19.

⁷⁰ David J. Greenblatt, *Urine Drug Testing: What Does it Test?*, 23 NEW ENG. L. REV. 651, 655 (1988-89).

scientific technique will control for the same basic variables, the test conditions can and should vary. More specifically, as the validity studies progress, test conditions should become more and more severe.⁷¹ "The more severe and more diverse the experiments that fail to falsify an . . . hypothesis, the more corroborated . . . it becomes."⁷² Hence, a pertinent validity study might not only have been performed by a third party other than the testifying witness; the study might also have been conducted under somewhat different test conditions.⁷³

B. *The Evidentiary Status of a Validity Study*

The expert's major premise is obviously an essential component of his or her reasoning process. If so, the litigants on both sides might have occasion to proffer testimony about a validity study to the judge or jury. Do the technical exclusionary rules of evidence such as hearsay and character apply at this juncture in the trial? If so, can the litigants overcome hearsay and character objections to the introduction of testimony about validity studies?

1. The Applicability of Exclusionary Rules of Evidence

At this point, a reader familiar with the Federal Rules of Evidence might wonder whether this question is much ado about nothing. After all, the last sentence of Federal Rule of Evidence 104(a), governing the trial judge's determination of most foundational or preliminary facts, reads: "In making its determination [the court] is not bound by the rules of evidence except those with respect to privileges."⁷⁴ The courts have squarely held that this language renders exclusionary rules such as hearsay inapplicable to foundational testimony.⁷⁵

Although Federal Rule of Evidence 104(a) does contain that provision, that provision does not reduce this question to a non-issue. To begin with, many jurisdictions do not follow the

⁷¹ Black et al., *supra* note 11, at 762-63.

⁷² Black et al., *supra* note 11, at 783.

⁷³ Black et al., *supra* note 11, at 762-63, 784.

⁷⁴ FED. R. EVID. 104.

⁷⁵ *State v. Cardone*, 368 A.2d 952, 954-55 (N.J. Super. Ct. App. Div. 1976), *cert. denied*, 379 A.2d 234 (N.J. 1977).

rule stated in the last sentence of Rule 104(a). In these jurisdictions, the exclusionary rules apply even to foundational testimony submitted to the judge when the judge makes admissibility determinations outside the jury's presence.⁷⁶ Furthermore, even when a jurisdiction follows the practice codified in the last sentence of Rule 104(a), that sentence has a limited effect. The sentence authorizes the litigant to submit technically inadmissible information to the judge when the judge is passing on an admissibility question. The sentence does not even purport to authorize exposing the jury to such information during the trial on the merits. If a litigant wants to present technically inadmissible information about a validity study to the jury to influence the jury's evaluation of the weight of scientific testimony, the litigant cannot cite to Rule 104(a).

2. Compliance with the Hearsay and Character Exclusionary Rules

Assuming that the litigant must satisfy the technical exclusionary rules, there are two potential objections to the admission of testimony about a validity study: the character evidence prohibition and the hearsay rule.

a. *The character evidence prohibition*

The character evidence prohibition is codified in Federal Rules of Evidence 404 and 405.⁷⁷ Rule 404(b) announces that "[e]vidence of . . . acts [other than those alleged in the pleadings] is not admissible to prove the character of a person in order to show that he acted in conformity therewith."⁷⁸ The rule prohibits the proponent from introducing evidence of a person's other acts to prove his or her character and, in turn, using the person's character as circumstantial proof of conduct.⁷⁹ The thrust of the prohibition is that the proponent cannot simplistically reason, "He did it once, therefore he did it again."⁸⁰ Rule 405(a), however, lifts the character evidence

⁷⁶ EDWARD J. IMWINKELRIED ET. AL. CALIFORNIA EVIDENTIARY FOUNDATIONS 4 (2d ed. 1994).

⁷⁷ FED. R. EVID. 404-05.

⁷⁸ FED. R. EVID. 404.

⁷⁹ CARLSON, *supra* note 13, at 451-52.

⁸⁰ EDWARD J. IMWINKELRIED, UNCHARGED MISCONDUCT EVIDENCE §§ 1:03, 2:18

ban when the person's character itself becomes "an essential element" in dispute at trial.⁸¹ Suppose that when the proponent attempts to present the jury with testimony about a validity study conducted by the testifying witness, the opponent objects on character evidence grounds. The opponent argues that the ultimate issue is whether the expert erred in performing the test conducted in the case and a prior validity study is logically relevant only on a forbidden character-reasoning theory—"He was right (or wrong) before, therefore he was right (or wrong) again."

At first blush, that objection might have some appeal. In the final analysis, however, it is spurious. The character evidence prohibition comes into play when a person's character is used as circumstantial proof of the person's conduct on a particular occasion, usually an event such as an accident or crime mentioned in the pleadings. When the proponent proffers a validity study, however, the proponent is not offering the study to prove the analyst's conduct on any occasion. Instead, the focus is the validity of the scientific technique used by the analyst. Even if the analyst dotted every *i* and crossed every *t*, the test result might be inaccurate due to the inherent margin of error in the technique; but in that event, the analyst's conduct is not the cause of the inaccuracy of the analyst's ultimate conclusion.

The situation is akin to cases in which character itself is an essential element. Validity testing is "not a simple pass-fail"⁸² or "black and white proposition."⁸³ The validation process has "a fundamentally mathematical dimension."⁸⁴ Validation is "probabilistic, rather than categorical. The experimental process may disclose a margin of error reflecting the percentage of cases in which [even] a qualified, careful analyst [properly] employing the technique will reach an incorrect conclusion."⁸⁵ Since validation is inherently probabilistic, the trier of

(1984).

⁸¹ FED. R. EVID. 405.

⁸² Black, et al., *supra* note 11, at 762.

⁸³ Black, et al., *supra* note 11, at 785.

⁸⁴ B.J. George, Jr., *Statistical Problems Relating to Scientific Evidence in SCIENTIFIC AND EXPERT EVIDENCE* 105, 118 (Edward J. Imwinkelried ed., 2d ed. 1981).

⁸⁵ Imwinkelried, *supra* note 55, at 602.

fact needs to know the probability that the technique will perform accurately. Ascertaining that probability is the whole point of a validation study.

In this regard, the distinction between a validation and proficiency study is akin to the difference between a negligent manufacture action and a strict product liability case. In the former, the question is whether, in the course of fabricating a particular product, the defendant manufacturer was guilty of negligence. When the plaintiff offers testimony about the defendant's other negligently manufactured goods, the plaintiff is using the other negligent acts to support an inference as to the defendant's conduct on the occasion alleged in the complaint. In effect, the plaintiff says, "The defendant did it before, therefore he did it again"—the paradigm of the reasoning forbidden by the character prohibition. Suppose, however, that the plaintiff offers testimony about similar accidents involving identically designed automobiles or heaters in a strict product liability action. The character prohibition is arguably inapposite; in this setting, "the focus is on the qualities or properties of a nonperson, usually some kind of physical object. Was a steering wheel's design dangerously defective? To prove the quality of the object, the plaintiff may attempt to introduce evidence of other accidents involving the same or similar objects."⁸⁶ without running afoul of the spirit of the prohibition. In sum, if the opponent raises a character evidence objection to testimony about a validity study, the trial judge should overrule the objection.

b. *The hearsay rule*

Federal Rule of Evidence 802 announces a general rule that hearsay is inadmissible "except as provided by these rules."⁸⁷ Rule 801 supplies the definition of hearsay. At the risk of oversimplification, the statutory definition includes assertive statements and acts⁸⁸ which were made or performed by out-of-court declarants⁸⁹ and which are offered at trial to

⁸⁶ IMWINKELRIED, ET AL., *supra* note 76, at 200.

⁸⁷ FED. R. EVID. 802.

⁸⁸ FED. R. EVID. 801(a).

⁸⁹ FED. R. EVID. 801(b).

prove the truth of the assertion.⁹⁰

Assume initially that the jurisdiction in question applies the hearsay rule even to foundational testimony submitted to the judge ruling on the admissibility of proffered scientific evidence. In the face of the hearsay rule, could the judge consider testimony about a validity study which the testifying expert has not personally conducted?

In a *Frye* jurisdiction such as California, at the admissibility stage the proponent can arguably offer at least part of the study for a nonhearsay purpose.⁹¹ One of the assumptions underlying *Frye* is that even trial judges are incompetent to pass directly on the question of scientific merit.⁹² If the judge finds that the experts disagree sharply over the question of the validity of a scientific theory or technique, the judge is not supposed to determine which position is correct; under *Frye*, the judge does not resolve the battle of the experts.⁹³ When the judge finds that there is a substantial controversy, the judge must exclude the testimony; the mere existence of the controversy precludes finding the general acceptance required by *Frye*.⁹⁴ In that light, the proponent can argue that the passages in the study reflecting the expert's acceptance of the theory or technique are logically relevant for a nonhearsay purpose.⁹⁵ The mere fact that an expert says he or she subscribes to the theory is some evidence of general acceptance, just as their statement that they rejected the theory would be some evidence of controversy.

The best analogy is to the operative fact or verbal act doctrine in contract cases. It is well settled that the statements constituting an offer and acceptance are admissible over a hearsay objection in a contract action. Under the objective theory of mutual assent, it is immaterial whether the defendant meant what he said when he uttered the purported offer or acceptance. So long as the defendant's external manifestation of intention matches the plaintiff's, there is a contract. . . . There is a strong parallel between the *Frye* test and

⁹⁰ FED. R. EVID. 801(c).

⁹¹ Edward J. Imwinkelried, *Forensic Science: Role of the Hearsay Doctrine in Litigating Frye Challenges to the Admissibility of Scientific Evidence*, 29 CRIM. L. BULL. 158 (Mar.-Apr. 1993).

⁹² *Id.* at 162-63.

⁹³ *Id.* at 163.

⁹⁴ *Id.*

⁹⁵ *State v. Cary*, 239 A.2d 680, 684 (N.J. Super. Ct. Law Div. 1968).

the objective theory of mutual assent. [U]nder the *Frye* test, the fact that the experts' statements match or do not match is relevant even if the statements are incorrect. If the experts say differing things about the validity of the scientific theory or technique, the difference tends to show a controversy that is the antithesis of general acceptance.⁹⁶

Although this nonhearsay theory enjoys some support in the case law,⁹⁷ the theory has limited utility in the present context. To begin with, this theory is unavailable in a *Daubert* jurisdiction; in such a jurisdiction, general acceptance is no longer in issue even at the admissibility hearing. Moreover, even in a *Frye* jurisdiction, the logic of the theory applies only to the passages in the validity study indicating whether or not the expert accepts the theory being tested; the logic does not extend to the passages summarizing the empirical research and quantifying the margin of error. Finally, the theory can operate legitimately only at the *Frye* hearing out of the jury's presence. It is for the judge to decide admissibility under the general acceptance standard; but once the judge rules in favor of admitting the evidence, general acceptance is no longer in issue—the only issue for the jury is the question of whether the theory or technique is in fact valid. If at the trial on the merits the litigant offers an assertive statement that the technique is valid to prove that the technique is valid in fact, the statement is undeniably being used for a hearsay purpose.

In some jurisdictions, a second nonhearsay theory might be tenable at the trial on the merits. Many jurisdictions permit the cross-examiner to confront the expert with passages from texts which appear to contradict the expert's position.⁹⁸ These courts permit questioning about contradictory passages at least when the testifying expert consulted the text in the process of forming his or her opinion.⁹⁹ While this use of scientific texts is widespread, this theory also has limited utility. The courts sanctioning this practice uniformly state that the cross-examiner is permitted to resort to the contradictory text in order to

⁹⁶ Imwinkelried, *supra* note 91, at 163.

⁹⁷ *Cary*, 239 A.2d at 684.

⁹⁸ EDWARD J. IMWINKELRIED, *THE METHODS OF ATTACKING SCIENTIFIC EVIDENCE* § 4-4(B), at 95-98 (2d ed. 1992).

⁹⁹ *Id.*

impeach the testifying expert's credibility.¹⁰⁰ The passage in the text is not admitted as substantive proof of the truth of the assertions in the passage. California Evidence Code section 721 expressly authorizes cross-examiners to use this impeachment technique,¹⁰¹ but the official California Revision Commission Comment to section 721 adds that "the court [is] required upon request to caution the jury that the statements read are not to be considered evidence of the truth of the propositions stated."¹⁰² Thus, the litigant cannot rely on this theory when he or she wants to use passages in a text documenting a validity study to establish that a particular scientific theory or technique is indeed valid. If the litigant wants to establish the validity of the theory or technique, the litigant must ordinarily turn to the learned-treatise hearsay exception.¹⁰³ That is the only exception powerful enough to permit the litigant to bring in passages in an out-of-court validity study as substantive proof on the validity issue.¹⁰⁴ That theory has constrained parameters, however.¹⁰⁵

Federal Rule of Evidence 803(18) represents one of the more liberal versions of the learned-treatise exception.¹⁰⁶

¹⁰⁰ *Id.* at 95.

¹⁰¹ CAL. EVID. CODE § 721.

¹⁰² PARKER'S EVIDENCE CODE OF CALIFORNIA 88 (1985).

¹⁰³ The business-entry exception, codified in Federal Rule of Evidence 803(6), is usually inapplicable. That exception comes into play when a business's employee gains personal knowledge of a fact and, in the regular course of business, prepares a record documenting that fact. With some exceptions, the person with first-hand knowledge of the fact must be an employee of the business. See generally EDWARD J. IMWINKELRIED, ET. AL., COURTROOM CRIMINAL EVIDENCE § 1220 (2d ed. 1993). On rare occasions, a validity study will fall within the ambit of this exception. Suppose, for example, that the researcher is on the faculty of the University of California and the *University of California Press* publishes the report detailing the study. In most cases, the researcher with personal knowledge of the study has no formal business relationship with the entity publishing the study. If the study appears in book form, the publisher might be a private commercial entity or the press affiliated with another university. When the study appears in a technical journal, the researcher typically has no formal agency relationship with the journal; the researcher simply submits an article documenting the validity study to the journal, and the journal then decides whether to publish the article.

¹⁰⁴ Edward J. Imwinkelried, *A Comparativist Critique of the Interface Between Hearsay and Expert Opinion in American Evidence Law*, 33 B.C. L. REV. 1, 15 (1991).

¹⁰⁵ *Id.* at 15-16.

¹⁰⁶ Edward J. Imwinkelried, *The Use of Learned Scientific Treatises Under Federal Rule of Evidence 803(18)*, 18 TRIAL 56 (Feb. 1982).

Even that version is crabbed, however. By its terms, the rule refers only to "treatises, periodicals, or pamphlets."¹⁰⁷ The common denominator of those three terms is that they all denote published, written material. It would strain that language beyond the breaking point to extend the statute to justify a witness's reference to another expert's research which had not yet been reduced to writing. Furthermore, the statute expressly states that the material must be "published."¹⁰⁸ Arguably, it would not even suffice if the article were in written form but still "in press." Worse still, many states recognize a version of the exception narrower than that set out in Rule 803(18). For example, some jurisdictions limit the scope of the exception to passages in "authoritative" works.¹⁰⁹ Some states are even more restrictive; even if the work itself is a "standard" one,¹¹⁰ the specific passage in question must state a fact "of general notoriety."¹¹¹ As a practical matter, this restriction limits the exception to judicially noticeable facts.¹¹² The upshot is that while testimony about a validity study can pass muster under the character evidence prohibition, in many cases the testimony would be excludable as incompetent hearsay. It is true that when litigators adduce testimony about validity studies, more often than not they overlook the hearsay problem.¹¹³ However, if the opponent is acute enough to raise a hearsay objection, and the trial judge applies hearsay doctrine rigorously, the judge frequently will be obliged to sustain the objection.

¹⁰⁷ FED. R. EVID. 803(18).

¹⁰⁸ *Id.*

¹⁰⁹ W. Brown Morton, Jr., *Recent Development, Medical Treatises to be Admitted as Direct Evidence in Wisconsin—Lewandowski v. Preferred Risk Mutual Ins. Co.*, 66 MICH. L. REV. 183, 183 (1967).

¹¹⁰ *Notes Learned Treatises*, 46 IOWA L. REV. 463, 466 (1961).

¹¹¹ CAL. EVID. CODE § 1341.

¹¹² 1 BERNARD JEFFERSON, CALIFORNIA EVIDENCE BENCHBOOK § 18.7, at 435 (2d ed. 1982); IMWINKELRIED ET AL., *supra* note 76 at 310; *People v. Conrad*, 107 Cal. Rptr. 421, 430 n. 9 (Cal. Ct. App. 1973).

¹¹³ Imwinkelried, *supra* note 107, at 16.

II. PROFICIENCY STUDIES

A. *The Scientific Nature of a Proficiency Study*

At trial, what is the logical relevance of a proficiency study? As Part I explained, the scientist's trial testimony is syllogistic in structure.¹¹⁴ A validity study bears upon the expert's major premise, that is, the assumption of the soundness of the theory or technique upon which the expert relies. A proficiency study relates to a different component of the expert's reasoning process. After describing the theory or technique, the expert specifies the case-specific information to be analyzed and then applies the theory or technique to evaluate that information. At this juncture in the reasoning, the question becomes how probable it is that the expert properly applied the theory or technique in evaluating the case-specific information. The proficiency study bears on that probability. The theory or technique may yield some inaccurate conclusions even when the analyst correctly applies the technique. A validity study attempts to capture that built-in margin of error. A proficiency study addresses a fundamentally different question, namely, how often will the analyst apply the technique improperly.

As we have seen, validity and proficiency studies not only differ in their respective focal point, they also differ in several other respects. In a validity study, the basic comparison is between the results yielded by different scientific techniques. The researcher compares results yielded by the technique being tested with the results generated by a technique that already has been validated. If the researcher is interested in validating a new intoxication testing instrument, he or she could compare its readouts with the results from direct blood alcohol readings. Or if the researcher is investigating the validity of a new drug identification technique, he or she might compare the findings yielded by that technique with a GC/MS analysis. In a proficiency test, the researcher compares the performance of laboratories using exactly the same scientific technique.

¹¹⁴ See *supra* notes 65-67 and accompanying text.

The Crime Laboratory Proficiency Testing Research Program, conducted by the Law Enforcement Assistance Administration ("LEAA") during the 1970s, illustrates the point.¹¹⁵ Referee laboratories initially analyzed the samples and made certain that they employed proper test procedures.¹¹⁶ The researchers not only instructed the crime laboratories being evaluated to use the same, standardized procedures as the referee laboratories;¹¹⁷ they also carefully monitored the manufacture of the samples¹¹⁸ to ensure that all the samples sent to the participating laboratories were homogeneous.¹¹⁹ The researchers compared the findings by the referee laboratories with the findings reported by the crime laboratories being tested.¹²⁰ If the samples were homogeneous, the crime laboratories were directed to use the very same procedures as the referees; if those laboratories reached different findings than the referee laboratories, the difference would indicate that the laboratories being tested were not properly following the procedures.¹²¹ The thrust of this type of inquiry is assessing the competency and performance of the individual laboratory,¹²² not an evaluation of the validity of the scientific technique itself.

B. *The Evidentiary Status of a Proficiency Study*

Like the expert's major premise, the expert's application of that premise to the case-specific information is an integral element of the witness's reasoning process. The parties can have occasion to proffer testimony about a study of the validity of the theory or technique functioning as the major premise. They might also have occasion to proffer testimony about a study of the proficiency of the analyst or laboratory analyzing the case-specific information. Part I demonstrated that at least

¹¹⁵ JOSEPH L. PETERSON ET AL., CRIME LABORATORY PROFICIENCY TESTING RESEARCH PROGRAM (1978).

¹¹⁶ *Id.* at 15, 22, 38.

¹¹⁷ *Id.* at 7.

¹¹⁸ *Id.* at 28.

¹¹⁹ *Id.* at 26.

¹²⁰ PETERSON ET AL, *supra* note 115, at 1.

¹²¹ *Id.* at 23.

¹²² Report of California Association of Crime Laboratory Directors Blind Trial #2, March 29, 1990 (on file in Professor Imwinkelried's office).

when the parties contemplate presenting the testimony to the jury at the trial on the merits, they must comply with the technical exclusionary rules of evidence. Can the parties introduce such testimony over hearsay and character evidence objections?

1. Compliance with the Hearsay Rule

Unlike a validity study, a proficiency study ordinarily will be admissible over a hearsay objection. Consider, for example, a proficiency study conducted by a government agency such as the LEAA's Crime Laboratory Proficiency Testing Program.¹²³ The report summarizing the test results was prepared by LEAA officials. The report sets out findings by a referee and participating laboratories, compares the findings, and draws conclusions as to the competency of the participating laboratories. Upon a moment's reflection, it becomes clear that the admissibility of the LEAA report is a classic problem of double hearsay: the author of the report writes that employees of the referee and participating laboratories made certain assertions to the author. The first level of hearsay is the set of assertions by the LEAA officials.¹²⁴ That level of hearsay falls squarely within the official-record hearsay exception codified in Federal Rule of Evidence 803(8).¹²⁵ In the words of that statute, the LEAA employees' assertions are "matters observed pursuant to duty imposed by law as to which matters there was a duty to report . . ."¹²⁶ Those employees are *de jure* public officials, and they have firsthand, personal knowledge that the referee and participating laboratories submitted certain findings to them.

Of course, there is a second level of hearsay: the seeming assertions by the employees of the referee and participating laboratories. The admission of the statements by the referee laboratories can again be rationalized under the official-record hearsay exception. The referee laboratories are performing a task for the government agency conducting the proficiency test.

¹²³ PETERSON ET AL., *supra* note 115.

¹²⁴ FED. R. EVID. 801(a).

¹²⁵ FED. R. EVID. 803(8).

¹²⁶ *Id.*

If the agency had the requisite in-house expertise, the agency could have had its own employees perform the testing; but lacking in-house expertise, the agency delegates the testing to the employees of the referee laboratory. They are consequently acting as de facto public officials, and the official-record hearsay exception extends to statements by de facto as well as de jure officials.¹²⁷

Like the assertions by the referee laboratories, the statements by the participating laboratories are admissible over a hearsay objection, albeit on a different theory. Here the pertinent theory is that the statements are being used for a nonhearsay purpose. Under Federal Rule of Evidence 801(c), a statement constitutes hearsay only if its proponent offers it to prove the truth of the assertion contained in the statement.¹²⁸ In a proficiency study, the researcher is interested in the assertive findings by the participating laboratory which are presumably false—the findings at odds with the findings by the referee laboratory. Those findings indicate the extent of the participating laboratory's incompetence or lack of proficiency. The trier of fact is not being asked to assume that those findings by the participating laboratory are true; quite to the contrary, the trier is invited to assume that those findings are erroneous and then use those erroneous findings to evaluate the participating laboratory's performance level.¹²⁹ Given that gauge of the laboratory's capacity,¹³⁰ the trier can then make a more informed decision as to whether the laboratory followed proper test protocol in the instant case.

A similar analysis would obtain if the proficiency study were conducted by a private, nongovernmental laboratory. As in the case of a government proficiency test, there are two levels of hearsay, but both levels either fall within a recognized exception or are logically relevant on a nonhearsay theory.¹³¹ In this context, though, the proponent of the proficiency study would rely on the business-entry hearsay exception codified in

¹²⁷ 5 JOHN H. WIGMORE, EVIDENCE IN TRIALS AT COMMON LAW § 1633 (Chadbourn rev. 1974).

¹²⁸ FED. R. EVID. 801(a), (c).

¹²⁹ PETERSON ET AL., *supra* note 115, at 23.

¹³⁰ PETERSON ET AL., *supra* note 115, at 23.

¹³¹ FED. R. EVID. 805.

Federal Rule of Evidence 803(6).¹³² The first hearsay level is the set of assertions by the employees of the private laboratory conducting the proficiency test. Laboratories certainly qualify as regularly conducted business entities.¹³³ One of the activities commonly conducted by laboratories is proficiency testing. If the laboratory's employees possess the necessary expertise, they might personally conduct the referee testing.

Assume, though, the more difficult fact situation in which an outside referee laboratory performs that function and both the referee and participating laboratories submit their reports to the employees of the laboratory supervising the proficiency test. It is true that the laboratory's employees have personal knowledge of the contents of the reports submitted to them by the referee and participating laboratories. As in the case of the official-records hearsay exception, however, the reported findings by the referee and participating laboratories constitute a second level of hearsay. Can the proponent of the proficiency study surmount a hearsay objection aimed at that level, as he or she can when relying on the official-record exception?

Again, the answer is yes. To begin with, the assertive findings submitted by the referee laboratory will fall within the business-entry exception. If the laboratory conducting the proficiency test hires the referee laboratory, the latter laboratory owes the former laboratory a business duty to properly evaluate the samples. "It is unnecessary that the source of the information be a direct employee of the business . . ."¹³⁴ Rather, the test is the existence of a business duty.¹³⁵ So long as the person furnishing the information to the business does so pursuant to a business duty, the report is considered to have been generated by the business. Because the referee laboratory owes a business duty to the laboratory supervising the proficiency test, the business-entry exception applies to the employees of the referee laboratory. Their reports are therefore admissible as substantive evidence that the reported findings are correct.

¹³² FED. R. EVID. 803(6).

¹³³ Edward J. Imwinkelried, *The Constitutionality of Introducing Evaluative Laboratory Reports Against Criminal Defendants*, 30 HASTINGS L.J. 621, 624-26 (1979) (collecting cases).

¹³⁴ IMWINKELRIED ET AL., *supra* note 103, § 1220 at 339.

¹³⁵ IMWINKELRIED ET AL., *supra* note 103, § 1220 at 339.

For their part, the participating laboratories' reports are admissible as nonhearsay. The significant reports are those that disagree with the referee laboratory's findings. The referee laboratory's findings are presumably correct; and to the extent that the participating laboratory's findings disagree, the disagreement reflects adversely on the competency or proficiency of the participating laboratory. Its reports are most relevant when they are false and erroneous. In short, the analysis is analogous to the theory used to justify the admission of the results of public-opinion polls.¹³⁶ The laboratory is in the business of conducting proficiency tests in the same sense that a pollster is engaged in the business of conducting public-opinion surveys; and in both cases, the reports submitted to the business by outsiders—the laboratories being tested or the citizens being polled—can be treated as admissible nonhearsay.

2. Compliance with the Character Evidence Prohibition

In the case of validity studies, use of the potential character evidence objection is unsound. When we turn to proficiency studies, however, that objection looms much larger. The ultimate disposition of the objection turns on whether the proffer of a proficiency study triggers the general rule forbidding character reasoning and, if so, whether the proffer falls within any recognized exception to the general rule.

a. *The proffer of a proficiency study as character evidence*

Federal Rule of Evidence 404(b) announces a general rule that a litigant may not proffer "[e]vidence of other crimes, wrongs, or acts" by a person "to prove the character of [the] person in order [in turn] to show [the person's] action in conformity" with their character.¹³⁷ Does the proffer of a proficiency study implicate that rule? That query raises three subissues.

First, does a proficiency study amount to "[e]vidence of

¹³⁶ 1 MCCORMICK, EVIDENCE § 208, at 936-37 (4th ed. 1992).

¹³⁷ FED. R. EVID. 404(b).

other crimes, wrongs, or acts" within the meaning of that expression in Rule 404(b)? Two leading commentators have argued that as a matter of evidentiary policy, the scope of the character evidence prohibition should be limited to "morally tinged" conduct.¹³⁸ Proficiency studies document "performance-type errors."¹³⁹ Such errors, however, are hardly crimes; and after all, "[t]o err is human[.]"¹⁴⁰ Does evidence of such errors constitute proof of a "crime[], wrong[], or act[]"? That question must be answered in the affirmative.

The testimony constitutes "[e]vidence of [a] wrong[.]" In this context, an error can amount to an actionable civil wrong. The courts routinely entertain tort actions based on errors in laboratory analysis. For example, a test subject can maintain a negligence action against a drug testing laboratory which erroneously reports to the subject's employer that the subject uses illegal drugs.¹⁴¹ Libel law points to the same conclusion. It is not only libelous to assert that a businessperson is incompetent; it is libelous per se, that is, actionable without proof of special damage.¹⁴²

Furthermore, as a matter of statutory construction, it is difficult to embrace the argument that the character evidence prohibition should be limited to "morally tinged" conduct.¹⁴³ As a matter of policy, it makes sense to confine the prohibition to such conduct. One rationale for the prohibition is that the routine admission of evidence of a person's bad character would prejudice the trier of fact and tempt the trier to decide the case against the person in order to punish them for past misdeeds.¹⁴⁴ The risk of prejudice is minimal if the conduct in question is neither criminal nor tortious. Yet, Rule 404(b) ex-

¹³⁸ Paul Rothstein, *Intellectual Coherence in an Evidence Code*, 28 LOY. L.A. L. REV. 1259, 1265 (1995). See also Richard Kuhns, *The Propensity to Misunderstand the Character of Specific Acts Evidence*, 66 IOWA L. REV. 777 (1981).

¹³⁹ Black, et al., *supra* note 11, at 775.

¹⁴⁰ ALEXANDER POPE, PASTORAL POETRY AND AN ESSAY ON CRITICISM 297 (E. Audra & Aubrey Williams eds., 1961).

¹⁴¹ *Willis v. Roche Biomedical Laboratories, Inc.*, 21 F.3d 1368 (5th Cir. 1994), *substituted opinion*, No. Civ. A.H-91-2360 1995 U.S. App. LEXIS 20463 (5th Cir. 1995); *Stinson v. Physicians Immediate Care Ltd.*, 63 L.W. 2605 (Ill. App., Mar. 24, 1995).

¹⁴² WILLIAM L. PROSSER & W. PAGE KEETON, PROSSER AND KEETON ON THE LAW OF TORTS § 112, at 788-92 (5th ed. 1984).

¹⁴³ See *supra* note 138 and accompanying text.

¹⁴⁴ IMWINKELRIED, *supra* note 80, § 1:03.

pressly refers to "crimes, wrongs, or acts" in the alternative.¹⁴⁵ It is a well-settled maxim of statutory interpretation that courts should prefer a construction that gives effect to every word in a statute.¹⁴⁶ The courts eschew interpretations that render a term inoperative¹⁴⁷ or superfluous.¹⁴⁸ Judicial redaction of a statute is an extraordinary step¹⁴⁹ which a court should take only to avoid a truly absurd result or the frustration of a clearly expressed legislative intent.¹⁵⁰ As a matter of evidentiary policy, it would probably be defensible to restrict the character evidence prohibition to testimony about other crimes or civil wrongs. However, the question is not simply one of common-law policy. Rather, the issue is a question of statutory construction, and Congress chose to insert the word "acts" in Rule 404(b) in addition to "crimes" and "wrongs."

Since the proffer of a proficiency study does amount to evidence of "wrongs, or acts," we must reach the second sub-issue. That question is whether, in the words of Rule 404(b), the evidence is being used "to prove the character of a person."¹⁵¹ Like "wrongs or acts," the term "person" poses a definitional problem. Does "person" apply only to natural persons such as a particular laboratory technician, or does the term extend to entities such as the laboratory itself?

Any court would agree that the litigant is offering testimony about the conduct "of a person" if the litigant attempted to

¹⁴⁵ FED. R. EVID. 404(b).

¹⁴⁶ *In re Larsen*, 59 F.3d 783 (8th Cir. 1995); *In re Andrews*, 49 F.3d 1404 (9th Cir. 1995); *Board of Tr. of Trucking Emp. Pension Fund v. Centra*, 983 F.2d 495 (3d Cir. 1992); *Herriman v. Conrail, Inc.*, 887 F. Supp. 1148, 1154 (N.D. Ind. 1995); *Brodheim v. Rowland*, 783 F. Supp. 1245, 1250 n. 1 (N.D. Cal. 1991), *aff'd in part, vacated in part*, 993 F.2d 716 (9th Cir. 1993); *In re Daniel M., III*, 20 Cal. Rptr. 2d 291, 293 (Cal. Ct. App. 1993); *RRLH, Inc. v. Saddleback Valley Unified Sch. D.*, 272 Cal. Rptr. 529 (Cal. Ct. App. 1990); *Atlantic Richfield Co. v. State*, 262 Cal. Rptr. 683 (Cal. Ct. App. 1989).

¹⁴⁷ *Mail Order Ass'n of America v. U.S. Postal Service*, 986 F.2d 509 (D.C. Cir. 1993).

¹⁴⁸ *Id.*; *Ishida v. United States*, 59 F.3d 1224, 1230 (Fed. Cir. 1995); *In re Oxborrow*, 913 F.2d 751 (9th Cir. 1990); *Central Montana Elec. v. Adm'r of Bonneville Power*, 840 F.2d 1472 (9th Cir. 1988).

¹⁴⁹ *Brodheim v. Rowland*, 783 F. Supp. 1245, 1250 n. 1 (N.D. Cal. 1991), *aff'd in part, vacated in part*, 993 F.2d 716 (9th Cir. 1993).

¹⁵⁰ *Adair v. Troy State University of Montgomery*, 892 F. Supp. 1401, 1407 (M.D. Ala. 1995).

¹⁵¹ FED.R.EVID. 404(b).

introduce evidence of a particular technician's errors on a prior proficiency study to increase the probability that the same technician erred in analyzing the samples in the instant case. The more troublesome issue is whether the prohibition is applicable when the litigant proffers a proficiency study and it is unclear whether the analyst who performed the test in the case at bar participated in the proficiency study. It is unsettled whether the term "person" includes entities such as incorporated laboratories.¹⁵² In popular usage, we rarely allude to the "character" of an entity.¹⁵³ However, Rule 404(b) was modeled after California Evidence Code section 1101, the governing statute in the *Simpson* case.¹⁵⁴ Like Rule 404(b), section 1101 uses the term "person." In a separate section, however, the California Evidence Code sets out a definition of "person;" and that definition explicitly includes a "firm, association, organization, partnership, business trust, corporation, limited liability company, or public entity."¹⁵⁵

In the present setting, it would be especially wrong-minded to refuse to include a laboratory within the protection of the character evidence prohibition. As previously stated, it is clear that the prohibition applies when the litigant proffers a particular analyst's prior errors to increase the probability that the analyst erred again. If the prohibition applies and there is no exception, the prohibition renders the evidence inadmissible. Thus, the outcome is that the evidence would be barred even though it tended to show the analyst's personal incompetence.

Contrast the outcome on the assumption that a laboratory is not a "person" covered by Rule 404(b). On that assumption, the prohibition is inapplicable; and the evidence is admissible. The evidence would be admitted even though it has much less probative value than evidence of the analyst's personal incompetence. When the evidence takes the form of the laboratory's proficiency test, in the final analysis the evidence is admitted to show incompetence by association; even though the laboratory's analyst who conducted the test in this case might not have participated in the laboratory's earlier proficiency

¹⁵² 22 CHARLES A. WRIGHT & KENNETH W. GRAHAM, JR., FEDERAL PRACTICE AND PROCEDURE: EVIDENCE § 5233, at 358 (1978).

¹⁵³ *Id.*

¹⁵⁴ *Id.*

¹⁵⁵ CAL. EVID. CODE § 175.

study, the study's results would be admitted to attack the competence of his or her analysis in this case. Hence, excluding a laboratory from the meaning of "person" leads to an absurd result: the prohibition excludes highly probative evidence of a particular analyst's personal incompetence but permits the admission of evidence that is relevant only on an incompetence-by-association theory.

If the litigant offered evidence of the analyst's personal incompetence or the court opted to extend the prohibition to entities such as laboratories, we would reach the third and last subissue, namely, whether the evidence is being utilized "to show [the person's] action in conformity" with character.¹⁵⁶ As previously stated, the prohibition forbids litigants from using a person's character as circumstantial proof of conduct.¹⁵⁷

Can the litigant argue that this is one of the extraordinary situations in which character itself is in issue? Federal Rule of Evidence 405(b) lifts the bar of the character evidence rule in the rare case "in which character or a trait of character of a person is an essential element of a charge, claim, or defense."¹⁵⁸ That question must be answered in the negative. When the proponent offers a proficiency study, the theory of logical relevance is that the tendency to err, documented in the study, increases the probability that the analyst erred in analyzing the sample relevant in the pending case; the evidence is relevant to the issue of whether the analyst correctly applied the scientific technique in the instant case. Assume that the laboratory has misanalyzed other samples in other cases. Nevertheless, the trier of fact should accept the laboratory's findings if the trier concludes that the analyst followed proper test protocol in the instant case.

This is not a case in which the pleadings or substantive law place the laboratory's competence directly in issue. If a newspaper published an article assailing the laboratory's proficiency, the laboratory might sue for libel,¹⁵⁹ and the newspaper could defend on the ground that its report was true.¹⁶⁰ Given those pleadings, the laboratory's competence itself would

¹⁵⁶ FED. R. EVID. 404(b).

¹⁵⁷ 1 MCCORMICK, EVIDENCE § 188 at 792-93 (4th ed. 1992).

¹⁵⁸ FED. R. EVID. 405(b).

¹⁵⁹ PROSSER & KEETON, *supra* note 142, at § 112.

¹⁶⁰ PROSSER & KEETON, *supra* note 142, at § 116.

be one of the facts in issue. Federal Rule of Evidence 405 would come into play,¹⁶¹ and the trial judge could undoubtedly overrule a character evidence objection to the proffer of a proficiency study.

This is the juncture in the analysis at which the distinction between proficiency and validity studies emerges most starkly. Validation is an intrinsically probabilistic process; and once the validity of a scientific technique comes into issue, the trier needs to know the probability that the technique will yield an inaccurate result even if the laboratory meticulously complies with proper test procedure. When the trier is evaluating the validity of the scientific technique itself, the trier need not draw any inference as to the analyst's conduct; to the extent of its invalidity, the technique can produce an erroneous result even when the analyst's conduct is flawless.

The logical relevance of a proficiency study is fundamentally different. When the proponent offers a proficiency study, the proponent is attempting to show initially that the laboratory is prone to error and ultimately that the laboratory once again committed a "performance-type error[]." ¹⁶² Beyond any cavil, the proponent is inviting the trier of fact to draw the intermediate inference that the analyst has a character trait, disposition or propensity for such errors. This is quintessential character reasoning. The character prohibition forecloses "once a thief, always a thief" reasoning,¹⁶³ and in principle it should preclude a litigant from arguing "once an incompetent, always an incompetent."

b. *The applicability of an exception to the character evidence prohibition*

If the proffer of a proficiency study would otherwise violate the character prohibition, the proponent's only hope for defeating a character objection is convincing the judge that there is a pertinent exception to the character ban. After announcing the

¹⁶¹ FED. R. EVID. 405.

¹⁶² Black, et al., *supra* note 11, at 775.

¹⁶³ Victor Gold, *Limiting Judicial Discretion to Exclude Prejudicial Evidence*, 18 U.C.D. L. REV. 59, 68-69, 80 (1984).

general character ban, Federal Rule of Evidence 404(a) recognizes several exceptions to it.¹⁶⁴ The first two exceptions are inapposite here; they relate to the character of a criminal accused or a named victim in certain types of criminal cases.¹⁶⁵ The third exception, though, is of interest. Rule 404(a)(3) codifies that exception, allowing “[e]vidence of the character of a witness, as provided in rules 607, 608, and 609.”¹⁶⁶ The proponent of a proficiency study might argue that this exception justifies receipt of testimony about the study; the thrust of the argument would be that this exception permits testimony about character on a credibility theory of logical relevance and that the study is relevant on that very theory.

Unfortunately, Federal Rule of Evidence 607 sheds little light. That statute addresses the question of who may impeach a witness,¹⁶⁷ but it says nothing about how a witness may be impeached. Rules 608 and 609, however, provide insight into the latter question. Rule 608(a) expressly authorizes the receipt of “[o]pinion and reputation evidence of character.”¹⁶⁸ Significantly, though, Rule 608(a) specifies that “the evidence may refer only to [the] character [trait] for truthfulness or untruthfulness.”¹⁶⁹ Rule 608(b) permits cross-examination about certain types of specific acts even if they have not yet resulted in a conviction.¹⁷⁰ In an important respect, however, Rule 608(b) parallels Rule 608(a); Rule 608(b) states that the acts in question must be “probative of truthfulness or untruthfulness.”¹⁷¹ Rule 609 governs when the impeaching evidence takes the form of the witness’s prior conviction for a crime.¹⁷² Rule 609(a)(1) permits inquiry about felony convictions when the judge concludes that the probative value of the conviction evidence outweighs any attendant probative dangers.¹⁷³ Lastly, Rule 609(a)(2) sanctions “evidence that any witness has

¹⁶⁴ FED. R. EVID. 404.

¹⁶⁵ FED. R. EVID. 404(a)(1)-(2).

¹⁶⁶ FED. R. EVID. 404(a)(3).

¹⁶⁷ FED. R. EVID. 607 (“The credibility of a witness may be attacked by any party, including the party calling the witness.”).

¹⁶⁸ FED. R. EVID. 608(a).

¹⁶⁹ *Id.*

¹⁷⁰ FED. R. EVID. 608(b).

¹⁷¹ *Id.*

¹⁷² FED. R. EVID. 609(a).

¹⁷³ FED. R. EVID. 609(a)(1).

been convicted of a crime . . . involv[ing] dishonesty or false statement."¹⁷⁴

These provisions share two common denominators. Admittedly, one is that they authorize the receipt of testimony logically relevant to a witness's credibility rather than the historical merits of the case. The second common denominator is that the provisions focus specifically on the character trait of untruthfulness. Rules 608(a) and 608(b) refer expressly to that character trait.¹⁷⁵ Rule 609(a)(2) uses even narrower language, limiting its scope to offenses "involv[ing] dishonesty or false statement."¹⁷⁶ For that matter, in the final analysis, even Rule 609(a)(1) targets that character trait. The theory of logical relevance underlying felony impeachment under 609(a)(1) is that the conviction demonstrates the witness's willingness to violate important social norms and that that willingness increases the probability that the witness would "again violate a[n important] social norm and testify untruthfully."¹⁷⁷ The Advisory Committee Note to Rule 609 explains that the committee drafted 609(a)(1) on the assumption that a "demonstrated instance of willingness to engage in conduct in disregard of accepted patterns . . . translate[s] into willingness to give false testimony."¹⁷⁸ Further, in striking the balance between the conviction's probative worth and the incidental probative dangers, the trial judge should give particular attention to the question of whether the nature of the felony bears directly on the character trait of truthfulness.¹⁷⁹

In this light, it is misleading to suggest that Rule 405(a)(3) broadly authorizes the receipt of character evidence relevant on a credibility theory. Quite to the contrary, Rule 405(a)(3) represents a narrow exception precisely targeting evidence logically relevant to a witness's character trait of untruthful-

¹⁷⁴ FED. R. EVID. 609(a)(2).

¹⁷⁵ FED. R. EVID. 608.

¹⁷⁶ FED. R. EVID. 609(a)(2). See *IMWINKELRIED ET AL.*, *supra* note 103, § 708, at 192-93; Edward Cleary, *Preliminary Notes on Reading the Rules of Evidence*, 57 *NEB. L. REV.* 908, 918-19 (1978).

¹⁷⁷ *CARLSON, ET AL.*, *supra* note 12 at 396.

¹⁷⁸ Committee on Rules of Practice and Procedure of the Judicial Conference of the United States, *Preliminary Draft of Proposed Rules of Evidence for the United States District Court and Magistrates*, 46 *F.R.D.* 161, 297 (March 1969).

¹⁷⁹ *IMWINKELRIED ET AL.*, *COURTROOM CRIMINAL EVIDENCE* § 708, at 194 (2d ed. 1993).

ness. The ordinary meaning of "untruthfulness" is a disposition to consciously lie.¹⁸⁰ There are cases in which scientific witnesses testify untruthfully, for example, by exaggerating credentials.¹⁸¹ However, in most cases—particularly in the cases identified in proficiency studies—the cause of the error is a blunder pure and simple. The errors shown by proficiency studies relate to a witness's character trait for competence, but they do not pertain to the character trait for untruthfulness—the focal point of the limited exception codified in Rule 405(a)(3).

The drafters of the Federal Rules used the California Evidence Code as one of their principal models.¹⁸² The result is even clearer under that statutory scheme. For example, Evidence Code section 786 proclaims: "Evidence of traits of his character other than honesty or veracity, or their opposites, is inadmissible to attack or support the credibility of a witness."¹⁸³ Another provision, Evidence Code section 1104, expressly extends the character prohibition to "evidence of a trait of a person's character with respect to care or skill. . . ."¹⁸⁴ The California Law Revision Commission Comment to section 1104 asserts that by virtue of that provision, "character evidence with respect to care or skill is inadmissible to prove that conduct on a specific occasion was either careless . . . or unskilled. . . ."¹⁸⁵ The Comment makes it clear that the judge has no discretion to admit evidence probative only of that proposition; the Comment states flatly that section 1104 prescribes "a fixed exclusionary rule."¹⁸⁶ Of course, as we have seen, a proficiency study is logically relevant only on that theory; and the plain statutory mandate is therefore that judges reject proffered testimony about such studies.

¹⁸⁰ WEBSTER'S SEVENTH NEW COLLEGIATE DICTIONARY 953, 975 (1972).

¹⁸¹ Carol Henderson Garcia, *Expert Witness Malpractice: A Solution to the Problem of the Negligent Expert Witness*, 12 MISS. COLL. L. REV. 39, 49-52 (1991).

¹⁸² For example, the Advisory Committee Notes to Rules 607 and 609 contain several references to California authorities. Fed. R. Evid. 607, 609 advisory committee's notes.

¹⁸³ CAL. EVID. CODE § 786.

¹⁸⁴ *Id.* at § 1104.

¹⁸⁵ PARKER'S EVIDENCE CODE OF CALIFORNIA, *supra* note 102, at 185.

¹⁸⁶ PARKER'S EVIDENCE CODE OF CALIFORNIA, *supra* note 102, at 185.

CONCLUSION

It has been observed that evidence law should be structured to ensure that experts educate the trier of fact.¹⁸⁷ That model certainly seems preferable to a system under which experts merely express opinions ipse dixit and expect the trier to uncritically defer to the opinion as a matter of course.¹⁸⁸ If the former model is preferable, it seems to follow as a corollary that testimony about scientific validity and proficiency studies should be admissible. If the jury is to decide independently whether to conclude that a scientific technique is valid, the jury needs to know the probability that the technique will yield inaccurate results. Likewise, if the jury must determine whether a laboratory correctly applied a scientific technique, the jury needs a sense of the laboratory staff's proficiency in using the technique. On that issue, the most trustworthy evidence would be a proficiency study investigating the staff's competency.

The case for admitting testimony about validity and proficiency studies is compelling if we accept the widespread premise that, by and large, laypersons tend to overestimate the probative value of scientific testimony. Many lower courts subscribe to that premise.¹⁸⁹ In *Daubert*,¹⁹⁰ the Supreme Court approvingly quoted Judge Jack B. Weinstein's statement that expert testimony can be "quite misleading because of the difficulty in evaluating" its probative worth.¹⁹¹ If that fear is well-founded, it would seem imperative to ensure the admissibility of validity and proficiency studies. Evidence that the technique sometimes produces erroneous results would counteract the risk that the jurors would assume that the scientific technique is infallible.¹⁹² Likewise, testimony about a profi-

¹⁸⁷ Ronald J. Allen & Joseph S. Miller, *The Common Law Theory of Experts: Deference or Education?*, 87 NW. U. L. REV. 1131 (1993).

¹⁸⁸ *Id.*

¹⁸⁹ See *supra* notes 1-5 and accompanying text.

¹⁹⁰ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 113 S. Ct. 2786 (1993).

¹⁹¹ *Id.* at 2798 (citing Jack B. Weinstein, *Rule 702 of the Federal Rules of Evidence Is Sound: It Should Not Be Amended*, 138 F.R.D. 631, 632 (1992)).

¹⁹² Edward J. Imwinkelried & Robert G. 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, 84 (1991).

ciency study would be an effective antidote for the facile assumption that a laboratory's staff has absolutely mastered the protocol for using a technique.

As previously stated, in its 1992 report the N.R.C. simply assumed that evidence law permits the introduction of testimony about proficiency studies.¹⁹³ In the *Simpson* case, the testimony was admitted without objection. Like Mr. Bumble, the bench and litigation bar apparently cannot believe that evidence law would be so asinine as to bar evidence of such scientific studies. There are modern day Bumbles. In a 1983 decision, the Criminal Division of the English Court of Appeal faced an evidentiary objection to testimony about a scientific study conducted by the Home Office.¹⁹⁴ The court overruled the objection. As one commentator remarked, it seemed patent to the court "as a matter of common sense" that the study had to be admitted.¹⁹⁵ In her words, "[a] legal system that would . . . rule out such cogent evidence . . . [could not be] defended."¹⁹⁶ As we have seen, though, if the exclusionary rules of evidence are rigorously applied to testimony about validity and proficiency studies, common sense might not prevail; there are potentially successful hearsay objections to evidence of validity studies, and the character evidence prohibition might block the admission of evidence of a relevant proficiency study. If we are to ensure the admission of these seemingly necessary types of evidence, the hearsay and character rules should be revised accordingly.

It is understandable that neither the bench nor the bar has yet recognized the evidentiary hurdles to the introduction of testimony about scientific research studies. Again, one of the beauties of the old *Frye* regime was that under that evidentiary standard, judges and litigators could "hid[e] from science."¹⁹⁷ The general-acceptance standard enabled judges and litigators to "avoid coming to grips with science."¹⁹⁸ *Daubert* has ushered in a new era in which the legal system no longer has that luxury. Judges and litigators will need some time to

¹⁹³ See *supra* note 49 and accompanying text.

¹⁹⁴ *R. v. Abadom* [1983] 1 All E.R. 364 (C.A.).

¹⁹⁵ Jennifer A. James, *A Clear Cut Case*, 47 MOD. L. REV. 103, 107 (1984).

¹⁹⁶ *Id.* at 104.

¹⁹⁷ Black et al., *supra* note 11, at 722.

¹⁹⁸ Black et al., *supra* note 11, at 730.

get their bearings; they need to become accustomed to working with scientific studies. As Judge Alex Kozinski noted, judges and litigators face the "daunting task"¹⁹⁹ of evaluating scientific research²⁰⁰ in the post-*Daubert Brave New World*.²⁰¹

It was, of course, the 20th century English novelist, Aldous Huxley, who first gave us a vision of *Brave New World*.²⁰² Perhaps, though, the most telling remark was made by his forebear, the famous 19th century biologist, Thomas Huxley. The latter once wrote that "[t]he rung of a ladder was never meant to rest upon, but only to hold a man's foot long enough to enable him to put the other somewhat higher."²⁰³

Daubert was a step in the right direction, at long last forcing the courts to confront directly the scientific standards for determining the merit of expert testimony.²⁰⁴ It is now time for the next step—another step upward toward a more sophisticated appreciation of the critical scientific and evidentiary differences between validity and proficiency studies.

¹⁹⁹ *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 43 F.3d 1311, 1315 (9th Cir. 1995), *cert. denied*, 116 S. Ct. 189 (1995).

²⁰⁰ *Id.* at 1316.

²⁰¹ *Id.* at 1315.

²⁰² ALDOUS L. HUXLEY, *BRAVE NEW WORLD* (1932).

²⁰³ THOMAS HUXLEY, *ON MEDICAL EDUCATION*, *quoted in* THE SHORTER BARTLETT'S FAMILIAR QUOTATIONS 185 (1959).

²⁰⁴ See Black et al., *supra*, note 35.