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JUDICIAL NOTICE AND THE LAW'S "SCIENTIFIC" SEARCH FOR TRUTH

*Christopher Onstott**

Back when the Earth was the center of the Universe, Copernicus started tracking the movement of different celestial bodies in the sky.¹ Eventually, Copernicus's observations led him to a troubling theory.² The earth was actually revolving around the sun, meaning the Earth was not the center of the universe.³ His heliocentric scientific theory later proved to be a contentious issue, pitting wide-held religious beliefs about the Earth's place in a revolving universe against his own.⁴ Only after years of painful upheaval in both the scientific and religious communities did the paradigm shift to accept Copernicus's dramatically different theory.⁵ Indeed, his theory eventually landed his student, Galileo, a heresy conviction and a sentence of life imprisonment.⁶

In Copernicus's day, religion conclusively picked a particular scientific theory and then denied the possibility that later theories could eventually discredit the current one.⁷ Today, the law similarly ties itself to a particular scientific theory—although somewhat unwittingly—through the concept of judicial notice.

Through judicial notice, judges bind juries to accept a principle as conclusive without taking evidence concerning that principle.⁸ Over time, a repeatedly judicially noticed scientific or technical principle is endowed by the law with a false sense of truth. But as when the Earth

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1. See DAVID L. FAIGMAN, LEGAL ALCHEMY 15-16 (W. H. Freeman and Company 1999) (1999).

2. *Id.* at 16.

3. *Id.*

4. *Id.* at 16-18.

5. *Id.* at 17.

6. *Id.*

7. See *id.* at 14-15.

8. See FED. R. EVID. 201.

was the center of the universe, eventually, the scientific/technical paradigm shifts, and the “truth” seems less clear. Red-faced, the law reverses itself, hoping nobody noticed.

For example, in a 1902 nuisance action, the Iowa Supreme Court issued judicial notice that “[i]t is well known that modern scientific research has discovered means of disinfecting and deodorizing sewage, so that it is practically innocuous.”⁹ In 1918, the Oklahoma Supreme Court took the assertion even further, claiming that “[i]n Iowa it has been repeatedly held that the court will take judicial notice of the fact that sanitary science has developed means by which sewage may be disinfected and deodorized so that it is rendered innocuous.”¹⁰ In 1931, the same court took judicial notice of “the fact that modern science has advanced to the point where sewage is capable of purification, and that it is not only capable of purification, but can be easily and successfully purified by the use of modern appliances.”¹¹ Unfortunately, early 20th-century sewage treatment may not have achieved the innocuous results that these courts thought. It was not until 1925 that sewage treatment plants began testing for lead in the water supply.¹² Lead may be linked to delays in physical and mental development in children and to kidney problems and high blood pressure in adults.¹³ Even through the 1940s, experts did not test for cyanide in the water supply.¹⁴ Cyanide has been linked to nerve damage and thyroid problems.¹⁵ Additionally, sewage treatment methods in the early 20th century were certainly not environmentally “innocuous.” Sewage treatment often involved levels

9. Hollenbeck v. Marion, 89 N.W. 210, 212 (Iowa 1902).

10. Magnum v. Sunset Field, 174 P. 501, 503 (Okla. 1918) *overruled by* Okla. City v. West, 7 P.2d 888 (Okla. 1931).

11. *Okla. City*, 7 P.2d at 889. Missouri courts followed the Oklahoma court’s reasoning as late as 1942. See Stewart v. Springfield, 165 S.W.2d 626, ***16 (Mo. 1942) (stating that “[c]ourts take judicial notice of the fact that modern science has advanced to the point where sewage is capable of purification and can be easily and successfully purified by the use of modern appliances”).

12. The Standards of Purity for Drinking Water Supplied by Common Carriers in Interstate Commerce released by the U.S. Treasury in 1914 and widely followed by urban treatment facilities only set standards for bacteriological impurities. See generally THE AMERICAN WATER WORKS ASSOCIATION, MANUAL OF WATER QUALITY AND TREATMENT, AMERICAN WATER WORKS ASSOCIATION (1941) [hereinafter, WATER QUALITY]. In 1925, the standard was revised to include limits on lead, zinc, and copper in the water supply. *Id.* at 25.

13. See National Primary Drinking Water Regulations, <http://www.epa.gov/safewater/mcl.html> (last visited March 8, 2002). See also W.S. HOLDEN, WATER TREATMENT AND EXAMINATION 83 (Longman Group Ltd, ed., Williams and Wilkins Co. 1970) (1970) (describing lead as the “commonest poisonous metal occurring in water supplies”).

14. See WATER QUALITY *supra* note 12, at 25.

15. See National Primary Drinking Water Regulations, <http://www.epa.gov/safewater/mcl.html> (last visited March 8, 2000).

of chlorination believed toxic to some species of fish.¹⁶

Another scientific misstep occurred in 1900 when the U.S. Supreme Court declared the following:

While [tobacco's] effects may be injurious to some, its use over practically the entire globe is a remarkable tribute to its popularity and value. We are clearly of opinion that it cannot be classed with diseased cattle or meats, decayed fruit, or other articles, the use of which is a nuisance to the health of the entire community.¹⁷

Many medical experts now believe that tobacco is injurious not just to "some" but to all, or nearly all, who use it.¹⁸ It has likely had enormous effects on the health of the community.¹⁹

Judicial notice is a problem even when a scientific principle is not totally discredited. Just becoming more widely disputed in the scientific community is sufficiently problematic. For example, in 1928, a New York court ordered a plaintiff to have an X-ray taken of his right elbow.²⁰ The appellate court reviewing the case took "judicial notice that the X-ray is in common use and that the science and art thereof have been developed to a point where, in the hands of specialists, there is little

16. See W.S. HOLDEN, *supra* note 13, at 53. "With chlorination of sewage effluents . . . difficulties may be experienced in always providing sufficient chlorine without giving rise to excess on occasions, which would be toxic in the discharge; concentrations of free chlorine as low as 0.05-0.2mg/l are toxic to some fish." *Id.*

17. *Austin v. Tenn.*, 179 U.S. 343, 345 (1900).

18. See, e.g., Jane E. Brody, *Ailing Lungs Said to Improve When Smokers Stop*, NEW YORK TIMES, Nov. 16, 1994, at B8 ("Nearly all smokers experience an accelerated decline in lung function.") (citing a study released by The Journal of the American Medical Association). See also William Reville, *Not Enough Known About the Addiction of Smoking*, THE IRISH TIMES, July 28, 1997. "Inhaled tobacco smoke contains hundreds of toxic substances and therefore almost all smokers suffer from some form of tobacco-induced disorder. *Id.*

19. See Daniel Hays Lowenstein, "Too Much Puff": *Persuasion, Paternalism, and Commercial Speech*, 56 U. CIN. L. REV. 1205, 1212 (1988) ("Cigarette smoking is disastrous to individuals and unparalleled in its harm to public health."); National Center For Chronic Disease Prevention and Health Promotion, *Targeting Tobacco Use: The Nation's Leading Cause of Death*, <http://www.cdc.gov/tobacco/overview/oshaag.htm> (last visited April 11, 2002) (stating that cigarette smoke results in the death or disability of half of all regular users, causing 400,000 deaths a year in the United States alone). Cigarette smoking causes more than \$75 billion in medical expenditures and an additional \$80 billion in indirect costs a year. *Id.*

20. *Gilbert v. Klar*, 223 A.D. 200, 200-01 (N.Y. App. Div. 1928). It should be noted that in *Gilbert*, the X-ray was ordered, not for the purpose of medical diagnosis and treatment, but for proof in a courtroom. This goes against medical beliefs associated with risks and benefits of X-rays. See ERIC J. HALL, *RADIATION AND LIFE* 223 (2d ed. 1984).

From the medical point of view, the small hazard to the patient from irradiation should be more than compensated for by the information obtained in the test, as a contribution to the diagnosis and treatment of his disease. If this is not the case, then there is no excuse for any X-rays to be taken.

Id.

or no danger.”²¹ Crude methods of radiation exposure detection methods existed in 1928, but it was not until that year that a unit for measuring radiation was even adopted.²² And “[a]lthough the basic techniques of X-ray protection were well known by 1905 . . . , during the 1920’s into the ‘30’s and even ‘40’s it was not uncommon to find medical X-ray units with virtually no safety precautions.”²³ Despite the improved safety precautions now in place, the health effects caused by low-level exposure to X-rays for medical-diagnosis purposes have periodically been questioned by some.²⁴

Even now, previously judicially noticed scientific and technical principles can begin to lose their place atop the legal totem pole. For example, several courts have judicially noticed the reliability, even “infallibility,” of suspect identification through latent or “lifted” fingerprints.²⁵ In *State v. Inman*, the Maine Supreme Court took judicial

21. *Gilbert*, 223 A.D. at 200-01.

22. See Ronald L. Kathren & Paul L. Ziemer, *The First Fifty Years*, HEALTH PHYSICS: A BACKWARD GLANCE 3 (1980) (stating that “the definition and adoption of the Roentgen, as this unit was named, provided a physical basis for quantitative measurement, heretofore lacking, thus permitting in a more or less unequivocal way, documentation of radiation exposures”). See also Richard D. Terry, *Historical Development of Commercial Health Physics Instrumentation*, HEALTH PHYSICS: A BACKWARD GLANCE 159 (1980) (“Also in 1928 the Second International Radiological Congress met in Stockholm. The significant accomplishment of this meeting was the international adoption of the Roentgen as the unit of measure of x-radiation.”).

23. See Kathren & Ziemer, *supra* note 22, at 2.

24. See John W. Gofman, RADIATION-INDUCED CANCER FROM LOW-DOSE EXPOSURE: AN INDEPENDENT ANALYSIS 3-1 (1990) stating:

[A] surprising number of Americans—estimated at about 7 out of 10 every year—receive some exposure to ionizing radiation from diagnostic X-rays in medicine and dentistry . . . [b]ut the same diagnostics benefits are often obtainable at much lower doses . . .” and estimating that “unnecessarily high X-ray doses cause about 1.5 million unnecessary cancers per generation in the United States alone.

Id.

The estimate excluded second cancers induced by therapeutic radiation and cancers induced by diagnostic nuclear medicine. *Id.* Gofman also states that “[t]he carcinogenicity of X-rays is even greater than the carcinogenicity of A-bomb radiation.” See *id.* at 3-2. According to one government source, medical X-rays account for 11 percent of the nation’s total radiation exposure, trailing only radon and other natural sources of radiation. The effects of low-level exposure to radiation may not show up for months or even years. See Radiation Protection Division Publication, *Ionizing Radiation Series No. 2*, <http://www.epa.gov/radiation/ionize2.htm> (last visited April 10, 2002) (citing NCRP no. 93). See also Radiation and Your Environment, *A Guide to Low-level Radiation for Citizens of Florida*, <http://www.fipr.state.fl.us/fipr036.htm> (last visited April 10, 2002) (reporting that X-rays for medical diagnosis and treatment account for an average of 30-40 mrem/year per American while all other man-made sources account for about 8/10 mrem/year). There is debate about whether cancer-producing X-ray exposure is subject to a minimum threshold, below which there would be no incidents of cancer, or if cancer rates caused by low-level exposures are directly proportional to cancer rates produced from higher exposure levels. See *id.* (stating that “this concept can neither be proven or disproven”).

25. See, e.g., *Emerson v. State*, 880 S.W.2d 759, 771 (Tex. Ct. Crim. App. 1994) (Clinton, J.,

notice that the “fingerprint method of identification is accurate.”²⁶ The court recognized the absolute reliability of latent fingerprint identification, stating that “[w]hen one’s fingerprints are found in a particular place, such person cannot be heard to say he was not at that place at some time.”²⁷ The court continued, holding that “[t]he infallibility of fingerprints as a method of identification is now too widely accepted to require citation of authority.”²⁸ In January of 2002, a highly respected Pennsylvania federal judge created a stir when he initially declined to even admit expert identification of lifted fingerprints.²⁹ Although he later withdrew his decision, the judge initially claimed that the techniques were not even reliable, much less infallible.³⁰

The point of these examples is not to ridicule “wrong” past decisions but to illustrate the tension between judicial notice and its application to evolving scientific principles. A discussion of this tension lends itself to several conclusions. The first is that – even considering that several of the above mentioned cases were decided under previously existing judicial notice standards – there remain several problems applying even the current judicial notice standard to scientific and technical principles. In fact, because the problems are unique to these

dissenting) (citing *Grice v. State*, 151 S.W.2d 211 (Tx. Ct. Crim. App. 1941) as taking “judicial notice of the conclusiveness of fingerprint identification”); *State v. Fuller*, 802 P.2d 599, 602 (Kan. 1990) (citing *Tice v. Richardson*, 644 P.2d 490 (Kan. App. 1982) (asserting that “[i]n selected cases, a scientific technique is so broadly and generally accepted in the scientific community that a trial court may take judicial notice of its reliability” and that “[s]uch is commonly the case today with regard to ballistics tests, fingerprint identification, blood tests, and the like”). *But see State v. Wheeler*, 1983 R.I. Super. LEXIS 169, *13 (R.I. Sup. Ct. 1983) (stating that the pronouncement of fingerprints as an “infallible means of identification . . . goes a bit too far”).

26. *Inman v. State*, 350 A.2d 582, 588 (Me 1976).

27. *Inman*, 350 A.2d at 588.

28. *Id.*

29. *United States v. Llera Plaza*, 179 F. Supp. 2d 492, 514 (E.D. Pa. 2002) *vacated by United States v. Plaza*, 188 F. Supp. 2d 549 (E.D. Pa. 2002). Judge Pollak’s initial decision in *United States v. Llera Plaza* garnered considerable media attention. *See, e.g.*, Richard Willing, *Fingerprint Evidence Faces New Test*, USA TODAY, Feb. 25, 2002, at 4-A (quoting Justice Department lawyers as saying that “[t]he ruling ‘could have a profound impact on the investigation and prosecution of crime’ unless it is reversed”); Andy Newman, *Judge Rules Fingerprint Evidence Cannot Be Called a Match*, N.Y. TIMES, Jan. 11, 2002, AT A-14 (“A judge has ruled for the first time that fingerprint evidence, a virtually unassailable prosecutorial tool for 90 years, does not meet the standards set for scientific testimony . . .”).

30. *See Llera Plaza*, 179 F. Supp. 2d. at 515-16 (declining to admit latent fingerprint identification stating that such evidence is “hard to square with *Daubert*” because it does not meet “*Daubert*’s testing, peer review, and standards criteria”). Facing a blunt attack on the decision from government lawyers, Pollak vacated the decision, issuing a new opinion on March 13, 2002. *See Plaza*, 188 F. Supp. 2d. at 576; Willing, *supra* note 29, at 4-A (stating that “in an unusually blunt pleading, the team urges federal Judge Louis Pollak to reconsider his January decision”).

principles, a new standard should be created specifically for them. The new standard suggested in this Article would be more consistent with the evolving nature of science and take into account judicial shortcomings regarding scientific and technical principles.

Part I of this Article begins by introducing the concept of judicial notice followed by a short background defining the scope of scientific and technical principles. Part II addresses the problems created by the current judicial notice standard. The standard's text is problematic, and courts' diverse interpretations of the standard have also created problems. Part III analyzes whether scientific and technical principles merit a different judicial notice standard specifically for them. This Part concludes that the inherent inconsistency of science and technical knowledge with the current standard and the judicial shortcomings in scientific/technical competence justify different legal treatment. Finally, Part IV suggests a solution that would create a new standard for scientific and technical principles. In addition, it creates a new officer of the court, a neutral scientific adviser who would advise judges on scientific and technical judicial notice decisions.

I. BACKGROUND

Before discussing the problems and solutions mentioned above, a short introduction to judicial notice is necessary. After this, the scope of scientific and technical principles must be determined.

A. *A Brief Introduction to Judicial Notice*

Through judicial notice, a judge accepts an adjudicative fact (fact questions that would be decided by the jury if the proceeding were a jury trial)³¹ or legislative fact (questions normally reserved for the judge)³² without requiring proof.³³ This is done for purposes of convenience.³⁴ This article limits its scope to judicially noticed adjudicative facts.³⁵ The

31. JOHN W. STRONG, 2 MCCORMICK ON EVIDENCE, §328, at 491 (5th ed. 1999). *See also* BLACK'S LAW DICTIONARY 42 (6th ed. 1990) (citing *Grason Elec. Co. v. Sacramento Mun. Utility Dist.*, 571 F. Supp. 1504, 1521 (D.C. Cal. 1983)).

32. *Id.*

33. *See* BLACK'S LAW DICTIONARY 851 (7th ed. 1999) (defining judicial notice as "[a] court's acceptance, for purposes of convenience and without requiring a party's proof, of a well-known and indisputable fact").

34. *Id.*

35. It should be noted that the dividing line between adjudicative fact and legislative fact is often tenuous. *See* STRONG, *supra* note 31, at 493 (stating that "any bright-line distinction between adjudicative and legislative facts [tends to] dissolve in practice").

effect of judicial notice in civil cases is to bind the jury to accept as a given the judicially noticed fact.³⁶ In criminal cases, jurors are encouraged, but not required, to accept the judicially noticed fact.³⁷

Traditionally, two categories of fact questions qualified for judicial notice: “facts generally known with certainty by all the reasonably intelligent people in the community” and “facts capable of accurate and ready determination by resort to sources of indisputable accuracy.”³⁸ These categories are reflected in the judicial notice standard outlined in Federal Rule of Evidence 201(b).³⁹ Most states follow judicial notice standards similar to FRE 201(b).⁴⁰

B. Scope of Scientific/Technical Principles

The scope of scientific/technical principles needs to be defined before discussing the difficulties of the current judicial notice standard’s application to those principles. Fortunately, a resort to the writings of the legions of legal scholars interested in the subject is unnecessary because a simplistic definition will do.⁴¹ For this article, “scientific principles” are synonymous with “scientific knowledge,” which is alluded to in Federal Rule of Evidence 702 and interpreted by *Daubert v. Merrell Dow Pharmaceuticals* and subsequent case law.⁴² In other words, scientific principles are hypotheses tested by using the scientific method.⁴³ The scientific method consists of “generating hypotheses and

36. See FED. R. EVID. 201(g) (stating that “in a civil action or proceeding, the court shall instruct the jury to accept as conclusive any fact judicially noticed”).

37. See FED. R. EVID. R 201(g) (stating that “[i]n a criminal case, the court shall instruct the jury that it may, but is not required to, accept as conclusive any fact judicially noticed”).

38. STRONG, *supra* note 31, at 492.

39. FED. R. EVID. R 201(b) (“A judicially noticed fact must be one not subject to reasonable dispute in that it is either (1) generally known within the territorial jurisdiction of the trial court or (2) capable of accurate and ready determination by resort to sources whose accuracy cannot reasonably be questioned.”)

40. See, e.g., *infra* notes 76 and 78 and accompanying text.

41. Legal scholars have spent many trees discussing this question—especially following *Daubert v. Merrell Dow Pharm. Inc.*, 509 U.S. 579 (1993). See, e.g., Leslie Morsek, *Get on Board for the Ride of Your Life! The Ups, Downs, Twists, and the Turns of the Applicability of The ‘Gatekeeper Function’ to Scientific and Non-Scientific Expert Evidence: Kumho’s Expansion of Daubert*, 34 AKRON L. REV. 689 (2001); Laird C. Kirkpatrick, *Appellate Craftsmanship in Evidence Law: A Tribute to Justice Unis*, 76 OR. L. REV. 21, 26 (1997) (“One of the most important aspects of Justice Unis’ opinion in O’Key is that it addresses a crucial question sidestepped by the United States Supreme Court in *Daubert*, namely, what qualifies as scientific evidence for purposes of applying these new standards governing admissibility?”).

42. *Daubert*, 509 U.S. at 591-93.

43. *Id.* at 593.

testing them to see if they can be falsified.”⁴⁴

What exactly a technical principle is and how it differs from scientific fact is difficult.⁴⁵ Here, “technical principles” are the “technical, and other specialized knowledge” alluded to in Federal Rule of Evidence 702.⁴⁶ In *Kumho Tire Co. LTD v. Carmichael*, Justice Breyer, quoting Judge Learned Hand, stated that scientific and technical knowledge differed from lay knowledge in that they show “general truths derived from specialized experience” and usually rest “upon an experience [] foreign [] to [the jury’s] own.”⁴⁷ Justice Breyer put testimony by engineers into this category;⁴⁸ others have included certain types of forensic evidence such as fingerprints and ballistics data as well.⁴⁹ For convenience and flow, the word “technical” is omitted from the discussion of “scientific/technical principles.” By referring to “scientific principles,” assume that this is a shorthand reference to both scientific and technical principles. Having defined scientific principles, a discussion of the significant problems created by applying these principles to the current judicial notice standard can go forward.

II. PROBLEMS RELATED TO JUDICIAL NOTICE UNDER THE CURRENT STANDARD

This Part outlines the textual inconsistencies Federal Rule of Evidence (FRE) 201 suffers when it is applied to scientific principles. Then, the problems caused by courts’ varying interpretations of FRE 201 and similar state evidence rules are discussed.

A. Textual Problems

FRE 201(a) suffers from poor word choice. Subsection (a) defines the rule’s scope as only applying to “adjudicative facts.”⁵⁰ Many

44. *Id.*

45. See *Kumho Tire Co. LTD v. Carmichael*, 526 U.S. 137, 148 (1999) (describing the difficulty in the legal system of “depend[ing] on a distinction between ‘scientific’ knowledge and ‘technical’ or ‘other specialized’ knowledge[,]” explaining that “[t]here is no clear line that divides the one from the others”).

46. *Id.* at 147.

47. *Id.* at 148-49.

48. *Id.* at 141.

49. See *United States v. Llera Plaza*, 179 F. Supp. 2d 492, 516 (E.D. Pa. 2002) *vacated by* *United States v. Plaza*, 188 F. Supp. 2d 549 (E.D. Pa. 2002) (classifying fingerprint evidence as “technical”); *Ohio v. Mack*, 653 N.E.2d 329, 336 (Ohio 1995) (discussing the jury’s understanding of the “technical ballistics report”).

50. FED. R. EVID. 201(A) (“Scope of rule. This rule governs only judicial notice of adjudicative facts.”).

adjudicative facts, however, are not really “facts.” This is the case when judicial notice is given of scientific or technical principles.⁵¹ This concept will be discussed in more detail in Part III.

FRE 201(b) defines a clumsy two-prong standard that is inconsistent with the nature of scientific principles generally. More damningly, the two prongs directly conflict in certain instances. FRE 201(b) provides “[a] judicially noticed fact must be one not subject to reasonable dispute in that it is either (1) generally known within the territorial jurisdiction of the trial court or (2) capable of accurate and ready determination by resort to sources whose accuracy cannot reasonably be questioned.”⁵² The first prong, that the fact be “generally known within the territorial jurisdiction of the trial court . . . ,” provides little benefit for scientific and technical principles.⁵³ The very nature of scientific principles is that they are based on “specialized experience” that is “foreign in kind from the jury’s own.”⁵⁴ If this experience is foreign in kind from the jury, a rough sample of the general public, then it is probably also foreign in kind from the general public.⁵⁵ Consequently, a standard asking how universally the general public knows a scientific principle provides almost no benefit in assessing the reliability of those principles.⁵⁶ The standard paradoxically inquires about the general public’s unscrutinized common sense in a matter admittedly outside of the general public’s experience. Such a standard may potentially work a large amount of mischief.⁵⁷

51. See *infra* notes 103-120 and accompanying text.

52. FED. R. EVID. R 201(B).

53. *Id.*

54. See *Kumho Tire Co., LTD v. Carmichael*, 526 U.S. 137, 148 (1999) (quoting Judge Learned Hand).

55. See *Taylor v. La.*, 419 U.S. 522, 527 (1975) (“it is part of the established tradition in the use of juries as instruments of public justice that the jury be a body truly representative of the community.”); *Trevino v. Texas*, 503 U.S. 562, 563 (1992) (reiterating that the Sixth Amendment required that juries be a “fair cross-section of the community”).

56. See generally *O’Conner v. Commonwealth Edison Company*, 807 F. Supp. 1376, 1389 (C.D. Ill. 1992) (quoting Learned Hand, *Historical and Practical Considerations Regarding Expert Testimony*, 15 HARV. L. REV. 53 (1901) (“But how can the jury judge between two statements each founded upon experience confessedly foreign in kind to their own? It is just because they are incompetent for such a task that the expert is necessary at all.”); nsf.gov, Science & Engineering Indicators—2002: Science and Technology: Public Attitudes and Public Understanding (2002), <http://www.nsf.gov/sbe/srs/seind02/c7/c7h.htm> (stating that only about 50 percent of NSF survey “respondents knew that the earliest humans did not live at the same time as dinosaurs, [that] it takes the Earth one year to go around the Sun, [that] electrons are smaller than atoms, [that] antibiotics do not kill viruses,” that “60 percent of respondents agreed [with the statement] ‘some people possess psychic powers or ESP,’ and that “[] about 70 percent [] lack a clear understanding of the scientific process”).

57. See *infra* notes 102-21 and accompanying text (showing that the judge may choose to

The second prong declares a fact not subject to reasonable dispute if it is “capable of accurate and ready determination by resort to sources whose accuracy cannot reasonably be questioned.”⁵⁸ At first blush, this might appear workable for scientific and technical principles.⁵⁹ Who does this “reasonable question[ing]?” How is the standard being interpreted by courts? The standard is unclear whether it is the judge, or scientists and technical experts knowledgeable about the “source” who perform this function. Case law and treatises reflect this confusion. *McCormick on Evidence* asserts that both the judge and the experts should contribute to this decision, but the relative contributions from these different groups vary considerably.⁶⁰ McCormick writes that a principle may be judicially noticed if “the principle is accepted as a valid one in the appropriate scientific community,”⁶¹ but then continues that “[i]n continuing the intellectual viability of the proposition . . . the judge is free to consult any sources that he thinks are reliable.”⁶² Several courts adhere to this interpretation.⁶³ Other courts put greater emphasis on experts’ opinions.⁶⁴

B. Case Law’s Interpretation of the Standard Compounds the Problem

Courts and commentators also differ on what degree of unanimity is required to judicially notice scientific principles. They have asked for greater degrees of unanimity, requiring that the fact be accepted as certain in the scientific community⁶⁵ or beyond dispute,⁶⁶ and lesser

follow the “common knowledge” prong of the test when the second prong would be more appropriate).

58. FED. R. EVID. R 201(B).

59. Later a more searching analysis will show that this standard is also inherently inconsistent with scientific and technical knowledge. See *infra* notes 103-115 and accompanying text.

60. See JOHN W. STRONG, MCCORMICK ON EVIDENCE § 330, at 394-95 (4th ed. 1992).

61. *Id.*

62. *Id.*

63. See, e.g., *United States v. Sauls*, 981 F. Supp. 909, 920 (D.C. Md. 1997); *Clemmons v. Bohannon*, 918 F.2d 858, 865-68 (10th Cir.1990), *vacated on other grounds, on reh. en banc*, 956 F.2d 1523 (10th Cir. 1992).

64. See *Faya v. Almaraz*, 620 A.2d 327, 331 (Ct. App. Md. 1993) (stating that scientific facts must be “capable of immediate and certain verification by resort to sources whose accuracy is beyond dispute”); *Cholka v. Johnson*, 270 N.W.2d 438, 440 (Ct. App. Wis. 1972), *reversed on other grounds*, *Wis. v. Johnson*, 292 N. W.2d 835 (Wis. 1980) (“Scientific facts or principles are suitable for judicial notice if they are accepted as certain in the appropriate scientific community.”).

65. See *supra* note 64.

66. See *id.* See also JOHN W. STRONG, 2 MCCORMICK ON EVIDENCE § 328, at 492 (5th ed. 1999) (stating that the inquiry should be “facts capable of accurate and ready determination by resort to sources of indisputable accuracy”).

degrees,⁶⁷ such as requiring that it just not be reasonably questioned⁶⁸ and even surprisingly that it meet the *Frye* test.⁶⁹

1. Precedential Value of Previous Judicial Notice Decisions

The standard's varying court interpretations are problematic for two reasons. First, the different interpretations complicate the inquiry into the precedential value that judicially noticed principles should have. Second, some of these varying interpretations are problematic for courts to apply to scientific principles. Indeed, one interpretation, the *Frye* test, has already been rejected for its inadequacy in dealing with science in other contexts. Each is considered in turn.

Most courts recognize that a previously judicially noticed scientific principle carries precedential value.⁷⁰ This precedential value given to previously noticed principles contradicts the discretion allotted to the trial judge in deciding if the judicial notice standard is met.⁷¹ That courts often follow different interpretations of an identical judicial notice standard further complicates the matter.⁷² One court may interpret FRE 201's "cannot be reasonably questioned" language to require "certainty" while another follows a lesser standard, perhaps asking if it is "reasonably disputable." By giving a previous judicial notice determination precedential value, subsequent judges may judicially notice something that would not have been noticed had the judge conducted an independent analysis based on the tougher interpretation of the standard.⁷³ *McCormick on Evidence* hints at this problem in judicial

67. See Bruce W. Burton, *The "O.K. Corral Principle": Finding the Proper Role for Judicial Notice in Police Misconduct Matters*, 29 N.M. L. REV. 301, 311 (Spring 1999) (explaining that some courts use judicial notice "more actively, either to instruct a jury or adopt by the court technical facts where some level of consensus exists within the scientific community").

68. *In re Croneis*, 1998 Ohio App. LEXIS 4986, at *6 (Ohio App. 1998).

69. See *infra* notes 75-88 and accompanying text.

70. See *United States v. Martinez*, 3 F.3d 1191 (8th Cir. 1993) (recognizing the reliability of the general theory and the reliability of DNA profiling techniques and encouraging other courts to do so as well); *In re Croneis*, 1998 Ohio App. LEXIS 4986, at *6 (stating that the judicially recognized reliability of radar to detect speed "cannot reasonably be questioned [and] now serves as precedent for the court within our jurisdiction to take judicial notice of the same").

71. See *United States v. Sued*, 143 F.Supp.2d 346, 352 (S.D.N.Y. 2001) (recognizing the "discretion to take judicial notice of fact not subject to reasonable dispute"); *Maynard v. Pneumatic Prod. Corp.*, 256 F.3d 1259, 1265 (11th Cir. 2001) (Fletcher, J., dissenting) (arguing that the district court's failure to take judicial notice of an agreement was an abuse of discretion).

72. See *supra* notes 64-69.

73. Korn, *Law, Fact, and Science*, 66 COLUM. L. REV. 1080, 1108-09 (1966). Korn discusses the implications to precedent of adopting lower standards of judicial notice such as "professional acceptance" to judicial notice of science and stating, "[f]requently, however, decision of a technical issue will produce knowledge that is viable and transmissible when severed from the particulars of

noticing of scientific principles:

Puzzling enough in this regard, it has been noted that “nowhere can there be found a definition of what constitutes competent or authoritative sources for purposes of verifying judicially noticed facts.” And, it should be noted that after a number of courts take judicial notice of a principle, subsequent courts begin to dispense with the production of these materials and to take judicial notice of the principle as a matter of law established by precedent.⁷⁴

2. *Frye*'s Application to Judicial Notice in State Court

The increasingly disfavored *Frye* general-acceptance test, usually applied to admissibility questions, maintains a parallel existence in judicial notice case law. State courts have been especially likely to use *Frye* to decide judicial notice.⁷⁵ This holds true even in states whose evidence rules regarding judicial notices are similar and often even identical to FRE 201. Even states that have adopted *Daubert*'s admissibility standard, thereby rejecting the *Frye* test for admissibility, continue to treat *Frye*'s application to judicial notice positively.

For example, in *Colorado v. Shreck*, the Colorado Supreme Court allowed DNA evidence to be admitted under the *Daubert* standard. Colorado Rule of Evidence 201(b) is identical to FRE 201(b).⁷⁶ While rejecting *Frye*'s application to the admissibility of scientific evidence, the court noted in a parenthetical citing a previous case that “general acceptance is a proper requirement for taking judicial notice of scientific facts, but should not be a criterion for the admissibility of scientific evidence.”⁷⁷

the case at hand. Difficulties may still remain in gauging the level of certainty of scientific knowledge” See generally Keeffe, Landis & Shaad, *Sense and Nonsense About Judicial Notice*, 2 STAN. L. REV. 664, 667 (1950) (“General rules describing particular facts that can be judicially noticed are worthless.”).

74. JOHN W. STRONG, MCCORMICK ON EVIDENCE § 330, at 496 (5th ed. 1999) (quoting Comment, *The Presently Expanding Concept of Judicial Notice*, 13 VILL. L. REV. 528, 545 (1968)). See also *United States v. Bell*, 335 F. Supp. 797, n. 2 (E.D.N.Y. 1971), *aff'd* 464 F.2d 667 (2d Cir. 1972); *People v. Flaxman*, 141 Cal. Rptr. 799, 803 (Cal. App. Dep't Super. Ct. 1977).

75. See *Colorado v. Shreck*, 22 P.3d 68, 76 (Col. 2001); *Hawaii v. Vliet a.k.a. “Spiderman,”* 19 P.3d 42, 50 (Haw. 2001); *Franklin v. Stevenson*, 987 P.2d 22, 27 (Utah 1999); *Furness v. Pois*, No. 99-P-0014, 2000 WL 1876655, at *3 (Ohio Ct. App. Dec. 22, 2000) (“While ‘general acceptance’ is not a criterion for admissibility, it may allow a trial court to take judicial notice of certain scientific facts.”).

76. COLO. R. EVID. 201(B). See also FED. R. EVID. 201(B).

77. *Shreck*, 22 P.3d at 76 (citing *United States v. Sample*, 378 F. Supp. 44, 53 (E.D. Pa. 1974)). It should be noted that the court did not actually adopt the general-acceptance test for judicial notice. However, just the unnecessary assertion that general acceptance is proper in

The Utah Supreme Court, also with an identical judicial notice rule to FRE 201,⁷⁸ applies the general acceptance test in judicially noticing a scientific principle.⁷⁹ In *Franklin v. Stevenson*, the Utah court held that the trial court was correct not to judicially notice the reliability of therapeutic methods claiming to help recover lost memories.⁸⁰ The Utah court stated that “neither the record nor our research indicate that these techniques enjoy a general acceptance within the field.”⁸¹

Last year, the Hawaii Supreme Court affirmed a district court judge’s admittance of blood-alcohol-concentration level (BAC) expert testimony.⁸² The court held the BAC testimony as reliable by “employing judicial notice of what we believe to be general acceptance of the Widmark formula in the scientific community and by the courts.”⁸³

3. The Problems Created by Applying *Frye* to Judicial Notice

Applying the *Frye* general-acceptance test in judicially noticing scientific principles is questionable for several reasons. First, many considerations that resulted in *Frye* being rejected as a test for admissibility apply at least as strongly to the judicial notice question. For example, *Shreck* inferred that *Frye* general acceptance was a proper standard for judicial notice.⁸⁴ But it then declared the standard “ill-suited for determining the admissibility of scientific evidence, which, by its nature, is ever-evolving.”⁸⁵ The court continued, “[u]nder *Frye*, once a scientific principle or discovery becomes generally accepted, it forever remains accepted, despite improvements or other developments in scientific technologies.”⁸⁶ But the “ever-evolving” nature of science is exactly why the general acceptance test is so ill-suited for judicial notice.⁸⁷ The court asserts that the general acceptance standard is not

deciding judicial notice but not admissibility is bafflingly inconsistent.

78. See UTAH R. EVID. 201; FED. R. EVID. 201.

79. See *State v. Rimmasch*, 775 P.2d 388, 398 (Utah 1989).

80. *Franklin v. Stevenson*, 987 P.2d 22, 28 (Utah 1999).

81. *Id.* at 28.

82. *Hawaii v. Vliet a.k.a. “Spiderman,”* 19 P.3d 42, 50 (Haw. 2001).

83. *Id.*

84. *Colorado v. Shreck*, 22 P.3d 68, 76 (Col. 2001).

85. *Id.*

86. *Id.*

87. *State v. Rimmasch*, 775 P.2d 388, 398 (Utah 1989) (stating that once “a scientific principle or test has achieved sufficient reliability that ‘judicial notice of that fact may be taken, . . . foundational evidence as to the validity of the basic principles may be dispensed with in th[e] jurisdiction in the future.” (quoting *Kofford v. Flora*, 744 P.2d 1343, 1348 (Utah 1987))).

adequate to guard against outmoded or questionable science in admissibility determinations. But if this is true, then judicial notice under the general acceptance standard will not only lead to *admissibility* of outmoded scientific evidence, but *imposed acceptance* of such principles by judicial fiat.⁸⁸

In Utah, “general acceptance” does not serve as the ultimate test for admissibility either. The Utah Supreme Court admits evidence not qualifying for judicial notice if evidence satisfies the trial judge of its “inherent reliability.”⁸⁹ Although endorsing general acceptance’s application to judicial notice, the court in *State v. Rimmasch* criticized the trial courts, stating that it was “convinced that [trial courts] sometimes admit ‘scientific’ evidence without scrutinizing its foundations carefully.”⁹⁰ Strangely, the court’s general-acceptance test for judicial notice suffers from the same problem because courts are likely to short shrift the analysis if there is precedent for judicially noticing the principle.⁹¹ Moreover, the *Frye* test intrinsically does “not scrutiniz[e] its foundations carefully”⁹² because it focuses on the quantity of scholars subscribing to the theory and not the reliability of the theory itself.⁹³ Oddly, although it applies *Frye* to judicial notice questions, Hawaii has also rejected general acceptance as the sole means for determining admissibility.⁹⁴

The second problem with general acceptance is that it magnifies judicial shortcomings in the scientific area. A judge may not be able to distinguish between the shades of gray regarding when something becomes generally accepted. Once general acceptance becomes the test,

88. *Id.*

89. *Id.*

90. *Id.* at 399.

91. See STRONG, *supra* note 74 and accompanying text (stating that “after a number of courts take judicial notice of a principle, subsequent courts begin to dispense with the production of these materials and to take judicial notice of the principle as a matter of law established by precedent”). See also *Kofford*, 744 P.2d at 1348 (stating that once judicial notice of a fact is taken “foundational evidence as to the validity of the basic principles may be dispensed with in th[e] jurisdiction in the future”).

92. *Rimmasch*, 775 P.2d at 399.

93. See *infra* notes 98-99 and accompanying text (explaining that general acceptance is only one inquiry into whether a scientific principle is reliable).

94. See *State v. Montalbo* 828 P.2d 1274, 1280 (Haw. 1992).

Although general acceptance in the scientific field is highly probative of the reliability of a scientific procedure, there are other indicators of suitability for admission at trial. Examination of either the principle underlying scientific evidence, or of the procedure itself, may be a sufficient basis upon which to admit or deny evidence at trial, depending upon the procedure as well as upon the relevance of the evidence to issues at trial.

Id.

the judge will have to assess what level of “generalness” is legally appropriate if there are a few outliers with significantly different opinions. And more difficulty, the judge will be asked to decide which differing scientific opinions are *qualitatively* similar enough to conjoin to form a generally accepted principle. This problem is similar to what Justice Blackmun referred to in *Daubert* as the “twilight zone” problem judges faced in deciding *Frye* questions.⁹⁵ There, Justice Blackmun described as “famous (perhaps infamous)” *Frye*’s assertion that the line between when a scientific principle passes from being experimental to demonstrable is a difficult one and that “[s]omewhere in this twilight zone the evidential force of the principle must be recognized.”⁹⁶

Additionally, state courts following *Daubert* or similar standards⁹⁷ create a third potential problem by treating general acceptance as an acceptable judicial notice standard. The general acceptance of scientific evidence is still a factor in the admissibility inquiry. In *Daubert*, Justice Blackmun stated, “[f]inally ‘general acceptance’ can yet have a bearing on the inquiry. A ‘reliability assessment does not require, although it does permit, explicit identification of a relevant scientific community and an express determination of a particular degree of acceptance within that community.’”⁹⁸

Because general acceptance is just one factor in determining admissibility, other factors may override the general acceptance of a scientific community. This was the case in *United States v. Plaza*. There, the judge initially declined to admit expert testimony identifying “latent” fingerprints, despite the fact that latent fingerprint identification “ha[d] attained general acceptance within the American fingerprint examiner community.”⁹⁹ This creates a problem for states following *Frye* for judicial notice and *Daubert* for admissibility: a scientific principle may be “generally accepted” and thus qualify for judicial notice, while paradoxically being inadmissible under *Daubert*.¹⁰⁰

95. See *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 585 (1993).

96. *Id.*

97. See *supra* note 94.

98. *Daubert*, 509 U.S. at 593 (quoting *United States v. Downing*, 753 F.2d 1224, 1238 (3d Cir. 1985)).

99. See *United States v. Llera Plaza*, 179 F. Supp. 2d 492, 515 (E.D. Pa. 2002), *vacated by* *United States v. Plaza*, 188 F. Supp. 2d 549, 2002 WL 389163, (E.D. Pa. 2002) (“The failure of fingerprint identifications fully to satisfy the first three *Daubert* factors militates against heavy reliance on the general acceptance factor.”). Although Pollak, facing intense scrutiny, see *supra* note 30, withdrew this opinion, it shows that it is possible for something to be generally accepted and still be held to be too unreliable to be admissible.

100. No case has ever recognized this paradox. But this is the theoretical implication of following *Frye* in judicial notice questions and *Daubert* or a similar standard in admissibility

One last problem with the current judicial notice standard is that it is internally inconsistent. FRE 201 provides that a “judicially noticed fact must be one not subject to reasonable dispute in that it is *either* (1) generally known [in the sense that they are ‘facts generally known with certainty by all the reasonably intelligent people’]¹⁰¹ within the territorial jurisdiction of the trial court *or* (2) capable of accurate and ready determination by resort to sources whose accuracy cannot reasonably be questioned.”¹⁰² But what happens when a scientific principle clearly satisfies one part of the standard but not the other?

III. IS A UNIQUE JUDICIAL NOTICE STANDARD SPECIFICALLY APPLICABLE TO SCIENTIFIC AND TECHNOLOGICALLY DERIVED FACTS JUSTIFIED?

The discussion above raises questions about the current standard of judicial notice as it applies to scientific and technical principles. But the question remains, are these problems with judicial notice generally, or are they specific to scientific expertise? At least two differences between judicially noticed scientific principles and other judicially noticed facts support the need for a specific standard relating to scientific principles: inconsistency and competency.

A. *The Current Standard’s Inherent Inconsistency with Science*

The current judicial notice standard is incompatible with the nature of science.¹⁰³ The historical underpinnings of judicial notice concern the

questions.

101. See STRONG, *supra* note 31, at 369.

102. FED. R. EVID. 201(B).

103. FED. R. EVID. 201(a) states that it only applies to “judicial notice of adjudicative facts.” (emphasis added). The term “adjudicative facts” has been interpreted by courts as simply meaning “facts that, in a jury case, normally go to jury.” See BLACK’S LAW DICTIONARY 42 (6th ed. 1990) (citing Grason Elec. Co. v. Sacramento Mun. Util. Dist., 571 F. Supp. 1504, 1521 (E.D. Cal. 1983)). But “fact,” included in this definition, has been interpreted by courts as “[a] thing done; an action performed or an incident transpiring; an event or circumstance; an actual occurrence; an actual happening in time or space or an event mental or physical; that which has taken place.” *Id.* at 591 (citing City of South Euclid v. Clapacs, 213 N.E.2d 828, 832 (Ohio Mun. 1966)). *The American Heritage Dictionary* defines “fact” in the following ways: “1. Something done. 2. Something presented as objectively real. 3. Something that has been objectively *verified*.” THE AMERICAN HERITAGE DICTIONARY 484 (2d College ed. 1982) (emphasis added). The word “verify” comes from the Latin word *verus* and *facere*—literally, “to make true.” *Id.* at 1343. Black’s Law Dictionary defines fact as “[t]he quality of being actual; actual existence or occurrence.” See BLACK’S LAW DICTIONARY 591 (6th ed. 1990). None of these sources assert that a fact is an explanation of an actual occurrence. Therefore, the use of the word “fact” is misleading when applying it to scientific and other technical knowledge.

dichotomy of questions of fact, where it is said that the jury can produce two right answers,¹⁰⁴ and questions of law, where there is only one right answer reserved for the judge.¹⁰⁵ Judicial notice concerned fact questions that were so “well-known by all reasonably intelligent people in the community, or . . . so easily determinable with *certainty* from *unimpeachable* sources . . .”¹⁰⁶ that the existence of one right answer signaled a question of law for the judge to decide.¹⁰⁷ Given these historical underpinnings that have led to the current standard, it is not hard to see how judicially noticed scientific principles acquire an aura of truth.¹⁰⁸

Unfortunately, proof of scientific principles can never reach the level of “certainty” or “unimpeachability” where there is only one “right” or “true” answer. Karl Popper made this point in his piece, *The Logic of Scientific Discovery*.¹⁰⁹ As Popper explains, it cannot be assumed, “that by the force of [scientifically] ‘verified’ conclusions, theories can be established as ‘true’, or even as merely ‘probable’ . . . [t]heories are never empirically verifiable.”¹¹⁰ Instead, science is a method of deductive logic that is used to tell us what isn’t true, although he recognizes that there are some problems with this assertion.¹¹¹ For Popper, science consists of inductive, flash-of-light hypotheses that are tested and retested in an effort to discredit them but never conclusively proven true.¹¹²

Thomas Kuhn depicts a similar problem, describing paradigmatic shifts in science that result in science looking at entire fields differently.

104. See STRONG, *supra* note 31, at 491.

If there is produced at trial enough evidence upon which seriously to deliberate about what actually happened in the past, and provided that in a civil case the evidence is not so overwhelming as to make deliberation unnecessary, there is no scientific litmus by which to assay the accuracy of the opposing versions of the affair. A verdict either way is possible. In the law’s vernacular, we are met with a question of fact. . . . But this compels the conclusion that a question of fact is one to which there are two right answers.

Id.

105. See *id.* at 491 (stating that “the existence of one right answer signals a question of law”).

106. Harper v. Killion, 345 S.W.2d 309, 311 (Tex. Civ. App. 1961).

107. See *id.*

108. See generally State v. Bible, 858 P.2d 1152, 1181 (Ariz. 1993) (“[S]cience’ is often accepted in our society as synonymous with truth. . . .”).

109. See KARL POPPER, THE LOGIC OF SCIENTIFIC DISCOVERY (1968).

110. See *id.* at 27.

111. See *id.* at 42 (stating that although falsification may be avoided with auxiliary hypothesis, the force of competition between different theories and the severity of the test will reveal the fittest by “exposing them all to the fiercest struggle for survival”).

112. *Id.* at 30-32.

Kuhn asserts that, “[l]ed by a new paradigm, scientists adopt new instruments and look in new places. . . . [D]uring revolutions scientists see new and different things when looking with familiar instruments in places they have looked before.”¹¹³ To Kuhn, scientists observe everything through a kaleidoscopic lens composed of their own biases and predispositions, many adopted from the scientific community to which they belong.¹¹⁴

Both Popper and Kuhn strongly suggest that science cannot prove its principles as true. Rather, it is a purely deductive method warped by its community’s own biases. Science temporarily establishes consistency, not long-term truth. It is an observational method subject to change when the working hypothesis is eventually disproved or modified.

As Popper suggests, it is not a principle’s *verifiability*, but its *falsifiability*, that makes it valuable.¹¹⁵ A standard that only recognizes facts that are “indisputable,”¹¹⁶ “certain,”¹¹⁷ or “not reasonably question[able],”¹¹⁸ is inherently inconsistent with knowledge from a method deriving its value from the continued questioning of a working hypothesis. If judicial notice is concerned with letting only things that are unquestionably true be noticed, then it should have no application to scientific principles.¹¹⁹ Also, it seems odd to allow a person of no established competence¹²⁰ in the field declare information unquestionable¹²¹ when that information’s source makes no similar

113. THOMAS S. KUHN, *THE STRUCTURE OF SCIENTIFIC REVOLUTIONS* 111 (2d ed. 1970).

114. *Id.*

115. See POPPER, *supra* note 109, at 40-41 (stating that “not the *verifiability* but the *falsifiability* of a system is to be taken as a criterion of demarcation”).

116. See *supra* notes 64-65.

117. See *supra* note 64 and accompanying text.

118. See FED. R. EVID. 201(B).

119. See *supra* notes 64-65 and accompanying text.

120. See, e.g., FAIGMAN, *supra* note 1, at 53.

Further complicating the law’s use of science, legal consumers of scientific research often have little understanding of the product they are buying. In most areas of the law, those using science have little or no training in the subject. This is true for judges, jurors, legislators, and to a lesser extent, administrators.

Id. Michael L. Slack, *Daubert and Its Progeny: Curbing Junk Science, or Promoting Junk Law*, ATLA Annual Convention Reference Materials, July 2001, at 4, available at WESTLAW, 1 Ann.2001 ATLA-CLE 1231.

You must ask yourself, “Is the judge better qualified to make scientific decisions? What are his or her scientific credentials?” The answer to the former question is typically “no.”

The answer to the later [sic] is “he [or she] doesn’t have any.” Often, the judge has no more scientific background than any other officer of the court.

Id.

121. See *supra* note 64.

claim. That law continues applying standards inapposite to scientific knowledge both shows inconsistency and supports the next premise—that law is not competent in dealing with scientific principles.

B. Competency Shortcomings in Dealing with Scientific Principles

One system of categorization, dividing adjudicative facts into seven distinct areas, may be helpful to illustrate judicial shortcomings in the scientific arena. The seven categories are: Geographic; Matters of History, Economy, Current Events, and Social Conditions; Value of Property; Structure of Government, Office Holders, Public Documents, and Corporate Charters; Court Operations and Records; Medical, Health, and Biology; and Mechanical Facts and Natural Science¹²²

1. Distinguishing Science from Common Sense

Some scientific principles are similar to principles arrived at through everyone's common experience. For example, that a particular toxin in food has a certain carcinogenic effect on the lining of the stomach is what can be referred to as a scientific or technical fact within the meaning of this article. But the fact that common sense may note the possibility of getting a stomachache from something that a person has eaten is not scientific in the sense this article uses the term.¹²³ Judges, as members of the "common" sense, are presumably competent to issue judicial notice concerning appropriate instances of the latter; otherwise judicial notice would have no usefulness at all. Indeed, the courts' willingness to issue judicial notice of geography,¹²⁴ matters of history,¹²⁵ and even a small part of the medical,¹²⁶ health,¹²⁷ and biology¹²⁸

122. See Robert Banks, Jr. & Elizabeth T. Collins, *Judicial Notice in Tennessee*, 21 MEM. ST. U. L. REV. 431, 453-70 (1991).

123. See Banks, *supra* note 122, at 461. See also *supra* note 47 and accompanying text.

124. See *Coover v. Davenport*, 1870 WL 2672, *7 (Tenn. 1870) (taking judicial notice of divisions of counties in Tennessee); *Sublette Exchange Bank v. Fitzgerald*, 168 Ill.App. 240, *2 (Ill. App. 1912) (stating that "the court will take judicial notice of the geographical features of this and other states and countries, so far as the same may be fairly presumed to be within the general knowledge of persons of ordinary intelligence living here").

125. See *Patterson v. Van Wiel*, 570 P.2d 931, 936 (N.M. App. 1977) (stating that "common knowledge includes matters of learning, experience, history, and facts of which judicial notice may be taken").

126. See *Sparks v. Ribicoff*, 197 F. Supp. 174, 176 (D.C. Va. 1961) (stating that that court could only take judicial notice of medical matters that are common knowledge).

127. See *McCue v. Lowe*, 385 N.E.2d 1162, 1164 (Ind. App. 1974) ("It is well-settled that trial courts may take judicial notice of standard mortality tables which are matters of common knowledge of which there is a certainty and of which there is no dispute.").

128. See *King v. King*, 333 A.2d 135, 137 (R.I. 1975) ("It is common knowledge, of which the

categories, is reflected in the common-sense aspect of judicial notice.¹²⁹ And the judge's presumed legal competence would justify judicial notice of structure of Government, office holders, public documents, corporate charters, and of court operations and records. However, judicial notice of scientific matters is more problematic because it depends on what Learned Hand described as "specialized knowledge" outside of the realm of jury experience.¹³⁰

This specialized knowledge is also often outside the realm of judicial experience as well. *Daubert's* dissent voiced precisely this objection. Chief Justice Rehnquist questioned the wisdom of imposing on judges "either the obligation or the authority to become amateur scientists in order to perform that role."¹³¹ *Daubert's* critics often assert that judges cannot adequately perform a gate-keeping function based on known error rate, general acceptance, peer review, and the methodology used without inviting into courtrooms science that is junky.¹³² But if judges are unable to keep inherently unreliable science out of the courtroom on one extreme, it would be odd to conclude that they are capable of conclusively identifying and accepting inherently reliable science on the other. The latter proposition is even more problematic for the law because judges are not required to take evidence before issuing judicial notice.¹³³ And in the latter proposition, the jury is often not available to "nullify"¹³⁴ judicial mistakes.¹³⁵

court may take judicial notice, that during the period when a boy is passing from childhood into the teen years, he undergoes significant biological and emotional changes with a consequent broadening of his intellectual horizons.").

129. See *supra* notes 124-128.

130. See *supra* notes 45-47 and accompanying text.

131. *Daubert v. Merrell Dow Pharm.*, 509 U.S. 579, 601 (1993) (Rehnquist, C.J., dissenting).

132. See, e.g., Laurie Alberts, *Causation in Toxic Tort Litigation: 'Which Way Do We Go, Judge?'*, 12 VILL. ENVTL. L.J. 33, 62 (2001) ("Court-appointed experts may be useful to help judges, who ordinarily have little or no scientific background, to distinguish between 'junk science' and science that is not, under *Daubert*, 'grounded in science,' 'peer reviewed' or 'generally accepted' because it is novel."); Bruce H. White & William L. Medford, *Is Your Expert's Testimony Admissible Under The Supreme Court's Recent Ruling in Kumho Tire Co.?*, 20 AM. BANKR. INST. J. May, 1999 ("The focus on 'science' caused many to question *Daubert's* applicability, not to mention its factors, which appeared tailor-made for 'junk science.'").

133. See BLACK'S LAW DICTIONARY, *supra* note 34 (stating that judicial notice allows the court to dispense with the proof of a noticed principle).

134. See generally, John Clark, *The Social Psychology of Jury Nullification*, 24 LPSYR 39, 39 (2000) ("Jury nullification occurs when the jury acquits a defendant, blatantly disregarding evidence presented at trial which clearly indicates the guilt of the defendant beyond a reasonable doubt."); Lars Noah, *Civil Jury Nullification*, 86 IOWA L. REV. 1601, 1658 (2001) ("In contrast to [criminal] verdicts of acquittal, trial and appellate judges do have the power to intercede in civil cases, but in practice they may find it difficult to discern and correct instances of intentional jury departures from their instructions.").

Even if judges are capable of applying a *Daubert* standard to admissibility questions, capability in a judicial notice context remains problematic. The difference involves the degree that the legal community ties itself to a particular scientific principle. Most interpretations of judicial notice standards rely on language requiring unquestionability,¹³⁶ or indisputability,¹³⁷ compared to a standard of reliability and relevance under *Daubert*.¹³⁸ A judge deeming a scientific principle to be reliable and relevant that later proves not to be will be less damning than a judge conclusively accepting a principle as unquestionable when that principle later becomes questionable or even manifestly unreliable.

2. Scientific Missteps May Compromise the Public's Trust of the Legal System

The lack of consistency and competency in judicially noticing scientific principles may consequently affect public trust of the legal profession. The tension between the scientific and legal communities must be emphasized when analyzing the trust the public places in law to govern its conduct. For a democratic government to establish rules that the public will follow, public trust is essential.¹³⁹ This leads to an interesting paradox. In several studies, scientists, whose basic work is not as dependent upon trust, continually outrank legal institutions and government, whose very existence is dependent on trust and credibility.¹⁴⁰ One study comparing public confidence in the leadership

135. See FED. R. EVID. 201(g) (stating that judicial notice shall be conclusive in civil cases).

136. See, e.g., *Smith v. City of Pottsville*, No. CACR99-574, 2000 WL 177605, at *3 (Ark. Ct. App. Feb. 16, 2000) (“Finally, appellate courts may take judicial notice of ‘the unquestioned law of nature’ . . .”) (quoting *Stephens v. State*, 320 Ark. 426, 898 S. W.2d 435 (1995)); *Fine Foods Inc. v. Dahlin*, 523 A.2d 1228, 1231 (Vt. 1986) (“The distance from the Old Newfane Inn to plaintiffs’ restaurant in Brattleboro is a fact which the trial court could accurately determine from unquestionable sources, and, thus, judicial notices was within its discretion.”).

137. See, e.g., *U.S. v. Herrera-Ochoa*, 245 F.3d 495, 501 (5th Cir. 2001) (“Judicial notice may be taken of any fact ‘not subject to reasonable dispute . . .’”) (citing FED. R. EVID. 201(b)); *Hinkle v. Hartsell* 509 S.E.2d 455, 458 (N.C. App. 1998) (“As the statute implies, a court may take judicial notice of a fact if it is an ‘indisputable adjudicative fact.’”) (quoting *In re D.S.* 622 A.2d 954, 957 (Pa. Super. Ct. 1993)).

138. See *Daubert v. Merrell Dow Pharm., Inc.* 509 U.S. 579, 579-80 (1993) (“The Rules . . . place appropriate limits on the admissibility of purportedly scientific evidence by assigning to the trial judge the task of ensuring that an expert’s testimony both rests on a reliable foundation and is relevant to the task at hand.”).

139. See Mary Christina Wood, *Protecting the Attributes of Native Sovereignty: A New Trust Paradigm for Federal Actions Affecting Tribal Lands and Resources*, 1995 UTAH L. REV. 109, 132 (1995) (drawing a correlation between the ability to govern and trust).

140. See nsf.gov, Science & Engineering Indicators 2006: Science and Technology: Public

of various institutions found that the scientific community ranked second among all studied institutions—ahead of the Supreme Court, education, medicine, and even organized religion.¹⁴¹

While the law attempts to bring scientific evidence into many of the decisions it makes, it does so at its own peril. Trust may be severely compromised by one mistaken decision amidst a slew of correct ones.¹⁴² Thus, judges, whose competency in dealing with scientific and technical evidence is already widely questioned,¹⁴³ may suffer a net trust loss, even if they manage to get the scientific or technical question right more often than wrong in issuing judicial notice. As Paul Slovic points out in his book, *The Perception of Risk*, “Trust is fragile. It is typically created rather slowly, but it can be destroyed in an instant—by a single mishap or mistake. Thus, once trust is lost, it may take a long time to rebuild it to its former state.”¹⁴⁴

What has been created by these consequences is the proverbial Catch-22. Science is already a more trusted leader than law in making many decisions.¹⁴⁵ This often puts pressure on law to use science in decision-making. To efficiently use science and technical knowledge in the courtroom, judicial notice must be an available tool, or many proceedings will become bogged down by lengthy proofs of scientific principles.¹⁴⁶ But because the law lacks competence in evaluating

Attitudes and Public Understanding, <http://www.nsf.gov/statistics/seind06/c7/c7s3.htm> (last visited May 9, 2006). See generally Wendy E. Wagner, *Congress, Science, and Environmental Policy*, 1999 U. ILL. L. REV. 181, 225 n.157 (1999) (quoting Kristina Petkova & Pepka Boyadjieva, *The Image of the Scientist and Its Function*, 3 PUB. UNDERSTAND. SCI. 215, 215, 222 (1994)) (reporting that “[m]any leading sociologists of science have pointed out that the scientist is portrayed by society as an almost mythological figure” and concluding, based on an empirical study, that “the image of the scientist has been described in an elevated way with elements of idealization”); *Id.* (quoting Daniel S. Greenberg, *Thumbs Up for Science*, WASH. POST, July 8, 1996, at A15) (stating that “results of polls taken between 1983 and 1995 that reveal the public consistently ranks scientists well ahead of legislators with regard to their ‘confidence in the people running various institutions’”).

141. nsf.gov, Science & Engineering Indicators 2006: Science and Technology: Public Attitudes and Public Understanding, <http://www.nsf.gov/statistics/seind06/c7/fig07-19.htm> (last visited May 9, 2006).

142. See Paul Slovic, *Perceived Risk, Trust and Democracy*, in PAUL SLOVIC, *THE PERCEPTION OF RISK* 320-23 (2000) (comparing the effect that positive and negative events at a nuclear power plant have on public trust).

143. See *supra* note 120.

144. See Slovic *supra* note 142.

145. See Wagner, *supra* note 140 at 225 n.157.

146. See generally Robert D. Leinbach, Note, *Novel Scientific Evidence After Reese v. Stroh: The Washington Supreme Court’s Love Affair With Frye*, 71 WASH. L. REV. 1127, 1151 n.181 (1996) (“[T]he use of judicial notice will minimize the need for judges to engage in time-consuming investigations. . .”).

scientific principles, judicially noticing those principles may result in a net loss of public trust.¹⁴⁷ This possibly remains true even if judges are right more often than they are wrong.¹⁴⁸ And it is potentially true even if the law's application of judicial notice to science—as clumsy as it may be—results in a net gain in cases being decided correctly and efficiently.

IV. A SOLUTION TO THE DILEMMA

An acceptable solution to this dilemma must directly address the two components that make judicial notice of scientific principles so problematic—inconsistency and competency.

A. A New Judicial Notice Standard for Scientific Principles

The inconsistency problem can be fixed by creating a new judicial notice standard for scientific principles. FRE 201 ½ would be created specifically for scientific and technical judicial notice questions. It would have the following standard:

Based on current scientific understanding, the principle clearly and convincingly appears reliable because of 1. observed consistency during rigorous testing, 2. acceptance as apparently reliable by nearly all people in that specific field, and 3. without significant objection by people in science or technology generally.

This standard is desirable for its consistency with scientific and technical fields. It is preferable to the old one because it is honest about the value of scientific principles in the legal system. Scientific principles can only “appear reliable” “based on current scientific understanding,” they cannot be “certain,” “unquestionable,” or “indisputable.”¹⁴⁹ By including this limitation on judicially noticed principles, the standard allows for science to change and for courts to adapt to it. In short, there will be no more need for the uncomfortable confession that what courts had previously deemed indisputable turned out to be very disputable. And judges will not be stuck with balancing the same shortsighted indisputability claim for other scientific principles against the need for efficiency. Additionally, requiring the injury to be “based on current scientific understanding” would encourage the decision maker not to conduct such a cursory analysis to stale principles

147. See *supra* notes 143-144.

148. *Id.*

149. See *supra* notes 103-121.

recognized by judicial notice precedent.¹⁵⁰

The standard's insistence on the clear and convincing appearance of reliability differentiates the standard from ordinary admissibility decisions under *Daubert*. To justify binding the jury to accept the principle with no evidentiary presentation, it should have a convincing appearance of reliability judged by current scientific standards. It should also withstand rigorous testing attempting to discredit it, as required in the first prong of the test.

The principle should also be accepted as apparently reliable by "nearly all" people in a particular scientific field. And it should not be objected to by other areas of science or technology. These requirements assure that one field of science wholeheartedly endorses a particular principle before it is judicially noticed, while also assuring that principles subject to inter-field disputes regarding their reliability will not be judicially noticed. This would help alleviate the problem regarding judicial notice of fingerprint identification that is endorsed by one field while questioned by others.

Some may object that the last prong of the standard resembles the *Frye* standard I have already criticized. There are three key differences with this new standard. First, many of the objections to the *Frye* standard relate to judicial competence to determine "general acceptance."¹⁵¹ Those problems are greatly diffused by a second solution discussed below.¹⁵² Second, the *Frye* test is undesirable partly because it was the *only* test used for judicial notice. Even *Daubert* admits that some acceptance standard is relevant in gauging a scientific principle's apparent reliability.¹⁵³ Third, the consistency through rigorous testing requirement provides a check on the acceptance prong of the test by ensuring that the legal system will look underneath acceptance to also check the perceived reliability of the principle. And finally, the new standard specifies that acceptance is required by "nearly all" of a particular field. Thus, while it does suffer from a vagueness objection, it doesn't suffer it to the same degree that a general acceptance standard would.¹⁵⁴

150. See *supra* note 74 and accompanying text.

151. See *supra* notes 95-96.

152. See *infra* notes 155-161 and accompanying text.

153. See *Daubert v. Merrell Dow Pharm.*, 509 U.S. 579, 593 (1993) (stating that general acceptance is still a relevant factor in gauging the reliability of scientific evidence).

154. General acceptance could mean anything from a bare majority to unanimity. The "nearly all" language at least implies that a bare majority would be unacceptable.

B. Alleviating the Competency Problem Through a New Officer of the Court

The competency problem could be addressed in at least two ways. The first way would require judges and other officers of the court to complete a scientific education requirement. This requirement is certainly not unknown in the law. Patent lawyers have such a requirement.¹⁵⁵ Given the proliferation of science in the courtroom, this requirement seems to make sense. But this solution is probably unworkable for several reasons. First, in order to educate, some amount of initial aptitude is necessary. Many argue that the very reason many judges and lawyers chose the field in the first place was their lack of aptitude or interest in scientific and other technical areas.¹⁵⁶ Second, judges already on the bench would have to be subject to the new education requirement for it to be effective. It seems likely that such a solution would be subject to considerable institutional resistance. Third, the scientific and technical fields are becoming increasingly specialized.¹⁵⁷ It is questionable whether judges would have the time to maintain their current legal work and then learn enough scientific knowledge to competently dispose of scientific judicial notice matters. This is especially true considering the docket pressures that most judges already face.¹⁵⁸ Indeed, if these “amateur scientists” screw up, as they inevitably will, the same trust consequences are likely to occur as in the current system. Judges and law lose credibility, with no net effect on the credibility of the scientific field itself.

The second solution to the dilemma is more desirable. Create new officers of the court—neutral scientific advisers. This adviser would be

155. See General Requirements Bulletin, <http://www.uspto.gov/web/offices/dcom/olia/oed/grb0210.pdf> (last visited Apr. 21, 2002) (requiring a Bachelor’s Degree in specific scientific or technical areas to register to take the patent bar).

156. See FAIGMAN, *supra* note 1, at 53.

All judges and most legislators and administrators come from the rank of lawyers. These are people who typically ended up in law school because their prospects in science and math were dim. Fewer than 10 percent of all students attending law school have undergraduate degrees in fields that require substantial math and science training, such as the natural sciences, math and statistics, computer science and engineering.

Id. at 53-54.

157. See Marc P. Press, *Premenstrual Syndrome as a Defense in Criminal Cases*, 1983 DUKE L.J. 176, 179 n.23 (1983) (“In light of today’s rapid increase of scientific specialization and progress, . . . not only are the courts unable to determine the accuracy of the newest devices, but many of the experts themselves are unable to keep abreast of all the developing techniques.”).

158. See Margaret Martin Barry, Conference, *Access to Justice: On Dialogues With the Judiciary*, 29 FORDHAM URB. L.J. 1089, 1101 (2002) (“Respect for the litigants is often lost in the process of moving crowded dockets. . . .”).

a lawyer with appropriate scientific credentials. The new officer would serve a specified number of courts on judicial notice questions within his or her general competence.¹⁵⁹ Under the new system, before the judge could issue judicial notice of a scientific principle, the adviser would provide the judge with non-party advice on the decision. If the judge were to rule contrary to the adviser, the adviser would produce a formal, but non-binding, dissent to be used in any subsequent appeal. Such a system continues to allow judges to decide whether judicial notice will be issued in the first place, while reducing the likelihood of noticing something based on outdated or unreliable science. By allowing the judge to control the initial question of whether to submit the judicial notice question to the adviser, the institutional resistance from the legal community is likely to be less daunting because less power is given up than if the issue were totally in the hands of the adviser.

The system would still allow the judge to deny judicial notice to deserving scientific principles. But this error is not as damning to the trust of the legal institution. Even if judicial notice were denied, the evidence of the principle would still possibly be admissible under *Daubert*.¹⁶⁰ Because admissibility would still be possible, the judge would not be taking away a question from the jury based on mistaken application of scientific principles. Therefore, the mistake of denying judicial notice would still allow the legal process to properly apply the scientific principle to correctly decide the case.

The new system also protects the legal process' use of science if both the judge and the scientific expert mistakenly issue judicial notice of a principle. When both the judge and expert are mistaken, the judge's trust loss may not be as severe because it managed to fool the scientist professional as well. The zero-sum game is replaced by win-win or lose-lose in the competition for public confidence in leadership abilities. The adviser also safeguards the law's public trust in another way. Scientists and technical professionals may be less amenable to flogging one of their own for a mistake than they are to mocking the law's use of science. By tying one of their own to the judicial notice two-by-four, we give them less incentive to light fires under the legal edifice.

Some may object to the cost of hiring a new officer of the court.

159. It is logical to assume that the adviser's specific expertise will not reach every specialized area of science. But at the very least, this adviser would be starting with a well-developed foundation concerning basic principles of scientific knowledge and would presumably be more likely to have the aptitude and interest necessary to learn more about the field if necessary. Such a system would be much better than the one that is now in place.

160. See *supra* text accompanying notes 75-76.

But these costs should be weighed against the current system's inefficiencies in letting judges mistakenly apply scientific principles to distribute economic wealth and justice. Indeed, such concerns should be balanced against the possibility that many judges, perceiving their own lack of skill in the area, do not issue judicial notice in many instances where it is warranted.¹⁶¹ By allowing judges to simply raise the judicial notice question and seek counsel of the more-knowledgeable adviser, it may well be that judicial notice is issued more often, lessening the time spent litigating an issue and consequently lowering the cost of a legal dispute.

In short, the new standard provides a more consistent alternative in issuing judicial notice of scientific principles. It does this by dealing up front with the changing nature of science and being honest about the temporary nature of the reliability finding. The neutral adviser will also, in my view, considerably improve competency in judicially noticing scientific principles. It will also protect against junk-science submitted by party-affiliated experts. Ultimately, the changes will allow the law to keep pace with scientific understanding. Until then, law will continue its unrealistic hope that today's scientific principles will prove less subject to change than yesterday's. After all, a judge in 2001 would never regret stating that "DNA evidence [] indisputably linked" the suspect to the crime.¹⁶²

161. *See generally*, Johnson v. Com. 12 S.W.3d 258, 267 (Ky. 1999) (Stumbo, J., dissenting) ("Rather, judicial notice of scientific evidence should be reserved for the rare occasion when the evidence sought to be admitted is seemingly beyond dispute, such as, for example, evidence that the sun rises every day in the east, or acknowledgment of the law of gravity."); U.S. Sugar Corp. v. Henson, 787 So.2d 3, 16 (Fla. App. 2000) ("Nonetheless, courts rarely take judicial notice of a scientific theory or scientific technique.").

162. Harris v. State, 749 N.E.2d 57, 59 (Ind. App. 2001). *See also* Debra C. Moss, *DNA: The New Fingerprints*, A.B.A., May 1, 1988 at 66 (stating that "[i]n the family law area, [DNA] means a woman suing for paternity can establish conclusively whether the respondent is the father").