Articles

Scientific Expert Testimony and Intellectual Due Process

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Suppose that two groups of expert mathematicians disagree about a complex mathematical question—say, whether Princeton mathematician Andrew Wiles really did solve “Fermat’s Last Theorem,” which no mathematician had been able to prove since Louis Fermat first propounded it about 360 years ago.¹ These experts have had an opportunity to hear one another’s reasons for their competing conclusions about Wiles’s proof, and neither group is convinced by the other. How might we decide which of the two groups is making the correct mathematical judgment? Here’s a suggestion: Convene a group of twelve or so nonmathematicians, give them an opportunity to hear from representatives of each of the competing groups of mathematicians, and have the *nonmathematicians* decide whether Wiles’s proof really succeeded. If the truth of the matter was among one’s chief concerns, would this decision procedure seem sound? There is serious reason to doubt it. The most obvious problem with such a procedure is that it seems to turn the decision about this disputed, highly complex question in the science of mathematics over to those who are *least* competent to answer it.

Many legal systems, including the state and federal systems of the United States, use decision procedures that are disturbingly close to the one just imagined, procedures in which nonexpert judges and juries are called upon and authorized to evaluate expert scientific testimony. This Article’s goal is to offer a sustained critical analysis of the legal rules and doctrines that create and administer this procedure. Expert scientific information is relevant to, even decisively important in, a rapidly growing percentage of decisions throughout civil and criminal law. Most judges and juries, however, are not sufficiently familiar with relevant scientific fields to be able independently and reliably to bring scientific information to bear on their decisions. Instead, they must solicit and defer to the judgments of expert scientific witnesses.

Moreover, almost inevitably in litigated cases in which expert scientific evidence is offered, nonexpert judges and juries are presented, not with one authoritative “voice” of scientific truth, but instead with competing scientific expert witnesses who testify to contrary or even contradictory scientific propositions. Lacking the information necessary to make cogent independent judgments about which of the competing scientific experts to believe, nonexpert legal decisionmakers choose among the experts by relying on such indicia of expertise as credentials, reputation, and demeanor. Thus, even the act of soliciting and deferring to expert scientific judgment requires nonexperts to use a *reasoning process*—the process of selecting the experts, deciding which expert to believe when the experts compete, and, finally, deciding how

1. According to this theorem, whenever n is greater than 2, the equation $a^n + b^n = c^n$ cannot be solved in whole numbers. Wiles’s proof is nearly 200 pages long. See SIMON SINGH, *FERMAT’S ENIGMA* 256 (1997) (discussing the first efforts of the mathematical community to check Wiles’s proof).

to use the believed expert's information in resolving the central dispute being litigated.

Drawing on work in jurisprudence, epistemology, philosophy of science, and theories of practical reasoning, as well as on doctrines and leading cases on scientific expert evidence, this Article carefully models the reasoning process by which nonexpert legal reasoners defer to scientific experts in the course of applying a law to individual litigants. Drawing on this model, I argue for four central conclusions. Taken together, these conclusions have far-reaching consequences for virtually all legal systems in which nonexpert legal decisionmakers confront expert scientific testimony.

First, the Article argues that in order to avoid making an *epistemically arbitrary* choice about which of the competing scientific experts ought to be believed, a person must *understand* (in a special sense discussed in the text) the cognitive aims and methods of science. But nonexpert judges and juries lack just that kind of understanding, which is why they rely instead on other indicia of expertise, such as credentials, reputation, and demeanor. Second, nonexpert judges' and juries' lack of understanding of the cognitive aims and methods of science and their reliance on such indicia of expertise as credentials, reputation, and demeanor to choose between competing scientific experts thus yield only *epistemically arbitrary* judgments. Third, the conclusions that nonexpert judges and juries ultimately reach by relying significantly on expert scientific testimony are often also epistemically arbitrary and are therefore *not justified from a legal point of view*. Fourth, I identify—and begin the process of explicating—an emerging norm that belongs in the family of rule-of-law values: the norm I call *intellectual due process*. Showing that this norm is immanent in values to which many legal systems—including those in the United States—are already committed, I explain the way in which this norm places important *epistemic* constraints on the reasoning process by which legal decisionmakers apply laws to individual litigants. This norm requires, among other things, that the decisionmaking process not be arbitrary from an epistemic point of view. In other words, nonexpert judges and juries often fail to satisfy the demands of intellectual due process when they solicit and rely upon scientific expert testimony.

In sum, I argue that values to which legal systems are and ought to be committed actually condemn one of the most firmly entrenched evidentiary methods currently in place. As scientific theories continue to become more specialized, complex, and relevant to a widening range of cases, this incoherence between normative aspiration and actual doctrinal and institutional procedure will increasingly threaten the legitimacy of nonexperts' legal decisions. I conclude the Article with some brief observations about the kinds of doctrinal and institutional reforms that might better enable legal systems to meet the high aspirations of intellectual due process, thereby restoring, or at least improving, the coherence of value and institutional practice.

I. THE DOCTRINAL AND INSTITUTIONAL FRAMEWORK OF EPISTEMIC DEFERENCE

A. *Evidence, Procedure, and the "Law's Epistemology"*

In the course of making legal decisions, judges, juries, lawyers, and other legal reasoners must constantly repair to factual judgments about the world.² Indeed, if one treats judgments about what legal authorities have decided as being within the scope of "the world," one might even conclude that *every* legal decision involves some judgment about the way the world is.³ One of the most important overall decisions legal systems must make is how, if at all, to regulate the descriptive claims about the world—claims, that is, about how the world is, was, or will be—that enter into the legal system. In most civil and criminal cases, the principal doctrinal and institutional mechanisms for this kind of regulation are rules of evidence and procedure. In virtually every area of civil and criminal law, these are the rules that regulate judgments by legal officials (principally judges, but also legislative officials) about which conclusions of fact are both relevant to given legal judgments and adequately justified. In regulating these judgments, rules of evidence and procedure comprise what we may call the "law's epistemology"—the set of rules and

2. The advisory committee note to Federal Rule of Evidence 201 makes the point nicely:

[E]very case involves the use of hundreds or thousands of non-evidence facts. When a witness in an automobile accident case says "car," everyone, judge and jury included, furnishes, from non-evidence sources within himself, the supplementing information that the "car" is an automobile, not a railroad car, that it is self-propelled, probably by an internal combustion engine, that it may be assumed to have four wheels with pneumatic rubber tires, and so on. The judicial process cannot construct every case from scratch, like Descartes creating a world based on the postulate *Cogito, ergo sum*.

FED. R. EVID. 201 advisory committee's note (citation omitted).

3. If assertions about what the law is are assertions of fact, then there is no legal decision that does not require some judgment about the way the world is, for even what are usually regarded as "purely legal questions," such as questions of law about the interpretation of statutes, are questions about the world. A proper analysis of this issue concerning the "factual" nature of the law combines the doctrinal analysis of rules of evidence, on the one hand, with the jurisprudential analysis of the concept of law, on the other. Legal positivists characteristically treat statements about what the law is as statements of fact. Jules Coleman, for example, asserts that legal positivism is best associated with at least two theses about the nature of law. One is the "negative" thesis that the moral acceptability of a norm is not a necessary condition of its legality. The other is the "positive" thesis that "law is ultimately a matter of social fact in the sense that the authority of the rule of recognition is itself a matter of social convention." Jules L. Coleman, *Rules and Social Facts*, 14 HARV. J.L. & PUB. POL'Y 703, 716-17 (1991). If law really is a social fact in this sense, then knowledge of what the law is itself is knowledge of a type of fact—i.e., knowledge about the way (part of) the world is. This positivist treatment of law as fact would seem to accord well with the common law view that law is the kind of thing that can be "judicially noticed." See, e.g., *Schultz v. Tecumseh Prods.*, 310 F.2d 426, 433 (6th Cir. 1962) ("The law of any State of the Union, whether depending upon statutes or upon judicial opinions, is a matter of which the courts of the United States are bound to take judicial notice, without plea or proof." (quoting *Lamar v. Micov*, 114 U.S. 218 (1885))). Nonpositivist accounts, such as Ronald Dworkin's, which view law as interpretive rather than factual, are not easily reconciled with the familiar evidentiary doctrine that law can be judicially noticed. There are, however, ways to explain "interpretive" judgments as factual ones—for example, by treating a statement about what the law is as that interpretation of the relevant legal materials that *in fact* makes it "the best" it can be. See RONALD DWORKIN, *LAW'S EMPIRE* 45-113 (1986).

institutions that determine what, from a legal point of view, can be believed with sufficient justification for the purposes of the legal system.

Ultimately, my argument is a philosophical one: *When a certain condition ("the underdetermination condition") is satisfied by the aggregate testimony of scientific witnesses in a particular case, there is compelling reason to doubt that a nonexpert legal reasoner can acquire expert information from a scientific expert in a manner that is both epistemically and legally justified.* I set up this philosophical analysis with a detailed and focused examination of legal rules and institutions—chiefly those in U.S. federal law. There is an important heuristic relation between the highly abstract philosophical analysis presented in this Article and the rather concrete analysis of doctrine: Each keeps the other intellectually honest. Philosophical analysis without detailed facts is blind; recitation of detailed facts without philosophical analysis is ignorant. Philosophical inquiry into the practices of an institution proceeds by examining the structures of the concepts, arguments, and other intellectual procedures that comprise those practices.⁴ My specific philosophical inquiry is whether and under what conditions it is possible for scientific experts to convey justified beliefs to nonexpert judges and juries.⁵ To be successful, such inquiry must be deeply informed by at least some *actual* practices of the type that are examined and explained. In this area of "legal epistemology," an understanding of "what is actual" will materially inform the analysis of "what is possible," just as detailed analysis of scientific theories and methods deeply informs the philosophical analysis of science.⁶ Thus, an adequate philosophical investigation of whether and how a legal system might achieve justified epistemic deference by nonexperts to experts requires attending to the ways in which current legal systems seek to achieve it. In this way, the detailed doctrinal discussion in Part II will inform the philosophical inquiry that this Article pursues throughout.

In the American federal system (to which, for the most part, I confine my discussion of doctrine⁷), the rules most directly concerned with the shepherding of experts' beliefs from their minds into those of legal

4. I discuss the distinctive philosophical "point of view" at length below. See *infra* Sections II.B-C.

5. The explanation of how some state of affairs or some condition (e.g., knowledge or truth) is possible is one standard mode of philosophical explanation. For discussion of this mode, see ROBERT NOZICK, *PHILOSOPHICAL EXPLANATIONS* (1981).

6. Norwood Hanson's observation about philosophy of science—"profitable philosophical discussion of any science depends on a thorough familiarity with its history and its present state"—is no less true for philosophical analysis of law. NORWOOD RUSSELL HANSON, *PATTERNS OF DISCOVERY: AN INQUIRY INTO THE CONCEPTUAL FOUNDATIONS OF SCIENCE* 3 (1958).

7. I confine my analysis to federal doctrines of evidence for two reasons. First, a great many states have adopted rules that are very close to the federal rules and routinely look to federal court decisions under those rules as persuasive authority. Second, the philosophical issues I raise after discussing some basic issues in the doctrines of evidence pertain to any system seeking to bring scientific expert information into the legal decisionmaking process. Focusing on one more-or-less unified jurisdictional system serves to make the philosophical discussion less abstract by showing how it relates directly to an existing set of laws.

decisionmakers are the rules of evidence that pertain to expert testimony,⁸ relevance,⁹ and judicial notice.¹⁰ Close examination of two well-known U.S. Supreme Court decisions will serve to introduce this basic rule framework and to call attention to the nature and importance of nonexpert deference to experts in the American legal system. One of these decisions, *Daubert v. Merrell Dow Pharmaceuticals, Inc.*,¹¹ interpreted key provisions of the Federal Rules of Evidence concerning admission of expert testimony, and so its direct relevance to my topic is no surprise. The other decision is *Brown v. Board of Education*,¹² a decision far better known for its momentous holding under the Equal Protection Clause regarding governmentally mandated segregation. Despite its more common association with equal protection doctrine, *Brown* and its progeny also conspicuously illustrate the crucial importance of a court's use of putatively scientific results in reaching and attempting to justify legal decisions. Taken together, *Daubert* and *Brown* forcefully present the doctrinal issues that I analyze from a philosophical point of view in the remainder of this Article.¹³

B. *Daubert's Philosophy of Science*

Among the most important concepts in the law's epistemology are relevance, admissibility, weight, and sufficiency of evidence. Because scientific expert testimony is evidence, it is subject to analysis under each of these categories—it can be relevant or not, admissible or not, sufficient or not, and given a certain deliberative weight by those assessing it. *Daubert* made the *scientific reliability* of scientific evidence the touchstone of its admissibility. Before discussing *Daubert* itself, I briefly summarize (and oversimplify) these four basic evidentiary concepts and the institutional procedures in which they play a role.

Rules of evidence and procedure effect a division of decisionmaking labor between two types of legal reasoners, each serving a distinct function, with

8. See FED R. EVID. 702-706.

9. See *id.* 401-403.

10. See *id.* 201. These are the main rules, but several others contribute to the effort to effect a reliable transfer of expert information to nonexpert legal decisionmakers, such as the exception to the hearsay rule for learned treatises. See *id.* 803(18) (concerning admission of learned treatises).

11. 509 U.S. 579 (1993).

12. 347 U.S. 483 (1954).

13. This important relationship between *Daubert* and *Brown* has been largely unremarked upon by legal scholars, but not wholly so. Gordon Beggs, for example, observes that since *Daubert*, scholars have commented extensively on the expanded use of expert evidence . . . [in] the fields of mass tort litigation and criminal law. Less noticed, but no less dramatic, is the parallel increase in the use of expert evidence in federal civil rights litigation. Beginning with the landmark case of *Brown v. Board of Education*, this trend is reflected in the diverse issues involving expert proof, often novel in nature, which have regularly appeared in the Supreme Court's civil rights decisions.

Gordon J. Beggs, *Novel Expert Evidence in Federal Civil Rights Litigation*, 45 AM. U. L. REV. 1, 2-3 (1995) (footnotes omitted).

some overlap. One function, always served by judges, is to make decisions “as a matter of law” regarding the interpretation and application of laws, including laws of evidence.¹⁴ The other function is that of factfinder. This is sometimes performed by the judge without a jury and sometimes performed by the jury under the close supervision of the judge—supervision itself guided by rules of evidence and procedure. Factfinders, whether judges or juries, “find” facts that are relevant to a case—the whos, whats, whens, wheres, and whys of a litigated dispute. These are sometimes called “evidentiary facts.” Factfinders also make judgments about whether some legal predicate like “murder” or “breach of contract” or “negligence” applies to the (evidentiary) facts in the way the complaining litigant claims it does.¹⁵ These are judgments about what are sometimes called “ultimate issues,” or “ultimate facts,” or “mixed questions of law and fact.” For example, the judgment about whether a person was “unreasonably searched” under the Fourth Amendment might be broken into a law component, namely, the meaning of “unreasonable search,” and a fact component, such as where the police were standing, where the citizen was standing, etc. Perhaps the only real importance of the division of labor into “lawfinding” and factfinding is that appellate courts are far more deferential to decisions made by factfinders (whether judges or juries) than they are to the “lawfinding” decisions of lower court judges. (The reason for this difference in deference is simple and sensible. Appellate courts are not institutionally designed to examine testimonial evidence and other kinds of evidence firsthand and so are far less well-situated than factfinders to make an accurate factual judgment in the face of competing factual claims.)

Judges have special and quite significant duties vis-à-vis factfinders with respect to proffers of evidence. It is the judge who must make threshold decisions about which evidence proffered by a litigant is *admissible* and which is not.¹⁶ Decisions about admissibility are made as a matter of law and as such are subject to review by an appellate court (though the review of this judgment is more lenient, more deferential, than is the review of other legal judgments, such as the interpretation of statutory, regulatory, or constitutional provisions or of the jurisdiction’s authoritative common law doctrines). The factfinder is permitted to consider all and only that evidence that passes this threshold test of admissibility. This is true even when the judge herself is the factfinder; having ruled as a matter of law that evidence is not admissible, the judge who is also a factfinder in the case is not permitted to consider it.

Admissibility and *relevance* are closely related. The Federal Rules of Evidence, for example, make the relevance of proffered evidence a necessary

14. See FED. R. EVID. 104(a).

15. For a discussion of the logic and pragmatics of maintaining a claim at law, see Scott Brewer, *Exemplary Reasoning: Semantics, Pragmatics, and the Rational Force of Legal Argument by Analogy*, 109 HARV. L. REV. 923, 998 n.215 (1996).

16. See FED. R. EVID. 104(a).

condition of its admissibility, and make it a *prima facie* sufficient condition as well.¹⁷ Like the judgment of admissibility, the judgment of relevance is made by a judge prior to trial, when considering whether to admit proffered evidence so that the factfinder may consider it. In the federal system, "relevant" evidence is divided into two main categories: "logical relevance" and "pragmatic relevance." Logically relevant evidence is evidence that has "any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence."¹⁸ (The modern statutory treatment of the concept of relevance in American law obscures the traditional common law distinction between *relevance* and *materiality*—concepts that, in their traditional distinct meaning, will be useful in my later argument.)¹⁹ "Pragmatically" relevant evidence is evidence whose probative value is *not* "substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence."²⁰ A judge is permitted to exclude even logically relevant evidence if it is not pragmatically relevant.

Once the judge decides that proffered testimonial evidence—including testimony by experts—is admissible, the factfinder is presented with that evidence. The factfinder listens to the screened experts and decides to what extent to credit their testimony and what impact that testimony should have on the case as a whole. The decision about the extent to which testimony and other evidence should be credited is a decision about the *weight* of the

17. Rule 402 states in full: "All 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. Evidence which is not relevant is not admissible." *Id.* 402.

18. *Id.* 401. *Relevance* is to be distinguished from the *burden of proof*, which is also often referred to in probabilistic terms. The burden of proof is the rule the factfinder uses in assessing whether, given all the evidence that has been admitted, the complaining litigant has proven his assertions.

19. The modern, statutorily enacted Federal Rules of Evidence have eliminated the handy reference to the distinction between *materiality* and *relevance* that was a centerpiece of the common law of evidence (though they fortunately have not eliminated the effective legal significance of the distinction itself). In the common law system, evidence was said to be "relevant" if it tended to establish the point for which it was offered. It was "material" if the point for which the evidence was offered actually bore on issues in the case. See CHRISTOPHER B. MUELLER & LAIRD C. KIRKPATRICK, *EVIDENCE UNDER THE RULES* 62 (2d ed. 1993). Under Rule 401, however, the requirement that the fact proved must be "of consequence to the determination of the action," FED. R. EVID. 401, effectively assimilates the judgment of materiality (in the common law sense of the term) into the judgment of relevance. Thus, under the newer rules, a lawyer no longer makes separate objections regarding the relevance (whether the proffered evidence tends to establish the point for which it was offered) and materiality (whether the proffered evidence bears on issues in the case). Instead, there is simply a uniform objection on grounds of irrelevance, which could really be either an objection that the evidence is not relevant or that it is not material (in the common law senses of these terms) or both. See John R. Schmertz, *Relevancy Under 401: A Dual Concept*, *LITIGATION*, Spring 1988, at 12, 12. Because of this "underdeterminative" quality of the objection under the Federal Rules of Evidence on grounds of irrelevance, it would be far more useful to maintain the old common law concepts of materiality and relevance for both ease of reference and clarity and accuracy of evidential analysis. I use the basic concepts of materiality and relevance (in their older, common law sense) to articulate the concept of "rational pertinence." See *infra* Section V.B.

20. FED. R. EVID. 403.

evidence. Should there be an appeal after trial in which the losing party claims that, as a matter of law, the evidence did not support the ultimate decision made by the judge or jury, an appellate court considers whether, as a matter of law, the evidence was *sufficient* to support the verdict.

I turn now to the specific evidentiary issues in *Daubert*. In *Daubert*, the Supreme Court considered the proper method by which federal judges are to evaluate proffers of scientific evidence in deciding whether to *admit* that evidence.²¹ Displacing the test that had long been used in the federal courts, the Court held that the Federal Rules of Evidence and Federal Rules of Civil Procedure obliged judges to ensure that proffered scientific evidence is both "relevant" and "reliable." The complex doctrinal structure that the Court built for the admission of scientific evidence includes Federal Rules of Evidence 104(a),²² 201(b),²³ 401,²⁴ 402,²⁵ 403,²⁶ 702,²⁷ 703,²⁸ and 706(a),²⁹ as well as Federal Rules of Civil Procedure 50(a)³⁰ and 56.³¹

21. The dispute began in the lower federal courts as an issue about the admissibility of plaintiff-proffered expert scientific evidence that the "morning sickness" drug Bendectin caused birth defects. The trial court denied the evidence's admissibility for failing to satisfy the *Frye* "general acceptance" test for the admissibility of novel scientific evidence and granted summary judgment for the defendant pharmaceutical company. See *Daubert v. Merrell Dow Pharms., Inc.*, 727 F. Supp. 570, 575-76 (S.D. Cal. 1989), *aff'd*, 951 F.2d 1128 (9th Cir. 1991), *vacated and remanded*, 509 U.S. 579 (1993). According to the *Frye* test, a court should admit "expert testimony deduced from a well-recognized scientific principle or discovery" only when "the thing from which the deduction is made [is] sufficiently established to have gained general acceptance in the particular field in which it belongs." *Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923). After the Ninth Circuit affirmed the lower court's decision in *Daubert*, the Supreme Court granted certiorari on the question whether the Federal Rules of Evidence, adopted long after *Frye*, had in some way displaced the *Frye* test. See *Daubert v. Merrell Dow Pharms., Inc.*, 506 U.S. 914 (1992), *granting cert. to* 951 F.2d 1128 (9th Cir. 1991).

22. The Rule reads:

Preliminary questions concerning the qualification of a person to be a witness, the existence of a privilege, or the admissibility of evidence shall be determined by the court, subject to the provisions of subdivision (b) [pertaining to conditional admissions]. In making its determination it is not bound by the rules of evidence except those with respect to privileges.

FED. R. EVID. 104(a); *see also* CHRISTOPHER B. MUELLER & LAIRD C. KIRKPATRICK, EVIDENCE 190 & n.1 (1995).

23. Rule 201 reads in full: "A judicially noticed [adjudicative] 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." FED. R. EVID. 201(b).

24. See *supra* text accompanying note 18.

25. See *supra* note 17 and accompanying text.

26. See *supra* text accompanying note 20.

27. Rule 702 reads in full: "If scientific, technical, or other specialized knowledge will assist the trier-of-fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise." FED. R. EVID. 702.

28. Rule 703 establishes that experts may rely on facts or data not themselves admissible as evidence "[i]f of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject." *Id.* 703.

29. Rule 706 establishes that the court "may appoint any expert witnesses agreed upon by the parties, and may appoint expert witnesses of its own selection." *Id.* 706(a). Court-appointed experts are then subject to being called to testify by the court or by either party, and are subject to cross examination. See *id.*

30. FED. R. CIV. P. 50(a) (providing for directed verdicts).

31. *Id.* 56 (providing for summary judgment).

Roughly, *Daubert* orchestrates these rules as follows. Under Rules 104(a) and 702, a court is to assess whether the expert is qualified.³² Under Rules 702 and 703,³³ as well as Rules 401, 402, and 403,³⁴ the judge is to determine whether the expert's methodology and principles are relevant and "scientifically valid."³⁵ Under Rule 706, a court is free to appoint its own expert.³⁶ Finally, once scientific evidence is admitted, a court may either direct a verdict or grant summary judgment when, in the court's view, a reasonable person could not find, on the basis of the evidence, that the position the evidence was proffered to support was more likely than not to be true.³⁷

Of particular concern for my purposes is how, on the Court's analysis, a trial judge is to determine whether proffered scientific evidence is sufficiently relevant and reliable to be presented to a jury. According to *Daubert*, that determination requires the judge to admit the evidence only if it satisfies the following criteria: It must be "ground[ed] in the methods and procedures of science";³⁸ must be "derived by the scientific method,"³⁹ that is, be "scientifically valid";⁴⁰ it must be, "more than subjective belief or unsupported speculation,"⁴¹ a "body of known facts or . . . ideas inferred from such facts or accepted as true on good grounds,"⁴² although it need not

32. The Court's discussion of the role of Rule 104(a) is somewhat unclear. "Faced with a proffer of expert scientific testimony," said the Court, "the trial judge must determine *at the outset*, pursuant to Rule 104(a), whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact in issue." *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 592 (1993) (emphasis added) (footnotes omitted). This might suggest that "at the outset" of *every* question involving a proffer of scientific evidence, a trial court is required to hold an in limine hearing under Rule 104(a). It seems that this cannot be quite right, because in many cases the methodology of proffered evidence is well accepted in the jurisdiction, so that district judges will often think it not worth the cost to the court or parties to spend time on an in limine hearing. See Margaret A. Berger, *Evidentiary Framework*, in FEDERAL JUDICIAL CTR., REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 37, 50 & n.23 (1994). Assuming the Court is not to be taken quite at its word, *Daubert* does not give good guidance about when such a hearing ought to be held. Note that, when it is required, such a hearing is significant from an epistemic point of view, because Rule 104(a) allows the trial judge to consider inadmissible evidence, under a preponderance test, in deciding whether to admit the evidence. See FED. R. EVID. 104(a) ("In making its determination [the trial judge] is not bound by the rules of evidence except those with respect to privileges."); *Daubert*, 509 U.S. at 592 n.10 (requiring that judgment under Rule 104(a) "should be established by a preponderance of proof"). This means that a judge has much greater freedom to try to inform himself in a 104(a) inquiry than in an inquiry under other rules of evidence. See MUELLER & KIRKPATRICK, *supra* note 22, at 190 n.1.

33. See *Daubert*, 509 U.S. at 592 ("Unlike an ordinary witness, see Rule 701, an expert is permitted wide latitude to offer opinions, including those that are not based on first-hand knowledge or observation. See Rules 702 and 703.").

34. See *id.* at 595.

35. *Id.*

36. See *id.*

37. See *id.* at 595-97.

38. *Id.* at 590. The Court took this to be a criterion implied by the adjective "scientific" in Rule 702. See *id.*

39. *Id.*

40. *Id.* at 590-91 n.9 ("In a case involving scientific evidence, evidentiary reliability will be based upon scientific validity.").

41. *Id.*

42. *Id.* at 590 (citing WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY OF THE ENGLISH LANGUAGE, UNABRIDGED 1252 (1986) (defining "knowledge")).

be "certain[]";⁴³ and the proffered evidence must be *relevant*, that is, it must have "a valid scientific connection to the pertinent inquiry."⁴⁴ In sum, a judge considering proffered scientific evidence must determine that "the reasoning or methodology underlying the testimony is scientifically valid and . . . properly can be applied to the facts in issue."⁴⁵

Lest this seem too daunting a task for judges who for the most part have no advanced scientific training, the *Daubert* Court saw fit to offer "general observations," in the form of four factors (none of them either a necessary or a sufficient condition) that a trial court should use to determine "whether a theory or technique is scientific knowledge that will assist the trier of fact" as required by Rule 702⁴⁶ if scientific evidence consisting of or informed by that theory or technique is to be admitted: (1) whether the scientific evidence is testable and falsifiable;⁴⁷ (2) whether it has been subjected to peer review and publication;⁴⁸ (3) whether it has a high known or potential rate of error;⁴⁹ and (4) whether the evidence is generally accepted in the scientific community.⁵⁰ By articulating this four-factor test for "scientific validity," the *Daubert* Court effected a substantial change in the existing and longstanding rule for the admission of scientific evidence. Under the prior rule (the so-called *Frye* rule), *general acceptance* was the sole necessary and sufficient condition for the admission of (novel)⁵¹ scientific evidence.⁵² Under *Daubert's* approach, a court may, but is not required to, consider general acceptance, along with at least three other criteria, none of which the Court treated as either a necessary or a sufficient condition of scientific validity.⁵³

The *Daubert* decision is important for my purposes in at least two ways. First, in interpreting Rule 702's reference to "scientific knowledge," the Court set itself the paradigmatically *philosophical* task of exploring the criteria of the concept of science. A typical philosophical task is to explicate "the nature" of

43. *Id.*

44. *Id.* at 592.

45. *Id.* at 592-93.

46. *Id.* at 593.

47. *See id.*

48. *See id.*

49. *See id.* at 594.

50. *See id.*

51. Unlike the *Frye* Court, the *Daubert* Court expressly declined to limit its analysis to the admission of novel scientific evidence, *see id.* at 592, although it did limit itself to Rule 702's "scientific" evidence prong, *see id.* at 590 n.8.

52. *See Frye v. United States*, 293 F. 1013, 1014 (D.C. Cir. 1923).

53. *See Daubert*, 509 U.S. at 591-95. The Court asserted that "[m]any factors will bear on the inquiry, and we do not presume to set out a definitive checklist or test," *id.* at 593, and it expressly qualified each criterion listed, *see, e.g., id.* (arguing that "[o]rdinarily" a key question for determining scientific validity is "whether it can be (and has been) tested"); *id.* at 593-94 (describing peer review and publication as a "pertinent" and "relevant, though not dispositive, consideration" nor the "*sine qua non* of admissibility"); *id.* at 594 (stating that "ordinarily" a court should consider the known or potential rate of error); *id.* (maintaining that "general acceptance" can still have a bearing on the inquiry since "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" (citation omitted)).

various abstractions and the concepts used to express them, such as *truth*, *meaning*, *knowledge*, *justification*, *justice*, *good*, *bad*, *evil*. That task typically involves exploring the criteria that are characteristic of those concepts, and this is precisely what the *Daubert* majority did in its discussion of the closely related concepts of *science* and *scientific knowledge*. I say that the Court “set itself” this philosophical task because engaging that task *directly* was not an inevitable part of interpreting Rule 702. The Court noted, for example, that it was interpreting Rule 702 and other “legislatively enacted Federal Rules of Evidence as we would any statute.”⁵⁴ Thus, in principle the Court could have concluded that a particular conception of scientific knowledge—call it *C*—was legally authoritative not because *in the Court’s view C* was the correct conception of science, but rather because in the Court’s view *C* was the conception of science the legislature that enacted the Rules of Evidence had endorsed. In this way the Court would endorse a philosophical conception of science only indirectly. Nevertheless, in order for a legal system to decide whether certain evidence was “scientifically valid,” *some* legal decisionmaker along the chain of legal authority would have to undertake the philosophical inquiry directly.

In any event, the *Daubert* Court appears to use a “plain meaning” method of interpretation—hence its rather striking inquiry into the dictionary definitions of ‘knowledge’⁵⁵ and ‘scientific.’⁵⁶ By relying so heavily on dictionary definitions, the Court appears to have thought that its conception of “scientific knowledge” was endorsed by the “plain meaning” of the (American) English words ‘scientific’ and ‘knowledge.’ The decision to “look it up” might seem incompatible with the idea that the Court was doing philosophy here at all, but there is no necessary incompatibility between the claim that the Court’s inquiry is a philosophical one and its perhaps naive-seeming resort to the dictionary. Investigation of ordinary meaning is by now one quite familiar philosophical method, though, to be sure, that method can be executed with lesser or greater skill, producing lesser or greater philosophical insights.⁵⁷

54. *Id.* at 587.

55. I follow the philosophical convention of using single quotation marks to name words. That is, I use single quotation marks when referring to words by name rather than using them to refer to the things they name. Thus, whereas ‘Yale’ is a four-letter word, Yale is a university. I will use double quotes to refer to a direct quotation or to refer to the way in which something is referred to in some linguistic community. For a discussion of this convention, see WILLARD V. QUINE, *METHODS OF LOGIC* 37-38 (1959).

56. *Daubert*, 509 U.S. at 590 (“The adjective ‘scientific’ implies a grounding in the methods and procedures of science. Similarly, the word ‘knowledge’ connotes more than subjective belief or unsupported speculation. The term applies to any body of known facts or to any body of ideas inferred from such facts or accepted as truths on good grounds.” (citing WEBSTER’S THIRD NEW INTERNATIONAL DICTIONARY OF THE ENGLISH LANGUAGE, UNABRIDGED, *supra* note 42, at 1252)).

57. For particularly compelling examples of “ordinary language” philosophical methods, see J.L. AUSTIN, *PHILOSOPHICAL PAPERS* (J.O. Urmson & G.J. Warnock eds., 3d ed. 1979); and STANLEY CAVELL, *MUST WE MEAN WHAT WE SAY?* (1976). I offer additional brief discussion of the nature of philosophical method below. See *infra* note 174.

That the Court pursued the distinctly philosophical task of explicating the criteria of the concept of science also appears from its decision to take judicial notice of works by philosophers in offering its analysis of *scientific* validity.⁵⁸ The Court's effort to rely on work in philosophy of science raises the question of how, from an epistemic point of view, *nonscientific* expert information does and should enter into the legal system. Although I shall not argue the point here, there is no reason in principle to think that philosophers do *not* have "technical, or other specialized knowledge" that can "assist the trier of fact to understand the evidence or to determine a fact in issue" so that they could usefully and relevantly serve as "witness[es] qualified as . . . expert[s] by knowledge, skill, experience, training, or education."⁵⁹ And this I think is so even though philosophy should not be counted as a "science." Although cases in which there has been actual *testimony* of this sort are hard to find,⁶⁰ it is much less difficult to identify instances in which judges seem to be taking judicial notice of many different types of philosophical work.⁶¹ What criteria a court might use to regulate admission of expert philosophical work as either testimonial or as judicially "noticed" evidence is an important subject that *Daubert* expressly declines to address.⁶² But *Daubert's* reliance on

58. Thus, for example, the Court cited the works of Karl Popper and Carl Hempel to support the proposition that testability and falsifiability are characteristic of scientific method. See *Daubert*, 509 U.S. at 593 (citing C. HEMPEL, *PHILOSOPHY OF NATURAL SCIENCE* (1966); K. POPPER, *CONJECTURES AND REFUTATIONS: THE GROWTH OF SCIENTIFIC KNOWLEDGE* (5th ed. 1989)).

59. FED. R. EVID. 702.

60. Hard, but not impossible. For example, two philosophers, Martha Nussbaum and John Finnis, recently testified at a trial in a case raising various challenges to a state referendum that forbade Colorado localities from enacting civil rights protections specifically for homosexuals. See David Orgon Coolidge, *Same-Sex Marriage? Baehr v. Miike and the Meaning of Marriage*, 38 S. TEX. L. REV. 1, 119 n.87 (1997). They testified partly as experts on ancient Greek culture and partly as experts on the moral acceptability of the referendum. See John M. Finnis, *Law, Morality, and "Sexual Orientation,"* 69 NOTRE DAME L. REV. 1049, 1056-63 (1994); Martha C. Nussbaum, *Platonic Love and Colorado Law: The Relevance of Ancient Greek Norms to Modern Sexual Controversies*, 80 VA. L. REV. 1515, 1522-24 (1994). Deep questions, of ancient provenance, remain about this kind of testimony. The deepest and most enduring, perhaps, is one that comes to us in Plato's thoroughgoing condemnation of the sophists: Can philosophy maintain its intellectual and epistemic integrity when it enters the public political and legal forum?

61. See, e.g., *United States v. Charlottesville Redevelopment & Hous. Auth.*, 718 F. Supp. 461, 468-69 (W.D. Va. 1989) (holding that a public housing authority's tenant assignment plan was race-conscious and violated the Fair Housing Act). The court noted:

While the scope of this policy advancing integration must be circumscribed, that does not mean that the legal principle of integration goes away, that CRHA's duty to seek integration fades away, or that the legal value of integration has no force.

To utilize an analogy from moral philosophy, when one describes the conflict of moral principles, it is not accurate to act as if the principle which has been overridden evaporates without residue. A principle, even after being overridden, still has some force. It still leaves, in one philosopher's language, "moral traces."

Id. (citing Robert Nozick, *Moral Complications and Moral Structures*, 13 NAT. L.F. 1 (1968)); see also *American Home Prods. Corp. v. FTC*, 695 F.2d 681, 689 (3d Cir. 1982) (using Paul Grice's framework of conversational implicature to describe a false advertising claim).

As Professor Lawrence Lessig has recently emphasized, the Supreme Court's landmark decision in *Erie R.R. v. Tompkins*, 304 U.S. 64 (1938), relies heavily on taking judicial notice of a change in the philosophical conception of law from a natural law to a positivist conception. See Lawrence Lessig, *Understanding Changed Readings: Fidelity and Theory*, 47 STAN. L. REV. 395, 432 (1995).

62. See *Daubert*, 509 U.S. at 590, 592.

philosophical theories of science, albeit brief (and not particularly cogent⁶³), also reveals that this precise question about the admissibility or noticeability of nonscientific expert evidence is raised at a meta-level even by *Daubert*'s more limited inquiry into science: It seems that the Court relied on some expert theories *in order* to answer the philosophical question of what criteria were distinctive of "science." This meta-question cannot be overlooked in a thorough assessment of even the more limited question of the "nature" of science, and deserves more attention than philosophers and jurists have given it.⁶⁴

Daubert is of special concern here in another way as well. It addresses directly the question of how nonexpert judges and juries are to take account of putatively expert scientific information, and it attempts to establish a doctrinal and institutional system in which they can do so in an epistemically justified manner. In so doing, *Daubert* raises a question that has been central to the conscience and consciousness of American legal decisionmakers at least since Henry Hart and Albert Sacks (and other members of the "legal process" movement) highlighted it nearly half a century ago: the question of *institutional competence*.⁶⁵ Chief Justice Rehnquist's partial dissent in *Daubert* (joined by Justice Stevens) immediately voiced that question in the following terms:

I defer to no one in my confidence in federal judges; but I am at a loss to know what is meant when it is said that the scientific status of a theory depends on its "falsifiability," and I suspect some of them will be, too.

I do not doubt that Rule 702 confides to the judge some gatekeeping responsibility in deciding questions of the admissibility of proffered expert testimony. But I do not think it imposes on them either the obligation or the authority to become amateur scientists in order to perform that role.⁶⁶

Judge Kozinski, who wrote the opinion upon remand from the Supreme Court in *Daubert*,⁶⁷ put this question of institutional competence even more

63. The Court shows no awareness of post-positivist critiques of Popper's falsifiability thesis, for example. One of the most influential of these critiques is W.V. QUINE, *Two Dogmas of Empiricism*, in *FROM A LOGICAL POINT OF VIEW: 9 LOGICO-PHILOSOPHICAL ESSAYS* 20 (2d ed. 1961).

64. Anthony Kenny may be correct that "[t]he difficulty of deciding in the courtroom whether something is a science is not a difficulty which could be solved by admitting philosophers into the courtroom as higher order experts," Anthony Kenny, *The Expert in Court*, in *THE IVORY TOWER: ESSAYS IN PHILOSOPHY AND PUBLIC POLICY* 51 (1985), but surely the admission of such testimony could *help* solve the problem. Kenny also contends that "[t]he decision whether something is or is not a science is . . . a matter for philosophy," and that, on the test Kenny offers for science, "[p]hilosophy itself is clearly . . . no science [since it is] neither consistent, methodological, cumulative, or predictive." *Id.*

65. See HENRY M. HART & ALBERT M. SACKS, *THE LEGAL PROCESS: BASIC PROBLEMS IN THE MAKING AND APPLICATION OF LAW* (William N. Eskridge & Philip P. Frickey eds., 1994).

66. *Daubert*, 509 U.S. at 600-01 (Rehnquist, C.J., concurring in part and dissenting in part).

67. See *Daubert v. Merrell Dow Pharms., Inc.*, 43 F.3d 1311 (9th Cir. 1995). Judge Kozinski also

pointedly:

The first prong of *Daubert* puts federal judges in an uncomfortable position. The question of admissibility only arises if it is first established that the individuals whose testimony is being proffered are experts in a particular scientific field Yet something doesn't become "scientific knowledge" just because it's uttered by a scientist; nor can an expert's self-serving assertion that his conclusions were "derived by scientific method" be deemed conclusive As we read the Supreme Court's teaching in *Daubert*, therefore, though we are largely untrained in science and certainly no match for any of the witnesses whose testimony we are reviewing, it is our responsibility to determine whether those experts' proposed testimony amounts to "scientific knowledge," constitutes "good science," and was "derived by the scientific method."⁶⁸

The question, then, is this: How could a scientifically untrained judge be sufficiently epistemically *competent* to perform the gatekeeping task imposed

wrote the original *Daubert* opinion to which the Supreme Court granted certiorari. See *Daubert v. Merrell Dow Pharms. Inc.*, 951 F.2d 1128 (9th Cir. 1991), *vacated and remanded*, 509 U.S. 579 (1993). In that opinion, he affirmed the district court's grant of summary judgment, applying the *Frye* test to hold that the proffered scientific evidence was not admissible. See *supra* note 21. On remand from the Supreme Court, Judge Kozinski's panel decided to apply the newly minted test *without first remanding* to the district court—offering as a justification for this procedural arrogation the contention that it was permitted by "the peculiar circumstances of the case," "the interests of justice," and "judicial economy." *Daubert*, 43 F.3d at 1314-15.

Given the newness of the test, and the possibility that the original plaintiffs might have been able to develop new evidence or repackage existing evidence pursuant to it, the wiser course would have been to remand to the trial court. Apart from the claimed equities, Judge Kozinski's substantive argument for his decision to decide the case without remanding to the trial court was as follows. The *Daubert* test, according to Judge Kozinski, has "two prongs": First, the plaintiffs must show that the proffered scientific evidence really is "derived by the scientific method"; second, they must show that the evidence would "assist the trier of fact." *Id.* at 1320. Judge Kozinski conceded that the plaintiffs might have been able to "submit additional proof that the scientific testimony they proffer[ed] was 'derived by the scientific method,'" but he also concluded that they could not possibly show that their evidence would "assist the trier of fact," mainly because the evidence they could adduce would not meet the burden of proof for causation under California tort law. *Id.* at 1320-22.

This analysis is unconvincing. Judge Kozinski's claim that he could decide whether the evidence was relevant without seeing whether it was sufficiently scientifically valid seems to overlook the likely intellectual synergy between the "prongs" of the *Daubert* analysis. (I assume, *arguendo*, that Judge Kozinski's simplification of the *Daubert* rule is accurate—it seems actually to be an oversimplification.) If plaintiffs could, under the new and fairly detailed guidance of *Daubert*, show that their evidence was indeed "derived by the scientific method," such a demonstration might very well have helped to show that the evidence could also "assist the trier of fact." At least, such interaction between the two showings is clearly *possible* and not unlikely in many instances. Moreover, a careful reading of the Supreme Court's *Daubert* opinion shows that the Court itself clearly saw a close enough connection between the "scientific validity" criterion of Rule 702 and the "helpfulness" criterion as to suggest that it is a mistake to try to assess them independently. See *Daubert*, 509 U.S. at 591-92.

68. *Daubert*, 43 F.3d at 1315-16. Kozinski here echoes the concerns not only of Chief Justice Rehnquist and Justice Stevens, but also those of a great many commentators. See, e.g., Paul S. Milich, *Controversial Science in the Courtroom: Daubert and the Law's Hubris*, 43 EMORY L.J. 913, 919 (1994) ("Scientists who have spent . . . their professional lives wrestling with the . . . mysteries of their disciplines must be amazed at the law's hubris in thinking that nonscientist judges can . . . ultimately decide who has the better . . . argument.").

upon it by *Daubert's* reading of the Federal Rules of Evidence? Moreover, assuming the judge admits the evidence, how could a scientifically untrained trier of fact, whether judge or jury, be sufficiently epistemically competent to assess *competing* putatively scientific claims by competing expert witnesses when, *ex hypothesi*, that factfinder does not have the requisite expertise to judge the evidence itself?⁶⁹

Although the *Daubert* majority expressed its "confiden[ce] that federal judges possess the capacity to undertake" the analysis of proffered scientific evidence described above,⁷⁰ nowhere in its opinion does it provide any support for that judgment. The opinion indirectly addresses the question when it considers whether its elimination of "general acceptance" as a necessary condition for the admission of scientific evidence "will result in a 'free-for-all' in which befuddled juries are confounded by absurd and irrational pseudoscientific assertions."⁷¹ Such a view, the Court explains, is

overly pessimistic about the capabilities of the jury and of the adversary system generally. Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence. . . . Additionally, in the event the trial court concludes that the scintilla of evidence presented supporting a position is insufficient to allow a reasonable juror to conclude that the position more likely than not is true, the court remains free to direct a judgment . . . and likewise to grant summary judgment These conventional devices, rather than wholesale exclusion under an uncompromising "general acceptance" test, are the appropriate safeguards where the basis of scientific testimony meets the standards of Rule 702.⁷²

These remarks, however, wholly fail to show how it is possible for a judge to assess scientific validity (or for a factfinder to "adjudicate" competing claims to scientific truth) in an epistemically justified manner. The Court asserts that "vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof" are "appropriate" means for "attacking shaky but admissible evidence." But if a judge or a jury does not have the requisite scientific training, how can that judge or jury make a

69. I say "*ex hypothesi*" here because if the factfinder did have that expertise, the evidence would not be necessary and should thus probably be excluded under Rule 403. See FED. R. EVID. 403 (making relevant evidence excludable "if its probative value is substantially outweighed by . . . considerations of undue delay, waste of time, or needless presentation of cumulative evidence"). Rule 702 also might afford a ground for excluding the evidence; for example, assuming the law of thermodynamics were relevant to a case, and the trier of fact were a physicist, it would not "assist the trier of fact" to have expert testimony restating that law. See *id.* 702.

70. *Daubert*, 509 U.S. at 593.

71. *Id.* at 595-96.

72. *Id.* at 596.

warranted choice between competing “vigorously cross-examined” claims by putative experts in, say, medicine, mathematics, chemistry, or biology?⁷³ Of what use is “careful instruction on the burden of proof” to a jury that cannot understand the formal methodology used to reach a scientific conclusion? How can a judge who is, in Judge Kozinski’s words, “largely untrained in science and certainly no match for any of the witnesses whose testimony [he is] reviewing,” justifiably direct a verdict or grant summary judgment against a party in the face of contrary contentions by that party’s expert? I explore these precise questions in greater detail below when I undertake a more robustly philosophical inquiry into epistemic deference. Here I want only to set the stage for that argument by showing precisely how *Daubert* itself raises these issues—and, in the next section, how *Brown v. Board of Education*⁷⁴ and its progeny raise them as well.

C. *Brown’s Empirical Psychology*

Although the main *Brown* opinion does not expressly address the use by courts of putatively scientific expert evidence (and although *Brown* was decided long before the Federal Rules of Evidence were adopted in 1975⁷⁵), the use of such information in *Brown* and subsequent cases decided in its wake illustrates in a pointed way both the hazards and the vast importance of this reasoning process.

The facts and basic legal conclusions of *Brown* are too well-known to warrant recital here. What I shall focus on instead is the rather striking extent to which, at least on the argumentative surface of the main *Brown* opinion, the Court rested its holding on *contested judgments of empirical social science*. In so doing, *Brown* served as a remarkable culmination of the legal realist project of taming abstract legal propositions with the whip of social science—a process that began in the modern Supreme Court with the Court’s acceptance of the “Brandeis brief” in *Muller v. Oregon*.⁷⁶

73. Jurists concerned with the rules and institutions of expert evidence have long been wary of the adversary system’s capacity to produce truths. Professor John Langbein’s skeptical inquiry is a fair representation of this concern:

Wigmore’s celebrated panegyric—that cross-examination is “the greatest legal engine ever invented for the discovery of truth”—is nothing more than an article of faith . . . Judge Frankel explains why: “The litigator’s devices, let us be clear, have utility in testing dishonest witnesses, ferreting out falsehoods, and thus exposing the truth. But to a considerable degree these devices are like other potent weapons, equally lethal for heroes and villains.” . . . In the hands of many of its practitioners, cross-examination is not only frequently truth-defeating or ineffectual, it is also tedious, repetitive, time-wasting, and insulting.

John H. Langbein, *The German Advantage in Civil Procedure*, 52 U. CHI. L. REV. 823, 833 n.31 (1985) (citations omitted).

74. 347 U.S. 483 (1954).

75. See An Act To Establish Rules of Evidence for Certain Courts and Proceedings, Pub. L. No. 93-595, § 3, 88 Stat. 1926, 1926 (1975).

76. 208 U.S. 412 (1907). For a partial reprint and discussion of the brief, see JOHN MONAHAN & LAURENS WALKER, *SOCIAL SCIENCE IN THE LAW* 187-90 (4th ed. 1998).

Two empirical judgments undergirded the Supreme Court's decision in *Brown*, both of them framed by the Court as judgments that there had been deeply significant changes in society and in the state of social-scientific knowledge between the time of *Plessy v. Ferguson*⁷⁷ and the time of *Brown* itself. One was that a significant change had occurred in the role of public education in American life.⁷⁸ The second, more celebrated judgment, is the one the Court made, relying on the social-scientific authority of sociologists (such as Gunnar Myrdal) and psychologists (such as Kenneth Clark), that segregated schools inflict psychological harm on black schoolchildren in such a way as to make segregated schools for black children "inherently unequal" to segregated schools for white children.⁷⁹ One striking feature of the *Brown* opinion is that Chief Justice Warren nowhere asserts that *Plessy* was wrong as a matter of law in its interpretation of the Constitution.⁸⁰ The only error charged against the opinion is one regarding an empirical psychological claim:

Whatever may have been the extent of psychological knowledge at the time of *Plessy v. Ferguson*, this finding is amply supported by modern authority. Any language in *Plessy v. Ferguson* contrary to this finding is rejected.

We conclude that in the field of public education the doctrine of "separate but equal" has no place. Separate educational facilities are inherently unequal. Therefore, we hold that the plaintiffs . . . are, by reason of the segregation complained of, deprived of the equal protection of the laws guaranteed by the Fourteenth Amendment.⁸¹

77. 163 U.S. 537 (1896).

78. The Court noted:

[W]e cannot turn the clock back to 1868 when the [Fourteenth] Amendment was adopted, or even to 1896 when *Plessy v. Ferguson* was written. We must consider public education in the light of its full development and its present place in American life throughout the Nation. . . .

Today, education is perhaps the most important function of state and local governments. . . . In these days, it is doubtful that any child may reasonably be expected to succeed in life if he is denied the opportunity of an education.

Brown, 347 U.S. at 492-93.

79. See *id.* at 494 n.11.

80. This is a point ably made in PAUL L. ROSEN, *THE SUPREME COURT AND SOCIAL SCIENCE* 163-64 (1972).

81. *Brown*, 347 U.S. at 494-95 (emphasis added) (footnote omitted). The famous footnote 11 of *Brown*, in which the Court cited to social scientific literature in support of its conclusions, reads as follows:

K. B. Clark, *Effect of Prejudice and Discrimination on Personality Development* (Midcentury White House Conference on Children and Youth, 1950); Witmer and Kotinsky, *Personality in the Making* (1952), c. VI; Deutscher and Chein, *The Psychological Effects of Enforced Segregation: A Survey of Social Science Opinion*, 26 J. Psychol. 259 (1948); Chein, *What are the Psychological Effects of Segregation Under Conditions of Equal Facilities?*, 3 Int. J. Opinion and Attitude Res. 229 (1949); Brameld, *Educational Costs, in Discrimination and National Welfare* (MacIver, ed., 1949), 44-48; Frazier, *The Negro in the United States* (1949), 674-681.

And see generally Myrdal, *An American Dilemma* (1944).

Id. at 494 n.11. The plaintiffs in *Brown* strongly encouraged the Court to lean heavily on social science (when the law is against you, as the saying goes, argue the facts). They filed, for example, a detailed appendix to their brief, titled *The Effects of Segregation and the Consequences of Desegregation: A Social Science Statement*. See Appendix to Appellants' Briefs, *Brown* (No. 8). Similarly, in argument before the Court, Thurgood Marshall asserted that the social science witnesses who had testified below "stand in the

Because I am interested here in the question of whether judges and juries can use expert information in an epistemically justified way, it is useful to pause to see how the expert information on which the *Brown* Court so heavily relied actually entered into and proceeded through the lengthy multi-court decisionmaking process. First, as to the judgment about the widespread impact of education in modern society, it seems that the Supreme Court took judicial notice.⁸² Although there is likely to have been some discussion of that issue by the experts who testified in the trial courts and some record of such testimony before the Supreme Court, the proposition is asserted with bold strokes, wholly without citation or even mention of any kind of study, finding, conclusion, or brief. In this way, this conclusion is noticeably different from the other central judgment in the case, that of the psychological harm. Although it is clear from the *Brown* opinion that the Court was claiming to defer epistemically, regarding that second judgment, to the judgments of "expert" social scientists (that is, claiming to take some propositions to be true because the social scientists said they were true), it is somewhat unclear from the Court's opinion how exactly it understood the procedural and evidentiary devices it was using to bring this expert information into its decision. It is unclear, for example, whether the Court understood itself to be deferring *directly* to the social-scientific expertise of Kenneth Clark and others,⁸³ or whether instead it was only indirectly deferring to that expertise by deferring to factual findings made in some of the decisions below. Clark had testified for the plaintiffs in *Briggs v. Elliot*,⁸⁴ one of the companion cases that went up to the Court in *Brown*, and there was similar testimony in other companion cases, including cases from Kansas,⁸⁵

record unchallenged as experts in their field, and I think we have arrived at the stage where the courts do give credence to the testimony of people who are experts in their fields." ARGUMENT: THE ORAL ARGUMENT BEFORE THE SUPREME COURT IN *BROWN V. BOARD OF EDUCATION OF TOPEKA*, 1952-55, at 36, 37 (Leon Friedman ed., 1969) [hereinafter *BROWN ORAL ARGUMENT*].

82. Paul Rosen characterizes it thus. See ROSEN, *supra* note 80, at 162. In the terms established by the current Federal Rules of Evidence, this would be judicial notice of a "legislative fact," and thus would not be in any way regulated by the rules. See FED. R. EVID. 201(a) advisory committee's note

83. See *supra* note 81 and accompanying text.

84. 98 F. Supp. 529 (E.D.S.C. 1951), *vacated*, 342 U.S. 350 (1952). *Briggs* was the South Carolina case in which the court upheld the constitutionality of segregation and expressly refused to overturn it on the basis of testimony by putative educational and sociological experts. Like the other companion cases in *Brown*, this court's treatment of the expert evidence stands in instructive contrast to the treatment by the Court in the *Brown* opinion:

We conclude, therefore, that if equal facilities are offered, segregation of the races in the public schools as prescribed by the Constitution and laws of South Carolina is not of itself violative of the Fourteenth Amendment. We think that this conclusion is supported by overwhelming authority which we are not at liberty to disregard on the basis of theories advanced by a few educators and sociologists. Even if we felt at liberty to disregard other authorities, we may not ignore the unreversed decisions of the Supreme Court of the United States which are squarely in point and conclusive of the question before us.

Id. at 536-37.

85. The Kansas case was *Brown v. Board of Education*, 98 F. Supp. 797 (D. Kan. 1951). In that case,

Virginia,⁸⁶ and Delaware.⁸⁷ On the basis of this procedural posture one might conclude that the *Brown* Court had reviewed some of the empirical psychological testimony under the deferential "clearly erroneous" standard that appellate courts accord to trial courts regarding questions of fact.⁸⁸ The Court's opinion goes some way toward suggesting this by quoting a *finding* in one trial court case about the psychological hardship on black school children,⁸⁹ and then declaring that "this finding is amply supported by modern

the court admitted expert testimony regarding the psychological harm of public school segregation but upheld the constitutionality of segregation. *See infra* note 89 (noting the Supreme Court's quotation of the district court's discussion of this testimony).

86. The Virginia case was *Davis v. County School Board*, 103 F. Supp. 337 (E.D. Va. 1952). That court admitted conflicting expert testimony on the question of the harm of segregation and decided it was a toss-up on that evidence (so that, given the burden of persuasion, the plaintiffs failed to establish the proposition). The opinion provides a nice contrast to the use of social science evidence by the Supreme Court in *Brown*, so I quote it at some length:

Eminent educators, anthropologists, psychologists and psychiatrists appeared for the plaintiffs, unanimously expressed dispraise of segregation in schools, and unequivocally testified the opinion that such separation distorted the child's natural attitude, throttled his mental development, especially the adolescent, and immeasurably abridged his educational opportunities. For the defendants, equally distinguished and qualified educationists and leaders in the other fields emphatically vouched the view that, given equivalent physical facilities, offerings and instruction, the Negro would receive in a separate school the same educational opportunity as he would obtain in the classroom and on the campus of a mixed school. Each witness offered cogent and appealing grounds for his conclusion.

On this fact issue the Court cannot say that the plaintiffs' evidence over-balances the defendants'. But on the same presentation by the plaintiffs as just recited, Federal courts have rejected the proposition, in respect to elementary and junior high schools, that the required separation of the races is in law offensive to the National statutes and constitution. They have refused to decree that segregation be abolished incontinently. We accept these decisions as apt and able precedent. Indeed we might ground our conclusion on their opinions alone. But the facts proved in our case, almost without division and perhaps peculiar here, so potently demonstrate why nullification of the cited sections of the statutes and constitution of Virginia is not warranted, that they should speak our conclusion.

Id. at 338-39 (citation omitted).

87. *See* *Belton v. Gebhart*, 87 A.2d 862 (Del. Ch. 1952); *see infra* note 89 (providing the Supreme Court's quotation from the Delaware court regarding that court's assessment of the expert testimony).

88. Note that the clearly erroneous standard of FED. R. CIV. P. 52(a) was in place at the time of *Brown* and routinely used in federal courts.

89. The *Brown* Court reasoned:

To separate them from others of similar age and qualifications solely because of their race generates a feeling of inferiority as to their status in the community that may affect their hearts and minds in a way unlikely ever to be undone. The effect of this separation on their educational opportunities was well stated by a finding in the Kansas case by a court which nevertheless felt compelled to rule against the Negro plaintiffs . . .

Brown v. Board of Educ., 347 U.S. 483, 494 (1954). The Court quoted, without citation, the Kansas court as follows:

"Segregation of white and colored children in public schools has a detrimental effect upon the colored children. The impact is greater when it has the sanction of the law; for the policy of separating the races is usually interpreted as denoting the inferiority of the negro group. A sense of inferiority affects the motivation of a child to learn. Segregation with the sanction of law, therefore, has a tendency to [retard] the educational and mental development of negro children and to deprive them of some of the benefits they would receive in a racial[ly] integrated school system."

Id. In addition, the Supreme Court added the following footnote: "A similar finding was made in the Delaware case: 'I conclude from the testimony that in our Delaware society, State-imposed segregation in education itself results in the Negro children, as a class, receiving educational opportunities which are substantially inferior to those available to white children otherwise similarly situated.'" *Id.* at 494 n.10

authority.”⁹⁰ Perhaps the Court’s heavy and highlighted reliance on putative social-scientific facts was part of a *realpolitik* rhetorical strategy. The careful student of *Brown* should not overlook the possibility that the Court went out of its way to quote the “findings” in the Kansas and Delaware cases to build some political cover—perhaps hoping that by appearing to defer to factual findings by trial courts, the Court might seem less like a roving activist tribunal searching for “facts” that suited its results. Moreover, this might well have been a wise judgment. Writing in the third century in which science enjoyed its ascendancy over religion as the dominant cultural authority, the Court might reasonably have sought to invoke social-scientific expertise to provide cultural authority for its profoundly controversial decision.

But even if the Court did in part seek the appearance of appellate modesty in the face of scientific facts “found” by trial courts, it also did not stand—or hide—behind the procedural device of a deferential standard of review. Despite its reference to the findings below, the Court also clearly asserted in its own epistemic voice that those findings were “amply supported by modern authority.”⁹¹ Thus, the Court, at least to some extent, took “judicial notice” of what would today be called “legislative facts.”⁹² By whichever procedural or evidentiary devices social-scientific expert information entered the Court’s decision in *Brown*, the substantial extent to which the Court claimed to rely on this information was of great moment in the history of the law’s epistemology.

How well did the Court do in making an *accurate* psychological judgment based on the expert information it had before it? The conclusion that segregation caused psychological harm appears to have been shared among a great many social scientists,⁹³ and the finding seems to have withstood the test of time.⁹⁴ On the other hand, the studies on which the Court relied had serious limitations. Surely one of the most significant of these limitations is to

(quoting *Belton*, 87 A.2d at 865).

90. *Id.* at 494.

91. *Id.*

92. See FED. R. EVID. 201(a) advisory committee’s note. In colloquy with Thurgood Marshall during the first oral argument in *Brown*, Justice Frankfurter asked, “Can we not take judicial notice of writings by people who competently deal with these problems? Can I not take judicial notice of Myrdal’s book without having him called as a witness?” *BROWN ORAL ARGUMENT*, *supra* note 81, at 63. After Marshall batted this softball question with cautious enthusiasm, Frankfurter went on to assert that “in these matters this Court takes judicial notice of accredited writings, and does not have to call the writers as witnesses.” *Id.* He added, “How to inform the judicial mind, you know, is one of the most complicated problems. It is better to have witnesses, but I did not know that we could not read the works of competent writers.” *Id.*; see also ROSEN, *supra* note 80, at 141.

93. The Deutscher and Cheln study, which the Court cited third in footnote 11, see *supra* note 81, was a survey of more than 800 social scientists regarding their views about the psychological effects of segregation. See Max Deutscher & Isidor Cheln, *The Psychological Effects of Enforced Segregation. A Survey of Social Science Opinion*, 26 J. PSYCHOL. 259 (1948). Of that number, 517 responded, 90% of whom agreed that segregation had a harmful effect on the segregated group. See *id.*; see also ROSEN, *supra* note 80, at 188. This kind of unanimity might even have allowed this factual claim to be admitted as expert testimony under the *Frye* rule—indeed, perhaps in some of the *Brown* trial courts it was.

94. See ROSEN, *supra* note 80, at 194-95 (listing studies).

be found in the celebrated doll study, which the *Brown* opinion lists first in its citation of "ample authorities" in footnote eleven.⁹⁵ In that study, Kenneth and Mamie Clark sought to measure the self-conception of two groups of black schoolchildren, one attending integrated schools in the North, the other attending segregated schools in the South.⁹⁶ The Clarks asked the children whether they liked to play with a brown doll or a white doll, which of the dolls was the "nice doll," which was the doll that "looks bad," and which was the doll that had a "nice color."⁹⁷ What survives in the "popular" understanding of this study among people familiar with the *Brown* opinion is that this study showed that black children in segregated schools felt worse about themselves, as measured by their responses to these questions, than did the black children in integrated schools in the North. Some such finding, of course, would be the principal relevance, if not the only relevance, of such a study—and Kenneth Clark was the leading testimonial expert in many of the cases leading to *Brown*. The actual result of the Clarks' research, however, was quite different. Comparing the responses of black schoolchildren in segregated southern schools to those of black schoolchildren in integrated northern schools, the Clarks' study candidly stated:

A significantly higher percentage (71) of the northern children, compared to the southern children (49), *think that the brown doll looks bad* Also a slightly higher percent of the southern children think that the brown doll has a "nice color" [the numbers here are 40 and 37, respectively]

The southern children, . . . in spite of their equal favorableness toward the white doll, are significantly less likely to reject the brown doll (evaluate it negatively), as compared to the strong tendency for the majority of the northern children to do so.⁹⁸

Both Thurgood Marshall and Clark himself were aware of the problem that this expert evidence posed for the legal argument about the psychological harms of segregation.⁹⁹ These results suggested not only that black schoolchildren might not be psychically *harmed* by segregated schooling, but that they might in fact be harmed by *integrated* schooling. Clark's own explanation of this finding vis-à-vis his larger claim about the harm of segregation was that it would be a mistake to conclude from his findings that

95. See *supra* note 81.

96. See Kenneth B. Clark & Mamie P. Clark, *Racial Identification and Preference in Negro Children*, in READINGS IN SOCIAL PSYCHOLOGY 602 (Eleanor E. Maccoby et al. eds., 3d ed. 1958).

97. *Id.*

98. *Id.* at 611 (emphasis added).

99. See RICHARD KLUGER, *SIMPLE JUSTICE: THE HISTORY OF BROWN V. BOARD OF EDUCATION AND BLACK AMERICA'S STRUGGLE FOR EQUALITY* 356 (1975) ("Marshall had weighed the risks of Clark's findings and decided that on balance they demonstrated injury to segregated Negro youngsters. 'I wanted this kind of evidence on the record,' he had said.").

southern black schoolchildren in segregated schools suffered *less* psychic harm than their northern integrated counterparts.¹⁰⁰ Such a conclusion, he maintained,

would seem to be not only superficial but incorrect. The apparent emotional stability of the southern Negro child may be indicative only of the fact that through rigid racial segregation and isolation he has accepted as normal the fact of his inferior social status. Such an acceptance is not symptomatic of a healthy personality.¹⁰¹

If not flatly question-begging, this conclusion is far too ad hoc to provide solid ground for the contention it was adduced in the *Brown* litigation to support, namely the claim that segregation in schools caused psychological harm to black schoolchildren.¹⁰² In effect, from an epistemic point of view, instead of strongly *supporting* the claim that segregated schooling caused psychological harm to black schoolchildren, the Clarks' study actually provided reason (at least *prima facie* reason) to *doubt* that conclusion. Although the study seems particularly vulnerable in this way, the difficulty of showing the independence of causes besets virtually all the empirical data proffered in *Brown*. Moreover, it is a problem endemic to most social science findings where controlled and representative experiments are rarely possible.

Neither the weakness of the particular Clark study and testimony relied on so heavily in the *Brown* litigation, nor the general limitations of social-scientific methodology by itself, warrant the conclusion that the Court was wrong to use social-scientific data in *Brown*, or that other courts should not rely on such data in general. It is possible to offer a plausible defense of the precise use to which the Court put these studies in *Brown*, and some writers have done so. Paul Rosen, for example, defends the *Brown* Court's use of these data on the following ground. He acknowledges that social science is significantly more limited than natural science and that the studies relied on in *Brown* had substantial methodological limitations. Specifically, they failed to identify school segregation as an independent cause of whatever psychic harms resulted from segregation.¹⁰³ But he also observes that the studies cited in

100. See KENNETH B. CLARK, *PREJUDICE AND YOUR CHILD* 45 (2d ed. 1963).

101. *Id.*

102. Moreover, there seem to be some design flaws in the study that one might readily identify (though these flaws are perhaps more readily noticeable with the benefit of more than 40 years of hindsight). One might well expect—and *perhaps* one might reasonably have expected even then—that black children in integrated schools in the North would *at first* be deeply traumatized by being thrown together with white children in a general cultural atmosphere of discrimination. But one might also expect (and have reasonably expected then) that *over time* the effect would be to reduce the psychic discomfort of being in an integrated setting, thereby allowing integration to give greater psychic sustenance to black schoolchildren *in the long run*. The question this possibility raises for the design of the Clark study is, *over what span of time* must the children be studied before one can reach a warranted result about the specific harms allegedly arising from segregation? (Thanks to Henry Steiner for helpful discussion on this point.)

103. See ROSEN, *supra* note 80, at 138-39.

Brown were intellectually honest enough to wear their methodological limits on their sleeves and that the Court's finding of psychological harm was consistent both with what the studies modestly suggested and with what the overwhelming majority of social scientists believed about the psychic harms of segregation. Warren's opinion did not, for example, contend that segregated schooling was the sole cause of psychological harm.¹⁰⁴ Rosen further argues that unless one believes that no social science is to be accepted unless it rises to the level of confidence one can achieve with research in the natural sciences, one should not reject the use of these studies, and maintains that the few social scientists who actively opposed the conclusions of these studies were themselves strong, ideologically biased segregationists.¹⁰⁵ (It is fair game, of course, to ask whether Clark and other social scientists were also ideologically biased in their analyses.)¹⁰⁶

This modest defense of the *Brown* Court's use of expert evidence is in my view quite plausible. But there is nevertheless one very important way in which the Court's use of this evidence, in *Brown* itself and in subsequent cases, suggests a serious overstatement of the limited empirical result that Clark and others sought to confirm. It is just this implied overstatement that raises the issue of the justifiability of epistemic deference that is of central concern in this Article.

What I have in mind here is the Court's assertion in *Brown*—on the basis of sharply and openly limited empirical data—that separation is “inherently” unequal.¹⁰⁷ How could the Court legitimately conclude that separation is *inherently* unequal when the trumpeted basis for its judgment was *contingent* empirical evidence that was, and should have been recognized to have been, subject to further confirmation or disconfirmation? Perhaps this problem is in part terminological. Perhaps the Court should have said something like, “according to the best data currently available,” instead of “inherently,” or perhaps that is what the Court's assertion should be taken to mean. But even such a change would not eliminate the disproportion between the empirically modest basis for the legal conclusion in *Brown*, and the powerful, far-reaching conclusion that the Court sought to make virtually unquestionable.

That the Court *did*, in effect, make it unquestionable is an important part of my concern here. Given that *Brown* seemed to have rested its opinion so firmly on contingently verifiable psychological facts,¹⁰⁸ lower courts, and members of the polity more generally, might well have thought it legitimate to “help” the Court refine and, if necessary, correct the scientific-factual

104. See *Brown v. Board of Educ.*, 347 U.S. 483, 492-93 (1954).

105. See ROSEN, *supra* note 80, at 141-43.

106. See *id.* at 182-96.

107. *Brown*, 347 U.S. at 494-95.

108. See *id.* at 494 (“Whatever may have been the extent of psychological knowledge at the time of *Plessy v. Ferguson*, this finding is amply supported by modern authority.”).

judgments it had made so central a part of American constitutional life. Indeed, nearly ten years after *Brown*, a federal district court judge in Georgia accepted exactly that implied invitation.

In *Stell v. Savannah-Chatham County Board of Education*,¹⁰⁹ the district court denied an injunction to prevent a local school board from operating a segregated school system. The court took evidence and explicitly held, in the face of *Brown*, that the best available evidence established that segregated schooling caused *no* injury to white or black children, and further that forced integration *did* cause harm to both groups. The court reasoned that *Brown* rested on a scientific factual finding of psychological harm¹¹⁰ and that the doctrine of stare decisis did not bind nonparties to a case's factual findings. As a result, later courts were free to revisit the issue.¹¹¹ Moreover, the court concluded that the preponderance of the evidence—including Clark's own study—showed by "uncontroverted testimony on scientific issues given as the unanimous opinions of conceded authorities open to cross-examination on the witness stand" that there was no psychological harm of the sort *Brown* had claimed.¹¹² Accordingly, the judge "accept[ed] the evidence given in the

109. 220 F. Supp. 667 (S.D. Ga. 1963), *rev'd*, 333 F.2d 55 (5th Cir. 1964), *cert. denied*, 379 U.S. 933 (1964).

110. After noting the *Brown* opinion's quotation from the Kansas court, the district judge asserted: "These are facts, not law. To make these findings the Kansas District Judge considered evidence—not cases. Whether Negroes in Kansas believed that separate schooling denoted inferiority, whether a sense of inferiority affected their motivation to learn and whether motivation to learn was increased or diminished by segregation was a question requiring evidence for decision. That was as much a subject of scientific inquiry as the braking distance required to stop a two-ton truck moving at ten miles an hour on dry concrete."

Again, the Supreme Court quoted the record that Negro children in Delaware were "receiving educational opportunities which are substantially inferior to those available to white children otherwise similarly situated," a statement which could only be of factual rather than legal significance.

The Supreme Court put at rest any residual question on the nature of its inquiry when it indicated its reliance on scientific information: "Whatever may have been the extent of psychological knowledge at the time of *Plessy v. Ferguson*, this finding is amply supported by modern authority." The teachings of psychology in 1896, in 1954, or in 1963 are inquiries requiring evidence in the same sense as repeated determinations of "seaworthiness." Actually, the non-legal authority to which the Court referred was neither testimonial nor documentary in character but came from a "Brandeis"-type brief filed directly in the Supreme Court by the National Association for the Advancement of Colored People.

Id. at 678 (citations omitted). Although the judge's characterization of the factual and evidentiary basis of *Brown* seems fair, his analysis needs some such distinction as that between "legislative" and "adjudicative" facts—a distinction that did not become common until 1975, when Rule 201 of the Federal Rules of Evidence made it salient. See FED. R. EVID. 201(a) advisory committee's note. Such a distinction would have made his argument far less plausible, for it was the failure to distinguish these types of facts that gave this stare decisis argument whatever superficial plausibility it had. *Brown*'s holding rested on a finding not of adjudicative facts, but rather of legislative facts. While it is true that adjudicative facts cannot bind nonparties, legislative facts are much more likely, as a matter of institutional practice, to do so, as *Brown* itself shows. (Whether and to what extent a court *should* bind other parties to its findings of legislative facts is a separate question, a question on which *Brown* provides no guidance.)

111. See *Stell*, 220 F. Supp. at 676-77.

112. *Id.* at 678.

present case as having somewhat stronger indicia of truth than that on which the findings of potential injury were made in *Brown*.”¹¹³

On appeal, the Fifth Circuit slapped down the lower court’s procedural and evidentiary insurrection.¹¹⁴ One can well understand the likely urgency with which that court, as the faithful agent of the Supreme Court, must have felt the need to quell this kind of rebellion before it spread. But is there a *principled* basis for the *Brown* Court to have created, as it apparently intended to create and as courts like the Fifth Circuit clearly understood it to intend, what the *Stell* district court aptly termed “a *conclusive presumption* of injury to Negro students by reason of segregation”?¹¹⁵ If the Court really wanted the authority of science, was it not obliged, as a matter of principle, to allow science to reach modest conclusions, tentatively held and ever open to revision, that are among the most notable characteristics of empirical science—characteristics probably even more important for *social* science than for natural empirical science? By resting so heavily on empirical science, nay, on the least stable kind of empirical science, the Court opened itself up to the charge of fiat, of power, rather than reason, in shutting down efforts by the polity to revisit the scientifically informed fact at issue.¹¹⁶ The very modesty of truly scientific conclusions does not warrant so strong a result as the Court dictated with its irrebuttable “inherently.” Truly scientific results would seem not only to permit, but also to invite, if not to require, fresh reexamination.

Many scholars have been distressed at the Court’s use of factual evidence in *Brown*. Some contend that the Court’s decision to “constitutionalize” a putatively scientific result is deeply problematic because “attaching constitutional meaning to scientific opinion, even when scientists are in consensus, condemns the Constitution to fluctuations in meaning as scientific knowledge changes.”¹¹⁷ That admonition is not wholly without merit, but it

113. *Id.* at 680.

114. The Fifth Circuit noted in its opinion:

We do not read the major premise of the decision of the Supreme Court in the first *Brown* case as being limited to the facts of the cases there presented. We read it as proscribing segregation in the public education process on the stated ground that separate but equal schools for the races were inherently unequal. This being our interpretation of the teaching of that decision, it follows that it would be entirely inappropriate for it to be rejected or obviated by this court.

Stell v. Savannah-Chatham County Bd. of Educ., 333 F.2d 55, 61 (5th Cir. 1964), *cert. denied*, 379 U.S. 933 (1964). After the Supreme Court denied the state’s petition for certiorari, the district court on remand granted an injunction against the school board’s operation of a segregated school system and further enjoined the board:

[C]onsistently with and in accordance with *Brown* and the decision of the Court of Appeals in this case school children may be assigned to particular schools “on a basis of intelligence, achievement, or other aptitudes upon a uniformly administered program” provided race is not a factor in making the assignment.

Stell v. Savannah-Chatham County Bd. of Educ., 255 F. Supp. 88, 94 (S.D. Ga. 1966) (citation omitted).

115. *Stell*, 220 F. Supp. at 668 (emphasis added).

116. For a classic complaint about courts’ use of fiat rather than reason in attempting to justify their discussions, see Lon L. Fuller, *Reason and Fiat in Case Law*, 59 HARV. L. REV. 376 (1946).

117. David L. Faigman, “Normative Constitutional Fact-Finding”: Exploring the Empirical Component of Constitutional Interpretation, 139 U. PA. L. REV. 541, 573 (1991) (footnote omitted).

is not easy to discern exactly what its merit is. Ronald Dworkin is also among those who have worried about the relation between empirical judgment and normative constitutional judgment, and his version of the concern is instructive. His basic solution to the problem—in an argument that presages his later and more expressly “hermeneutic” work—was to recharacterize the nature of the evidence in *Brown* so that the necessary evidentiary judgment was not one of *science*, but was rather an “interpretive” judgment that is presumably more comfortably within the scope of judicial prowess. As Dworkin put it:

“We don’t need evidence for the proposition that segregation is an insult to the Black community—we *know* it; we know it the way we know that a cold causes snuffles.” It is not that we don’t *need* to know it nor that there isn’t something there to know. There is a fact of the matter, namely that segregation is an insult, but we need no evidence for that fact—we just know it. It’s an interpretive fact.¹¹⁸

Dworkin’s analogy is inapt. Surely our knowledge of the relation between a cold and “snuffles” rests on causal judgments that are empirical. Moreover, the kind of judgment the Court made in *Brown* does seem inevitably to be an empirical one, for which evidence *is* needed, and regarding which expertise is, at least in principle, available.¹¹⁹ The difficulty of making such judgments reliably cannot be wished away by recharacterizing them as “interpretive.”¹²⁰

118. Ronald Dworkin, *Social Sciences and Constitutional Rights—The Consequences of Uncertainty*, 6 J.L. & EDUC. 3, 5 (1977) (paraphrasing Edmond Cahn, *Jurisprudence*, 30 N.Y.U. L. REV. 150, 157-58 (1955)).

119. Dworkin focuses on a “finding” slightly different from that at issue in *Brown*. *Brown*’s finding was that segregation caused psychological harm. Dworkin’s issue is whether it was an “insult.” Not every insult causes psychological harm, and when an insult does so is a question of empirical psychological fact. Nevertheless, his question whether a given social gesture is an insult in a particular community or to a given person is also thoroughly empirical.

120. Dworkin’s analysis is an early version of arguments about so-called “social meaning” (what other kind is there?) that are becoming popular among legal academics. See, e.g., Lawrence Lessig, *The Regulation of Social Meaning*, 62 U. CHI. L. REV. 943 (1995). Like Dworkin’s approach to general jurisprudential issues, and like much recent work in literary and hermeneutic theory, this approach is much absorbed by the effort to linguistify and textualize features of legal and social experience that are readily explained in nonlinguistic terms. According to one of its recent expositors, Professor Lessig, the social meaning approach focuses on “the semiotic content attached to various actions, or inactions, or statuses, within a particular context,” *id.* at 951, for the purpose of assessing whether (1) collective action problems exist that make it difficult to “reconstruct” social meanings that have been “constructed”; and (2) whether and how such collective action problems as do exist should be addressed by private or public agents, *see id.* On this approach, for example, when an action creates a stigma, the stigma is a social meaning, and when a gesture is an insult, the insult is a social meaning. *See id.* Moreover, a stigmatizing socially meaningful act like discriminating on the basis of race in a publicly visible way can create a collective action problem for stigmatizers who would rather not behave in such a way, other things equal, but who feel compelled to do so by a social meaning that they cannot individually control. Lessig claims that this predicament afflicted many employers in the South prior to passage of the Civil Rights Act, which then, Leviathan-like, solved this collective action problem. *See id.* at 965-67.

An enduring question about all such approaches is to what extent theories of linguistic meaning narrowly conceived can usefully be extended to explain phenomena that seem linguistic only in a loose or—dare I say it—metaphorical sense. An answer to that question, however, awaits discussion elsewhere. For now, observe that such a theory easily lends itself (indeed, these very examples lend themselves) to

But even if Dworkin's and similar efforts cannot convert empirical questions into (allegedly) nonempirical "interpretive" or "semiotic" ones, the concern with "constitutionalizing" putatively scientific empirical results is a real one. Let us come back directly to the closely related problems that are my chief concerns in this Article, those of *institutional competence* and *justified epistemic deference*—whether courts, using rules of evidence, procedure, and other institutional and doctrinal devices, are competent to effect a transfer of experts' justified beliefs to judges or juries in a way that is sufficiently legitimate for legal decisionmaking.

Two questions present themselves about the Court's use of expert information in *Brown*. First, did the Court really face no serious problem of competing experts of the sort that threatens the legitimacy of nonexpert judge and jury decisions under the *Daubert* regime? Second, is a nonexpert court capable of discerning the degree of instability in a necessarily tentative empirical finding—that is, the degree of *epistemic repose* that the finding warrants¹²¹—and of discerning it sufficiently for the purpose of bringing about the amount of *legal repose* that relevant scientific factual findings warrant?¹²²

As to the first question, it may be that *Brown* lucked into a factual finding that really was supported by the evidence and by the opinion of a majority of reputable experts (presumably these are not wholly independent variables!), despite the contrary evidence vigorously adduced by the lawyers in *Stell*. Such a degree of support among those we take to be experts triggers in us what I shall refer to as "the *Frye* response": If a critical mass of duly recognized experts support a claim, that claim is very, very likely to be true. (Whether that response is also epistemically warranted is the issue I take up in more detail in a later discussion.¹²³ It is crucial to keep in mind that truth alone is no

a Dworkin-like analysis of *Brown*. Perhaps what *Brown* was really addressing was whether there was a "social meaning" of state-mandated segregation, and whether, if so, it created a psychological harm to black schoolchildren. Dworkin's suggested answer to the first question is, yes, the social meaning was that of "insult." But even through the "social meaning" lens, there are still fundamentally *empirical* questions, *pace* Dworkin, to be asked about whether *in fact* a given act or gesture is insulting and stigmatizing, and even if so, whether that insult or stigma *in fact* causes psychological harm. Thus, the social meaning interpretation of *Brown* cannot obviate, and instead merely restates or relocates, the problem of how courts can reliably acquire empirical information of this sort.

121. *Daubert* gives a nice example of what I am referring to here as epistemic repose:

[W]e do not read the requirements of Rule 702 to apply specially or exclusively to unconventional evidence. Of course, well-established propositions are less likely to be challenged than those that are novel, and they are more handily defended. Indeed, theories that are so firmly established as to have attained the status of scientific law, such as the laws of thermodynamics, properly are subject to judicial notice under Federal Rules of Evidence 201.

Daubert v. Merrell Dow Pharms. Inc., 509 U.S. 579, 593 n.11 (1993).

122. The "legal repose" at issue here is both internal to a particular case and external to it. Doctrines like *res judicata* and the pragmatic relevance requirement of Federal Rule of Evidence 403 guide judges in effecting repose *within* a case. See FED. R. EVID. 403. Judges' use of doctrines of *stare decisis* help effect legal repose across cases.

123. See *infra* Section V.C.

guarantor of epistemic warrant.) But even if the *Brown* Court did luck into such a finding, that is precisely the point: The Court *lucked* into it. It was not for any skill on the part of the Court in sorting through dozens of studies, many of which surely relied on statistical modeling and other complex methodologies, that the Court was able to discern the truth of the psychological claim. Nor is a court *in general* competent to do so. Thus, in many other cases in which social-scientific evidence is relevant, perhaps nearly dispositive, courts will be in the same position they are in with regard to results in the hard sciences: placed at the mercy of competing experts. Indeed, other cases in which psychological evidence is powerfully relevant, and which expose courts' limited epistemic competence come readily to mind; consider the increasing reliance by litigants on putatively expert testimony regarding various syndromes, including post-traumatic stress disorder and battered woman or battered child syndrome.¹²⁴

Consider now the second question, the question of how much *legal repose* is warranted by the degree of *epistemic repose* in an empirical study. Courts do not appear to be generally competent to make the subtle judgments required to balance appropriately epistemic and legal repose. To make such judgments, a court should be capable of assessing rationally the extent to which empirical data support a conclusion, which would in turn require the judge (or judge plus jury) to understand formal models, experimental design, and so on. The epistemic problem presented by the questions of the proper degree of epistemic and legal repose might even be framed as a problem of "diachronically" competing experts.¹²⁵ Even if most experts agree *now*, at what point in the future should courts be open to challenges to what is now agreed? In a way, that is the question that *Stell* posed to *Brown*, and neither the Fifth Circuit in *Stell* nor the Supreme Court in *Brown* itself provided any guidance.

The real problem with cases like *Brown*, no less than in cases like (and cases decided pursuant to) *Daubert*, is that scientifically nonexpert judges and juries do not seem institutionally competent to assess expert scientific evidence rationally. In a *Daubert*-type case, the main problem will be the battle of experts that is waged before spectators who are for the most part not competent even to understand, much less to apply in a nonarbitrary manner, that intellectual contest's rules. In *Brown*, there are likely to be two significant problems: the capacity of judges and juries to assess competing scientific testimony, and the capacity of judges to decide, in a principled way, how to balance the inherent instability of empirical results against the law's desire for finality, repose, stability, and incremental and conservative evolution. As I argue below in greater detail (but surely the claim, as vague as it is here, has intuitive force), legal decisionmakers should make decisions that are not

124. See MUELLER & LAIRD, *supra* note 19, at 729-41.

125. For extended discussion of "competition" in experts' testimony, see *infra* Section IV.C.

fundamentally arbitrary from an epistemic point of view.¹²⁶ Failure to do so threatens the legitimacy of the decision from a legal point of view. The reasoning in both *Brown* and *Daubert* inspires little confidence that courts are capable of overcoming this threat.

II. AXIOLOGY AND "POINT OF VIEW" IN THE ANALYSIS OF EPISTEMIC DEFERENCE

A. *Central Relation: Epistemic Deference by "Practical" (Legal) Reasoners to "Theoretical" (Scientific) Experts*

Brown and *Daubert* are tips of the iceberg. Questions to which scientific theories and methods are reasonably likely to have answers that are both *material* and *relevant* (in the older common law sense)¹²⁷ are raised in an increasingly large percentage of cases at civil and criminal law. Among the scientific theories and methods that have been prominent in litigation in recent years, for example, are the use of genetic theories and laboratory methods to assess "DNA fingerprint" evidence; findings by psychologists regarding the veracity of eyewitness testimony; and complex medical and epidemiological studies regarding the harm that food, drugs, and technologies have caused or can cause.

Legal and political systems around the world cede legal decisionmaking authority regarding such questions to scientifically nonexpert decisionmakers (those who are largely untrained in any field of scientific research) to varying degrees. Some systems, like that of the United States, give nonexperts the ultimate say on a great many legal issues to which scientific information is reasonably likely to be relevant and material. Several Continental systems are far less inclined to give these science-imbued decisions to nonexperts.¹²⁸

126. See *infra* Part VII.

127. See *supra* note 19 and accompanying text.

128. France is often mentioned as the chief exemplar of a political and legal system that gives decisions to "technocrats" who have received extensive training in (inter alia) science, but who also exercise a great deal of bureaucratic governmental power without any real oversight by democratic institutions. It is probably not quite right to conclude that this is a system in which *scientists* make many of the decisions that judges and juries would make in the United States. It appears that, although the elite French technocrat does typically get training in mathematics, physics, and chemistry (as well as economics, law, decision theory, and administration), he is specifically trained to be a *generalist manager*, whose only specialty is the multipurpose skill of governing, administering, and making organizational decisions—a skill that is thought to require sufficient competence with science to comprehend its use in policy decisions. Thus, for example, students of one of the elite training academies have been told routinely that "[t]he scientific training you receive will not give you the knowledge in any branch that the specialists have, but it will give you the aptitudes and the methods such as to allow you to be on top of everything." EZRA N. SULEIMAN, *ELITES IN FRENCH SOCIETY: THE POLITICS OF SURVIVAL* 166 (1978) (quoting language addressed to an entering class of the *Ecole Polytechnique*, in FREDERIC BON & MICHEL A. BURNIER, *LES NOUVEAUX INTELLECTUELS* 112 (1971)). For discussion of the issue, see JOHN ARDAGH, *FRANCE IN THE 1980s*, at 82-92 (1982); and SULEIMAN, *supra*, at 158-92. Even if these technocrats are not scientists in their own right, it does seem clear that they are far better trained in scientific matters than the average American juror or judge. It also seems clear that government officials trained in this way make many far-reaching decisions

This Article constructs a model of the reasoning process that nonexpert judges, juries, and other legal reasoners use in the effort to reach justified legal decisions when those legal reasoners rely on—defer to—expert scientific evidence. In developing this model, I hope to provide a philosophical explanation of how this particular reasoning process works, which in turn can advance our thinking about how it *might* be justified and whether it *is* justified, as currently practiced in American legal institutions. Although my chief explanatory target is the process of deference by *legal* reasoners to experts, such deference is only one species of a broader generic phenomenon: the deference by *practical* reasoners (those who reason about what they ought to do) to expert *theoretical* reasoners (those whose expertise lies in some area of reasoning about how the world is). I shall refer to this as “practical epistemic deference.” In providing the model of practical epistemic deference, I use examples from both legal and nonlegal practical reasoning. The legal examples will loom largest, however, in part because the express institutionalized rules that guide the legal system in this kind of deference—chiefly, rules of evidence and procedure—make this reasoning process in law more amenable to analysis than the comparable but less explicitly regulated process of nonlegal deferential practical reasoning.

Another qualification is equally important. Although I spend some time discussing and relying on a distinction between *practical* and *theoretical* reasoning, I limit my analysis in this Article to *scientific* theoretical reasoning, albeit with an expansive conception of the scientific, embracing “hard” and “soft” empirical science as well as the demonstrative sciences of mathematics and logic—all of which can be and have been the object of epistemic deference by legal reasoners to experts. I limit my analysis in this way for two main reasons. First, courts and scholars concerned with the problem of epistemic deference have themselves focused on scientific knowledge as a distinct category of expert evidence. For example, *Daubert* expressly limited its analysis to the admissibility of scientific expert testimony.¹²⁹ Left out of the Court’s analysis was any discussion of the admissibility of nonscientific expert testimony, such as the testimony a police officer might give about the motives and habits of drug dealers. The second reason is heuristic. My intuitions about the problems associated with nonexperts’ deferring to experts are clearest with regard to scientific evidence. If we can make a significant advance in understanding the structure of justification that frames nonexperts’ reasoning about scientific expert testimony, we may use that as a heuristic lever to gain clarity about deference by nonexperts to other types of experts—a task I leave for later work.

involving science and technology that are given to judges and juries in the United States, particularly in torts cases.

129. See *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579 (1993).

For the purposes of my inquiry here, assume that there is a cogent and important distinction between practical and theoretical reasoning. I rely on that assumption to explore and explicate epistemic deference by legal reasoners to scientific experts. I characterize these as distinct "points of view" and begin by explaining what a "point of view" is and how I use the concept in my analysis.

B. Reasoning from a "Point of View"

Many philosophers have invoked the concept of the "point of view." Oliver Wendell Holmes's "bad man" is an analytical device that offered a perspective, a point of view, on the law (the point of view, perhaps among others, of the lawyer).¹³⁰ H.L.A. Hart extended this basic idea and made it a central feature of his positivist account of law: the distinction of the "internal" and "external" attitudes—points of view—toward legal rules.¹³¹ Other positivists, such as Joseph Raz and Hans Kelsen, have relied heavily on the idea of a point of view in explaining the nature of law.¹³² Dworkin, too, has relied repeatedly on the concept of the point of view, distinguishing the external point of view (that "of the sociologist or the historian") from the internal point of view of the participant in a social practice like adjudication.¹³³ Dworkin declares that his own analysis of law is from the "internal," "participants'" viewpoint, from which he "tries to grasp the argumentative character of our legal practice by joining that practice and struggling with the issues of soundness and truth participants face."¹³⁴ Dworkin has also argued that legal interpreters seek to put the legal materials they interpret in their "best light," best "from the standpoint of political morality."¹³⁵ From a nonpositivist perspective quite distinct from Dworkin's, Ernest Weinrib has articulated a "formalist" legal theory that insists on the vital importance of taking an "immanent" point of view.¹³⁶ According to

130. See OLIVER WENDELL HOLMES, *The Path of the Law*, in COLLECTED LEGAL PAPERS 167, *passim* (1920); see also William Twining, *The Bad Man Revisited*, 58 CORNELL L. REV. 275 (1973).

131. See H.L.A. HART, *THE CONCEPT OF LAW* 89-91, 242-43, 254 (2d ed. 1994).

132. See JOSEPH RAZ, *THE AUTHORITY OF LAW: ESSAYS ON LAW AND MORALITY* 137-45 (1979) [hereinafter RAZ, *THE AUTHORITY OF LAW*] (discussing Kelsen); JOSEPH RAZ, *PRACTICAL REASON AND NORMS* 170-77 (1975) [hereinafter RAZ, *PRACTICAL REASON*].

133. DWORKIN, *supra* note 3, at 14.

134. *Id.*

135. *Id.* at 255-56. Dworkin maintains:

Hard cases arise, for any judge, when his threshold test does not discriminate between two or more interpretations of some statute or line of cases. Then he must choose between eligible interpretations by asking which shows the community's structure of institutions and decisions—its public standards as a whole—in a better light *from the standpoint of political morality*. His own moral and political convictions are now directly engaged.

Id. (emphasis added).

136. See Ernest J. Weinrib, *The Jurisprudence of Legal Formalism*, 16 HARV. J.L. & PUB. POL'Y 583, *passim* (1993) [hereinafter Weinrib, *Jurisprudence of Legal Formalism*]; see also Ernest J. Weinrib, *Legal Formalism: On the Immanent Rationality of Law*, 97 YALE L.J. 949 (1988).

Weinrib, "formalism represents the law's aspiration to be an immanently intelligible normative practice. Immanence bespeaks a *standpoint* that is internal to law" and thus has "a critical standpoint, but one that emerges from the law's own aspirations."¹³⁷ One hotly contested claim in a branch of recent legal academic writing is that there is a distinct "women's point of view" or "black point of view."¹³⁸

The concept of the point of view has played an important role for many nonlegal philosophers, too. W.V. Quine, for example, has distinguished the "epistemic" and the "ontological" points of view to explain how his complexly related theses of underdetermination and indeterminacy do not commit him to self-refuting relativism.¹³⁹ John Rawls has suggested the importance of the notion of "point of view" in distinguishing the roles and goals of the legislator and the judge.¹⁴⁰ Thomas Nagel has devoted an entire book to

a single problem: how to combine the perspective of a particular person inside the world with an objective view of that same world, the person and his viewpoint included. It is a problem that faces every creature with the impulse and the capacity to transcend its particular point of view and to conceive of the world as a whole.¹⁴¹

Laurence Bonjour has argued the importance of identifying the epistemic point of view, maintaining that "[t]he distinguishing characteristic of epistemic

137. Weinrib, *Jurisprudence of Legal Formalism*, *supra* note 136, at 591-93 (emphasis added).

138. There is good reason to doubt whether it is epistemically or morally valuable to believe that there are such points of view; that is, whether from either an epistemological or a moral point of view, we ought to think that there is such a thing as a woman's or a black person's point of view. For critical discussion of this issue, see Scott Brewer, *Pragmatism, Oppression, and the Flight to Substance*, 63 S. CAL. L. REV. 1753 (1990).

139. Quine argues:

From among the various conceptual schemes best suited to these various pursuits, one—the phenomenalistic—claims epistemological priority. Viewed from within the phenomenalistic conceptual scheme, the ontologies of physical objects and mathematical objects are myths. The quality of myth, however, is relative; relative, in this case, to the *epistemological point of view*. This point of view is one among various, *corresponding to one among our various interests and purposes*.

QUINE, *supra* note 63, at 19 (emphasis added). Quine continues:

For my part I do, *qua* lay physicist, believe in physical objects and not in Homer's gods; and I consider it a scientific error to believe otherwise. But *in point of epistemological footing* the physical objects and the gods differ only in degree and not in kind. . . . The myth of physical objects is epistemologically superior to most in that it has proved more efficacious than other myths as a device for working a manageable structure into the flux of experience.

Id. at 44 (emphasis added). The distinction of the epistemological from the ontological points of view is central to Quine's project of "naturalized epistemology." See, e.g., W.V. QUINE, *WORD AND OBJECT* 22-23 (1960). As Quine explains it, when we speak of *underdetermination* of a physical theory, we are speaking "from the standpoint of a description of the theory-building process," and noting that in building theories, "physical human subjects" go (and inevitably go) beyond the sensory evidence on which the theories are built; most generally, the project in which scientists are engaged is the *ontological* project the goal of which is "painstakingly to surmise what reality is like." *Id.* at 22; see also *id.* ("Everything to which we concede existence . . . is . . . real *from the standpoint of the theory being built*." (emphasis added)).

140. See John Rawls, *Two Concepts of Rules*, 64 PHIL. REV. 3, 6-7 (1955).

141. THOMAS NAGEL, *THE VIEW FROM NOWHERE* 3 (1986).

justification is . . . its essential or internal relation to the cognitive goal of truth."¹⁴²

Properly understood, the concept of a "point of view" will prove quite useful for the analysis of practical epistemic deference—deference by practical reasoners to scientific experts. Thus I now explicate this concept in a way that captures what is common to virtually all the aforementioned philosophical uses of the idea and indicates how that concept may advance the analysis of practical epistemic deference. Some observations about (more or less) common usage will usefully frame the issue. One might be said literally to have a point of *view*, that is, actually to occupy some position in space that gives one a particular visual vantage. On the forest floor, one might see only trees; from a point atop a mountain, one might see the forest, and not only the trees. From a bird's-eye view (say, from an airplane), one might see the shape of a lake; and from an astronaut's-eye view, the shape of the earth. It is also common to use the term "point of view" to speak of expertise. An expert witness might tell a jury or judge what the facts are from the point of view of a biologist or a chemist or a ballistics expert or a psychiatrist—indeed, the point of view of the expert scientist will be of central concern for my later analysis of practical epistemic deference. The facts that are salient from these expert points of view will by no means always be the same as the facts that are salient from some practical point of view, such as a legal or moral point of view.

One may also refer to the point of view of a particular type of actor in an institutional or other social setting—the point of view of a legislator or a judge, a lawyer or a citizen, a president or a "bad man," a parent or a child, a professor or a student. One may also refer to the point of view not of a given type of institutional or other social actor, but of the enterprise in which the actor acts—the enterprise that gives a judge, parent, or teacher his identity as that kind of actor. This might be understood as the point of view of an enterprise, an enterprise in which particular methods of analysis are chosen and used to serve specified cognitive goals. Examples of such enterprises include systems of moral reasoning (on a cognitivist account of morality, at least, this yields the "moral point of view"), philosophical reasoning (the philosophical point of view), systems of reasoning in support of business objectives (the business point of view), and many others that are familiar (the military point of view, the economic point of view, the religious point of view, and so on).

The "enterprise" conception of point of view is, I suggest, the common thread running through all the notions of point of view mentioned above, both the "common" and the more reflectively philosophical. The superficially varying conceptions of point of view noted above are reducible to the

142. LAURENCE BONJOUR, *THE STRUCTURE OF EMPIRICAL KNOWLEDGE* 8 (1985). The passage continues: "It follows that one's cognitive endeavors are epistemically justified only if and to the extent that they are aimed at this goal, which means very roughly that one accepts all and only those beliefs which one has good reason to think are true." *Id.*

enterprise conception by virtue of the close connection each use of point of view has to claims of *justification*, in that claims of justification are advanced and measured by reference to the cognitive goals of an enterprise and the methods the enterprise uses to serve those goals. To explain this point slightly differently, in each use of point of view noted above, the concept of point of view is invoked to *justify* some claim—either a claim about what we ought to believe (a theoretical claim) or how we ought to act (a practical claim).

Each claim is thus implicitly a claim that a certain belief is justified, and that its justification comes in significant part from the method the epistemic “enterprise” uses to produce it. If you are justified in claiming that a lake is rectangular in shape, it is because you have a bird’s eye (or some other reliable) point of view on it (or are reliably relying on someone who does). A geneticist might be justified in believing, on the basis of “DNA fingerprint” evidence, that a defendant was present at the scene of a crime, because the geneticist has the appropriate expert point of view. Because she is a lawyer (or other legally trained person), and so has the lawyer’s point of view, a person might be justified in her belief that her friend ought not sign some contract (given, of course, that she has sufficient information about the *friend’s* interests and desires). And a military commander’s claim that a particular bombing mission was the right thing to have done might be correct from a military point of view although highly questionable from either a legal or a moral point of view. Of course, simply identifying the general point of view of an enterprise does not by itself answer the following question: What are the specific aims of the enterprise for theorists who recognize themselves as pursuing the same generic enterprise, but who often disagree about what are the proper *specific* aims of the enterprise? Such disagreements are a principal source (but not the only source) of the difference among theories within an enterprise.

Further refinement of the “enterprise” conception of a point of view (the conception to which others are reducible) is useful. What is distinctive of an enterprise on whose behalf a participant in that enterprise makes a justificatory claim is that the claim was the product of a distinct method, and that the *method*, in turn, is chosen by enterprise participants to achieve distinct cognitive *aims*. The military point of view differs from the moral point of view, for example, because the enterprise of assessing a given action from each point of view differs according to the distinct methods and cognitive aims of military and moral analysis.

We may refer to this conception of point of view that focuses on the distinctive intellectual aims and methods of a given enterprise as an “axiological” conception. The axiological conception will help us map out the relations between the intellectual framework in which a judge or jury reasons about a given legal dispute (a legal point of view) and the rather distinct framework within which an expert scientist reasons about facts that are material and relevant to legal decisions. In offering this “enterprise” and

"axiological" conception of the point of view, I borrow from Larry Laudan's clarifying analysis of scientific reasoning.¹⁴³ Laudan presents a model of scientific reasoning that identifies three distinct levels of analysis: the "factual," the "methodological," and the "axiological." At the *factual* level are "all manner of claims about what there is in the world, including theoretical and unobservable entities."¹⁴⁴ At the *methodological* level are methodological rules that scientists share.¹⁴⁵ There is great variety in the scope and content of these rules, ranging from the rather vague ("avoid ad hoc explanations," "accept only independently testable results," "formulate testable and simple hypotheses," "prefer the results of double-blind to single-blind experiments") to the very precise ("make sure to calibrate instrument x against standard y").¹⁴⁶ It is the application of methods to experimental data (pursuant to methodological rules) that warrants a scientist's factual assertions; by applying methodological rules in this way, scientists who accept those rules are often able to resolve factual disagreements.

Laudan's model of scientific reasoning identifies a third crucial level of analysis, the "axiological" level.¹⁴⁷ At this level are statements, often in the form of rules, of the "cognitive aims" of science. For example, a scientist ought to use methods for generating factual beliefs that achieve empirical accuracy; or achieve coherence with the set of currently held theories and beliefs; or produce the simplest theory among those theories that explain the data equally well; or produce a predictively fertile theory; or produce a theory that possesses a high degree of generality and breadth of scope.¹⁴⁸ Although

143. See LARRY LAUDAN, *SCIENCE AND VALUES: THE AIMS OF SCIENCE AND THEIR ROLE IN SCIENTIFIC DEBATE* (1984).

144. *Id.* at 23.

145. See *id.*

146. *Id.*

147. See *id.*

148. See *id.* at 26. Thomas Kuhn identifies the following aims of scientific inquiry: accuracy (deducible consequences should be in agreement with experiments); consistency (both internally and with other currently accepted theories); simplicity (the explanation should presuppose the existence of fewer rather than more entities); fruitfulness (disclose new phenomena or previously unnoted relationships); and broad scope (consequences should extend beyond initial observations, laws, or subtheories). See THOMAS S. KUHN, *Objectivity, Value Judgment, and Theory Choice*, in *THE ESSENTIAL TENSION: SELECTED STUDIES IN SCIENTIFIC TRADITION AND CHANGE* 320, 321-22 (1977). Quine and J.S. Ullian identify and describe "five virtues which count toward plausibility, and which a hypothesis may enjoy in varying degrees." W.V. QUINE & J.S. ULLIAN, *THE WEB OF BELIEF* 43 (1970). These virtues are conservatism (the hypothesis should conserve prior beliefs because "[t]he plausibility of a hypothesis varies inversely with the plausibility of the prior beliefs that it disallows," *id.* at 44); generality ("[t]he plausibility of a hypothesis depends largely on how compatible the hypothesis is with our being observers placed at random in the world," *id.*); simplicity (that, when choosing among hypotheses equal in all other respects, the more plausible hypothesis is the simpler one, see *id.* at 45); refutability (a hypothesis neither confirms nor predicts anything unless "[s]ome imaginable event, recognizable if it occurs . . . suffice[s] to refute it," *id.* at 50); and modesty (a stronger "conservatism" demanding that the less "extravagant" hypothesis be preferred to those that are more so, other things being equal, *id.* at 51).

One might treat as axiological values (aims) the values that Kuhn, on the one hand, and Quine and Ullian, on the other, identify, but one might also treat some of them as methodological rules (methods). Laudan himself does not draw a sharp line between methods and aims. See, e.g., LAUDAN, *supra* note 143, at 31. One quite plausible explanation for this is that no sharp line can be drawn between the concepts

such cognitive norms are often vague,¹⁴⁹ they are not so vague as to be without action-guiding or belief-guiding content.

Suffusing his discussion with examples from the history of science, Laudan uses his tripartite model of scientific reasoning to argue against both “arch-rationalist” and “arch-undeterminationist” philosophers of science. The former are those who believe that there is “an algorithm or set of algorithms which would permit any impartial observer to judge the degree to which a certain body of data rendered different explanations of those data true or false, probable or improbable.”¹⁵⁰ The latter are those who believe that because “we have no perfectly general logic of confirmation or comprehensive theory of evidence,” and because many scientific rules (methodological and axiological) are vague or ambiguous or highly general, “the application of shared scientific [methodological] rules or [axiological] values to a specific choice situation will always be (or always has been) unavailing.”¹⁵¹ (Thomas Kuhn is Laudan’s chief target.)

Against the rationalists, Laudan advances several arguments and observations (well known in the work of Norwood Hanson, Paul Feyerabend, Quine, Kuhn, and others). For example, Laudan observes that methodological rules, though shared by scientists, may still underdetermine preferences among competing factual beliefs, and shared axiological goals may similarly underdetermine a preference among competing methodological rules. Furthermore, even among scientists who accept the same set of axiological aims (e.g., coherence, simplicity, empirical accuracy), that set will underdetermine a preference among competing methodological rules whenever competing methodological rules promote or thwart different members of the set of axiological goals in different ways. To choose among competing methodological rules that satisfy some axiological goals but thwart others, scientists must *weigh* those goals, and since they might weigh them differently, even a shared bundle of goals may underdetermine the choice of methodological rules. While he criticizes the rationalists, Laudan also deploys

“method” and “aim,” and that (as with all vague concepts) the line between them is to be drawn on the basis of holistic considerations. Consistent with this explanation is the possibility that there is one fundamental axiological aim that all other aims and methods subserve. For science, a likely candidate for such an overall and overriding and superseding axiological norm is a norm of truth or accuracy, such as, “Choose those aims, methods, and beliefs that are most likely to produce true or accurate accounts of the world.” Cf. BONJOUR, *supra* note 142, at 7 (“What makes us cognitive beings at all is our capacity for beliefs, and the goal of our distinctively cognitive endeavors is truth: we want our beliefs to correctly and accurately depict the world.”). Note that if there were such a norm, it would play a structural role for judgments of scientific validity analogous to the role that, on Kelsen’s account, the *Grundnorm* plays for judgments of legal validity. See RAZ, THE AUTHORITY OF LAW, *supra* note 132, at 122–45 (discussing Kelsen’s “basic norm”).

149. Every empirical concept is “open-textured,” i.e., has the *possibility* of being vague in some particular circumstance. See Brewer, *supra* note 15, at 993–96. If, with Quine, we abandon one of the two dogmas of empiricism, we would acknowledge that *all* concepts, even mathematical and logical concepts, are open-textured. See QUINE, *supra* note 63, at 43.

150. LAUDAN, *supra* note 143, at 5.

151. *Id.* at 32.

several arguments against the underdeterminationists,¹⁵² such as that while a methodological rule may underdetermine choice among competing factual-level beliefs in the abstract, "the same rule may still unambiguously dictate a comparative preference among extant alternatives"¹⁵³—that is, it can determine preference among competing beliefs that are under active consideration even while it underdetermines beliefs overall.¹⁵⁴

I maintain that this basic axiological structure is generalizable from scientific theory to any intellectual discipline that has a distinct intellectual method. I need not, and do not, endorse the conclusion that Laudan has achieved a complete analysis of scientific rationality. Surely Laudan's analysis can be questioned for its basic assumption that instrumental rationality is the essence of scientific rationality—an assumption clearly reflected in Laudan's dissection of science into an enterprise driven by the selection of aims and methods for achieving them.¹⁵⁵ But even if other conceptions of rationality fill out the picture, it does seem that a structure of the sort that Laudan identifies comprises a very significant part of the story of scientific rationality. I also believe that, suitably generalized, this structure provides both a full explication of the concept of a point of view and a deep insight into the nature of any intellectual discipline that uses a distinctive method to justify claims.

Another virtue of Laudan's model is its ready amenability to the pattern of "reflective adjustment" that I have emphasized elsewhere.¹⁵⁶ The concept of reflective adjustment provides a powerful explanation of the structure of justificatory reasoning in a wide variety of fields (including not only analogical reasoning, but also moral theory, logic, and epistemology). Laudan's axiological conception extends this model of justification to the realm of scientific reasoning. He argues, contrary to claims by Rudolf Carnap, Hans Reichenbach, Thomas Kuhn, and others, that scientific justification cannot be adequately explained as a linear hierarchy in which a scientist justifies fact claims by reference to methods and justifies choice of method by reference to aims.¹⁵⁷ Although on Laudan's model, facts, methods, and aims all play a critical role, they cannot be arrayed on a simple linear hierarchy in which factual claims are constrained only by methodological rules, and

152. Loud analogies to consensus and dissensus formation in both legal theory and legal interpretation ring in one's ears. Legal theory has certainly had its arch-rationalists (legal process theorists, perhaps, and Dworkinians), its arch-underdeterminationists (some Realists, some Crits), and its Laudan-like centrists (such as H.L.A. Hart).

153. *Id.* at 29.

154. For example, in biology, the rules and evidence do not "establish the unique correctness of evolutionary theory," but they do rule out several creationist claims from the permissible realm "and thus provide a warrant for a rational preference for evolutionary over creationist biology." *Id.* Of course, Laudan's claim here can be correct only if there is a "rational" way to delimit the theories that are placed "under active consideration." *Id.*

155. See *id.* at 42-66. For an argument that instrumental rationality does not exhaust all types of rationality, see ROBERT NOZICK, *THE NATURE OF RATIONALITY* 133-81 (1993).

156. See Brewer, *supra* note 15, at 938-39.

157. See LAUDAN, *supra* note 143, at 23-41.

methodological rules are constrained only by axiological aims, and axiological aims are constrained by nothing in particular. Instead, Laudan argues that constraints are multidirectional within the holistic network of aims, methods, and beliefs. For example, factual beliefs can constrain the choice of method in the sense that whether a given method (e.g., using double-blind experiments) is an effective means to achieve some cognitive aim (e.g., empirical accuracy) is itself a *factual* question. Some confirmation for the value of this model—Laudan calls it “reticular”—may be found in its fertility in producing explanations in other intellectual domains; for example such an explanation is a prominent and important part of Dworkin’s theory of “law as integrity.”¹⁵⁸ Dworkin borrows this kind of reticulated or holistic picture to argue that what he calls judgments of “fit” can constrain judgments of value even though the former judgments are themselves judgments of value.¹⁵⁹

I have argued, then, that an “enterprise” conception, properly supplemented by Laudan’s axiological model, can serve to explicate the concept of the “point of view” in its different philosophical uses. Generalized from the particular intellectual domain of science, the enterprise-axiological model posits that an intellectual enterprise that produces distinctive justificatory claims may be dissected into three separate components: factual judgments, the distinctive methods that the enterprise uses to generate those factual judgments, and the distinctive cognitive aims that the methods are chosen to advance and serve. One invokes a point of view to justify some claim. To serve this justificatory function, the point of view is assumed to be a reliable method of achieving the (explicit or implicit) aims of some rational enterprise. Because of the holistic, “reticulated” relation among aims, methods, and beliefs, we may understand claims about points of view to be claims about the axiological net that is associated with the point of view that a justificatory argument invokes.

It is time now to put this rather elaborate conception of “point of view” to work on the principal object of my investigation: epistemic deference by practical reasoners (specifically, legal reasoners) to expert scientists. Insofar as legal systems and legal decisionmakers purport to base legal decisions on justified reasoning—as virtually all legal systems claim to do—the reasoning of authoritative legal decisionmakers in the system (like judges or juries) is readily amenable to analysis by this axiological model sketched above. With that model, one can compare and contrast the aims, methods, and beliefs of the scientific expert as theoretical reasoner, with the aims, methods, and beliefs of the judge or jury as practical reasoner. Important steps in the reasoning process by the nonexpert practical reasoner involve an assessment *by* that reasoner of the methods and results, if not also the aims, of the scientific expert, and *that* assessment is (for many practical reasoners) and should be (for all such

158. See DWORKIN, *supra* note 3, at 176-277.

159. See RONALD DWORKIN, A MATTER OF PRINCIPLE 167-77 (1985).

reasoners) in turn guided by certain aims that aspire to bring "intellectual due process" into the law.

C. *The Practical and Theoretical as Points of View*

I am now in a position to explain my assertion that there is a distinction between practical and theoretical reasoning that is cogent, important, and, for my purposes, heuristically valuable.¹⁶⁰ That distinction raises one among a family of issues of perennial concern to moral philosophers and metaethicists, including the relation between fact and value, between "is" and "ought," between descriptive and prescriptive judgments, as well as the so-called "naturalistic fallacy."¹⁶¹ Nothing in my analysis of epistemic deference hangs on whether this is in fact a tenable distinction, but it is nevertheless a very useful heuristic. I assume with only a little argument that facts are different in kind from values; that this is true for both moral values and the value-aims that in large measure drive scientific inquiry; that there is an unbridgeable inferential gap between "is" and "ought"; that any argument in which a prescriptive proposition is putatively inferred from a set of premises containing only descriptive propositions is either fallacious or enthymematic; and that if it is enthymematic, then some prescriptive proposition has been omitted from the premise set but belongs in it in a proper interpretive reconstruction of the argument.¹⁶² (This last assumption will be prominent in my discussion below of "practical priority.")¹⁶³

Although I will not argue the fact-value issue in any detail, I will offer some brief remarks and adduce some intuitive examples to show why I think it tenable and useful for my particular purposes. A familiar debate about the role that moral values play in science will help me do so. When Anglo-American philosophy was barely emerging from the thrall of logical positivism, Richard Rudner offered an instructive argument that the scientist

160. See *supra* Section II.A.

161. See, e.g., R.M. Hare, *The Promising Game*, in THEORIES OF ETHICS 115 (Phillippa Foot ed. 1967) (arguing that "ought" cannot be derived from "is" without the addition of a prescriptive premise). But see John R. Searle, *How To Derive 'Ought' From 'Is,'* in THEORIES OF ETHICS, *supra*, at 101 (arguing that "ought" can be derived from "is," even without a prescriptive premise). One promising route of inquiry is to consider whether claims about what *is* (especially scientific claims) are on any surer epistemological footing than are claims of morality. See, e.g., Baruch A. Brody, *Intuitions and Objective Moral Knowledge*, 62 MONIST 446 (1979) (providing an intuitionist defense for "objective moral knowledge"); Hilary Putnam, *The Place of Facts in a World of Values*, in REALISM WITH A HUMAN FACE 163 (James Conant ed., 1990); J.B. Schneewind, *Moral Knowledge and Moral Principles*, in REVISIONS: CHANGING PERSPECTIVES IN MORAL PHILOSOPHY 113 (Stanley Hauerwas & Alasdair MacIntyre eds., 1983) (viewing moral and scientific principles as enjoying equivalent rational grounding). Another important question is whether "is" and "ought" claims are even distinguishable in kind, given the "holistic" way in which many of our beliefs confront experience. See MORTON WHITE, *WHAT IS AND WHAT OUGHT TO BE DONE: AN ESSAY ON ETHICS AND EPISTEMOLOGY* (1981).

162. Thus, for example, it seems to me that Hare decisively got the better of the argument with Searle regarding the derivability of ought from is. Compare Hare, *supra* note 161, with Searle, *supra* note 161.

163. See *infra* Sections VI.A-B.

qua scientist must make moral value judgments.¹⁶⁴ The argument is straightforward, albeit unconvincing. Its three main steps are as follows: (1) No scientific result is certain. (2) Scientific results are measurable only on a spectrum of epistemic confidence whose terms of epistemic evaluation vary somewhat according to one's theory of scientific knowledge. The spectrum might be, for example, *more or less probable*,¹⁶⁵ *more or less well supported by evidence*, *more or less warranted*, or *more or less confirmed*. Per (1), however, never does a scientific result have a probability of 1 (or the equivalent in whatever other evaluative term is used). (3) But if (2) is true, and if a scientist actually accepts hypotheses—as surely every scientist does—then the scientist *as such* must make a *moral* judgment in the course of doing science, namely the judgment that

the evidence is *sufficiently* strong or that the probability is *sufficiently* high to warrant the acceptance of the hypothesis. Obviously our decision regarding the evidence and respecting how strong is “strong enough,” is going to be a function of the *importance*, in the typically ethical sense, of making a mistake in accepting or rejecting the hypothesis. . . . *How sure we need to be before we accept a hypothesis will depend on how serious a mistake it would be.*¹⁶⁶

Rudner buttresses his argument with three examples in which different levels of epistemic confidence are called for in different kinds of scientific judgment. One example concerns a scientist's hypothesis about whether a toxic drug ingredient is present in lethal quantity in a substance to be consumed (presumably) by humans. For this judgment, Rudner asserts, “we would require a relatively high degree of confirmation or confidence before accepting the hypothesis—for the consequences of making a mistake here are exceedingly grave by our moral standards.”¹⁶⁷ But in the second example, where the judgment is about whether, based on a sample, a particular lot of machine stamped belt buckles is defective, we can settle for a lower level of confidence.¹⁶⁸ Rudner realizes that these two examples are of a very special kind of “scientific” judgment, namely ones in which the question of the proper level of epistemic confidence is raised regarding “scientific inferences in industrial quality control.”¹⁶⁹ Because his thesis is about the moral judgment a “scientist *qua scientist*” must make, he then provides a third example, one

164. See Richard Rudner, *The Scientist Qua Scientist Makes Value Judgments*, 20 PHIL. SCI. 1 (1953).

165. This is Rudner's preferred description since he believes that “an adequate rational reconstruction of the procedures of science would show that every scientific inference is properly construable as a statistical inference.” *Id.* at 3.

166. *Id.* at 2.

167. *Id.*

168. See *id.*

169. *Id.*

that allegedly proves his point to be "clearly quite general in application."¹⁷⁰ This example concerns the level of epistemic confidence on which Manhattan Project scientists chose to rely in reaching their conclusion that no uncontrollable pervasive chain reaction would occur when the first atomic bomb was detonated; presumably this would be the highest level of the three examples.¹⁷¹

Rudner's argument, and the examples he adduces to support it, fail. They do not show that *moral* decisionmaking is a necessary part of *scientific* decisionmaking. It is interesting to note that all three examples are ones in which a scientist is put in the position of making some kind of *practical* decision based on his *theoretical* occupation. That is, all examples are of the theoretical reasoner making a practical decision based on his own theoretical judgment. This is fairly close to the paradigm case of epistemic deference in which I am interested; indeed, the scientist in Rudner's first example of "industrial quality control" faces a question quite similar to that faced by the expert witnesses in the original *Daubert* case¹⁷²—whether Bendectin could cause birth defects. But there is one critical difference between Rudner's examples and my own. In my settings, the nonexpert practical reasoner must *defer epistemically* to the theoretical expert to reach the practical judgment.¹⁷³

Rudner's examples do indeed call quickly to mind the moral considerations that might in various ways impinge on a scientist's decision, but they are also misleading for precisely that reason. Rudner adduces examples of situations in which a scientist's decision about how to act or what to recommend does have clear *practical* consequences, including moral consequences. And, of course, on some metaethical views, moral considerations are overriding for *all* actions, including the "action" of endorsing a hypothesis in testimony of various kinds and of acting on that hypothesis by taking it to be true for the purpose of guiding further research. Moreover, many people, including many (but by no means all) scientists, more or less self-consciously endorse some such metaethical view about the overriding importance of moral obligation. But

170. *Id.*

171. *See id.* at 2-3.

172. *See supra* note 21.

173. Perhaps Rudner's scientist should defer epistemically to a moral theorist. There is reason to believe that moral deference takes place—children surely rely on it, and religious adherents probably do as well. Indeed, the concepts of a "moral leader" and "moral authority" are not at all alien to the discourse of communal moral life. In a well-known dissent, Judge Frank suggested that the proper way for the court to go about assessing whether an immigrant had "good moral character," as required by a federal immigration statute, was to ascertain "the attitude of our ethical leaders," an attitude that "would not be too difficult to learn." *Repouille v. United States*, 165 F.2d 152, 154 (2d Cir. 1947) (Frank, J., dissenting).

Interesting issues remain to be analyzed regarding the kind of epistemic deference that could occur in moral settings, and whether and when such deference *should* occur—"should" from both epistemic and moral points of view. As mentioned above, there appear to be cases in which courts defer to moral philosophers "as such." In *Daubert*, the Supreme Court arguably deferred epistemically to philosophers, albeit not moral philosophers. *See supra* notes 58-60 and accompanying text.

even if such a metaethical view is correct—and I doubt that it is¹⁷⁴—the overriding nature of moral considerations would no more show that *moral* decisionmaking is a necessary part of *scientific* decisionmaking than would a scientist's *morally-based* decision not to run a machine whose effluences he knew would injure many people.

Nor is the scientist's decision about the level of confidence he requires in order for him to accept a hypothesis necessarily a *moral* decision that is *part of science*. Suppose that the best genetic research established to a confidence level of 97% (or to a very high degree of warrant) that members of a given ethnic group were genetically predisposed to be less intelligent than members of other ethnic groups. As a self-consciously *moral* doxastic actor, a geneticist might refuse to accept or endorse any such hypothesis unless and until the level of confidence was greater than, say, 98% or 99%; indeed, he might even require a confidence level that was infinitely high, in the way perhaps that a

174. The metaethical issue Rudner raises—whether a scientist as such must make moral judgments—is closely analogous to one that has occupied a good deal of legal theory, namely, whether a judge “as such” must make moral judgments. John Lyons takes a position on this issue quite similar to Rudner's, and both of them raise (and, to my ears, beg) the metaethical question about the overriding nature of moral judgments. Arguing for the view that the judge as such must make moral decisions, Lyons asserts that

[p]eople who act in the name of the law do things which would require justification if they were *not* done in the name of the law—they use coercion and force, they kill and maim, they deprive people of liberty and valued goods. . . . [J]udicial decisions, like other things, stand in need of full-fledged moral justification.

David Lyons, *Substance, Process, and Outcome in Constitutional Theory*, 72 CORNELL L. REV. 745, 761-62 (1987). Basically, Lyons's contention amounts to the claim that moral considerations are overriding for the judge, just as Rudner's basic contention is that they are overriding for the scientist. Any point of view can be imperialistic, demanding that its methods, aims, and results trump others if and when they conflict. In this, Rudner and Lyons share a familiar deontic metaethical view. Though I do not argue it here, my own preferred metaethical view treats moral norms as hypothetical, not categorical imperatives. It is a kind of voluntarism about moral obligation cogently argued by Philippa Foot (later, unfortunately, abandoned), and is one that might have been better admired in Sartrean existentialism had it been advanced in a more disciplined manner.

An additional comment about intellectual “imperialism” is relevant. The domain of metaethics provides one example of the fact that *philosophical* analysis is the ultimate and inevitable court of appeal for disputes between and among competing points of view. Of course, that claim itself is advanced from a philosophical point of view; it's philosophy all the way up. (Ludwig Wittgenstein may have been right to suggest that there is no “meta-philosophy” in the sense of escaping philosophy, see LUDWIG WITTGENSTEIN, *PHILOSOPHICAL INVESTIGATIONS* § 121 (1953), but wrong if he was also claiming that philosophical reflection on philosophy is not possible. It is. Indeed, it is an almost inevitable, if often implicit, part of philosophical reflection.) What then are the distinctive aims, methods, and results of the philosophical point of view? As an axiological enterprise, philosophy's cognitive aims are not so much to produce *truths* or even *correct* beliefs—though truth is a regulative ideal for philosophical analysis. The principal overarching cognitive aim of philosophy is to produce rationally warranted argument and explanation. Its methods are varied but tend to be drawn from a delimited conceptual toolkit. Those methods deploy and are concerned with the metaphysical modalities (necessity, possibility, impossibility, contingency) and their normative kin (obligation, permission, prohibition). Philosophers deploy the modalities to explicate “the nature” of various abstractions and the concepts used to express them (such as truth, meaning, knowledge, justification, justice, good, bad, evil), as well as the concepts comprising the metaphysical and normative modalities themselves. They search for the necessary and sufficient conditions that constitute those concepts, or some of the necessary or sufficient conditions, or try to discern why it is not possible to offer the necessary and sufficient conditions either of some given concept or of any concept at all. Philosophers are also centrally concerned with argument, both as an object of study and as a method of analysis. My arguments in this Article concern several of these distinctively philosophical enterprises, especially the last.

mother might refuse to be convinced by evidence of her son's guilt no matter how overwhelming it might seem to others. But *as a scientist*, he might well choose to require the same level of confidence for the finding about genetic ethnic inferiority that he requires for any other scientific finding (presumably lower than 98%, certainly lower than 100%). If he did require only the same level of confidence, he would not be failing to serve the cognitive aims of *science*—or so my intuitions run. That the *epistemic* demands of morality might in such a situation (and in the situations Rudner mentions in his three examples) be more stringent than those of science fails to show that the scientist *qua* scientist is also a moralist.

Though Rudner's argument does not get him where he wants to go, his analysis is nevertheless quite helpful in bringing out an important feature of epistemic deference by nonexpert legal (and other practical) reasoners to scientific (theoretical) experts. The practical point of view (legal, moral, or prudential) consists of particular aims, methods, and judgments. As I argue in greater detail below,¹⁷⁵ one of the necessary components of *any* practical decision (whether or not that decision calls for epistemic deference to an expert) is a judgment about the required level of confidence the practical reasoner must have in the descriptive judgments he must make along the way to reaching a practical conclusion. Rudner's examples were of *theoretical* reasoners who, in Rudner's view, were inevitably driven to make practical, moral decisions. My focus here is on *practical*, legal decisionmakers who in the course of reaching a practical judgment must settle upon a required level of confidence for those factual, theoretical judgments that are important premises in the practical syllogism. (Again, they must settle upon the *level of confidence* whether or not they solicit expert scientific testimony, but my focus is on situations in which they do solicit it.) Like the scientists in Rudner's examples, practical reasoners must choose among different levels of confidence (95%, 75%, 51%, and so on). They must also choose the *standard of epistemic appraisal*—"probable," "warranted," "evidentially supported," etc.—on whose metric the level of confidence is to be measured. Rudner's argument acknowledges the importance of identifying these two *distinct* elements in making any descriptive judgment. Recognizing both elements is a central part of the analysis of epistemic deference that I present below.¹⁷⁶

In sum, although the family of distinctions between practical and theoretical reasoning and fact and value is still much contested, these distinctions are both useful and important for my analysis in at least two ways. First, I will show that reasoning by a practical reasoner that involves soliciting theoretical information from a scientific expert actually involves two distinct lines of reasoning by the nonexpert. One line involves whatever reasoning task

175. See *infra* Section VI.D.

176. See *infra* Section VI.C.

the nonexpert is pursuing that has led him to turn to the expert in the first place (my principal concern in this Article is with *legal* reasoning tasks); the other is a line of reasoning *about* the methods and conclusions the expert scientist reaches in his own reasoning process. Drawing on the distinction between practical and theoretical reasoning will be of significant heuristic value in the discussion that follows, for it will facilitate analysis of these converging lines of reasoning in practical epistemic deference.

As heuristically useful as the practical-theoretical distinction will be, my analysis of epistemic deference would survive with only minor changes even if it turned out that the distinction is not, in the end, philosophically tenable. The object of analysis as I frame it below—deference by a nonexpert practical reasoner to a scientific theoretical expert (what I have been referring to with the shorthand phrase “practical epistemic deference”)—could very easily be reframed to omit references to practical and theoretical reasoning while retaining all of the epistemological consequences of the analysis. The same question about the cogency of epistemic deference arises when the nonexpert epistemic “deferer” is not a practical reasoner; that question is raised, for example, when a nonmathematician decides whether he believes that Fermat’s Last Theorem has been proved after Andrew Wiles tells him that he has proved it, shows him the proof, and so on.¹⁷⁷

The people who are the epistemic “deferers” and the people who are the epistemic “deferees” can be more “generic” on both sides of the relation “*A* defers epistemically to *B*” than they are in the special case that is my principal focus: practical reasoners deferring to scientific experts. On the *A* side, the deferer need not be a practical reasoner. Nor need the deferee on the *B* side be a scientific expert; indeed, the deferee need not be an *expert* at all, at least in a common sense of that term. We will want to understand what features the epistemic deference relation has to understand better what is special about the relation when there is a practical (legal) reasoner on the *A* side who, in the course of practical reasoning, defers to a scientific expert on the *B* side. For now, I offer some observations about the general concept of epistemic deference and then build on them to note some features of epistemic deference in the more specific setting of practical epistemic deference.

When there are no special constraints on either *A* or *B* in the relation “*A* defers epistemically to *B*,” the epistemological issue presented is whether *testimony* can be a genuine source of either knowledge or justified belief. I discuss below a few epistemological accounts of testimony as a general source of knowledge.¹⁷⁸ For the moment, I focus not on the epistemic probity of testimony in general, but on the distinct conceptual question of what exactly it is for one person to defer epistemically to another. Again, answering that

177. For a discussion of Wiles’s proof and the publicity it occasioned, see SINGH, *supra* note 1.

178. See *infra* Section V.B.

more general question illuminates the specific analysis of practical epistemic deference to experts.

III. "THEORETICAL" AUTHORITY AND EPISTEMIC DEFERENCE

A. *Believing a Person Versus Believing a Proposition*

To bring out what I think is the correct structure of general epistemic deference I use as a foil an account offered by H.L.A. Hart.¹⁷⁹ Hart is, of course, chiefly concerned with the structure of practical authority, but he argues that practical and theoretical authority (and practical and theoretical deference) have the same underlying structure. Hart's account is importantly inaccurate but so typically clear and insightful as to be deeply instructive even so. Outlining the inaccuracies in his account will help me explicate precisely the related concepts (and the relation between the concepts) of epistemic deference and epistemic authority; to highlight the important, if obvious, distinction between believing a *person* and believing a *proposition*; to show that, contrary to the view Hart defends, epistemic deference and epistemic authority are matters of degree, not all-or-nothing affairs; and to show that the proper conceptual analysis of epistemic deference cannot by itself provide an account of the possibility of *justified* epistemic deference.

According to Hart,

[T]he reason for belief constituted by a scientific authority's statement [that some proposition is true] is in a sense peremptory since it is accepted as a reason for belief without independent investigation or assessment of the truth of what is stated. It is also content-independent since its status as a reason is not dependent on the meaning of what is asserted so long as it falls within the area of his special expertise.

. . . To be an authority on some subject matter a man must in fact have some superior knowledge, intelligence, or wisdom which makes it reasonable to believe that what he says on that subject is more likely to be true than the results reached by others through their independent investigations, so that it is reasonable for them to accept the authoritative statement without such independent investigation or evaluation of his reasoning.¹⁸⁰

We should attend carefully to several points in this account of theoretical authority.

179. See H.L.A. HART, *ESSAYS ON BENTHAM: STUDIES IN JURISPRUDENCE AND POLITICAL THEORY* (1982).

180. *Id.* at 261-62.

Hart's account seems to capture adequately a distinction that is important for the proper analysis of epistemic deference: the distinction between believing a *proposition* and believing a *person*. Where *S* is some speaker offering testimony that *p* and *H* is a hearer of that testimony, it is the distinction between *H*'s believing that *p* and *H*'s believing *S* that *p*. The distinction has long been remarked by philosophers. Thomas Hobbes, for example, noted: "To have faith in, or trust to, or believe a man, signify the same thing; namely, an opinion of the veracity of the man: but to believe what is said, signifieth only an opinion of the truth of the saying."¹⁸¹ Several recent works in the epistemology of testimony also make, and rightly insist on, the importance of this distinction. G.E.M. Anscombe argues that "[o]ne might think at first blush that to believe another is simply to believe what he says, or believe what he says is true. But that is not so, for one may already believe the thing he says."¹⁸² She adduces the example of a person who reports believing that a man was dying "[b]ecause the doctor told me . . . I had no opinion of my own—I just believed the doctor,"¹⁸³ and argues that the example "brings out how believing *x* that *p* involves *relying on x* for it that *p*."¹⁸⁴

Tony Coady makes this distinction a prominent part of both his general account of testimony, and his explication of the pragmatic conventions that govern the "speech act of testifying."¹⁸⁵ According to Coady, there are three individually necessary and jointly sufficient conditions under which speaker *S*'s statement that *p* constitutes the speech act of testifying:

A speaker *S* testifies by making some statement *p* if and only if: (1) His stating that *p* is evidence that *p* and is offered as evidence that *p*; (2) *S* has the relevant competence, authority, or credentials to state truly that *p*; (3) *S*'s statement that *p* is relevant to some disputed or unresolved question (which may, or may not be, *p*) and is directed to those who are in need of evidence on the matter.¹⁸⁶

On Coady's account, in testimonial settings, it is the fact that *S* asserts *p* that is evidence for *p*'s truth. That is, what the hearer of *S*'s testimony believes is *S*'s assertion that *p*, not simply *p* itself (though, of course, when the hearer

181. THOMAS HOBBS, *LEVIATHAN* (1651), *reprinted in* 3 *THE ENGLISH WORKS OF THOMAS HOBBS OF MALMESBURY* 1, 54 (Sir William Molesworth ed., London, John Bohn 1839).

182. G.E.M. Anscombe, *What Is It To Believe Someone?*, in *RATIONALITY AND RELIGIOUS BELIEF* 141, 144 (C.F. Delaney ed., 1979).

183. *Id.* at 145.

184. *Id.* (emphasis added).

185. C.A.J. COADY, *TESTIMONY: A PHILOSOPHICAL STUDY* (1992).

186. *Id.* at 42.

does believe *S*'s assertion that *p*, the hearer also believes *p*¹⁸⁷), and *S*'s assertion that *p* is distinct from *p* itself with regard to the probity of *p*.¹⁸⁸

There are various ways to establish the cogency of the distinction between *believing that p* and *believing S that p*. One is to observe that in most cases in which a speaker *S* testifies that *p*, *p* itself is (at the very least) unlikely to be evidence of its own truth, whereas in many cases (when Coady's conditions (2) and (3) are also satisfied, for example) *S*'s testimony that *p* is evidence that *p*. There are distinct reasons for this difference. One is the substantial difficulty of identifying propositions that are *self-evident*, a difficulty that I shall not rehearse here. Another reason, partly linguistic, partly epistemic, is as follows. In thoroughly Gricean spirit, Coady's conditions (2) and (3) suggest that testimony is not properly *cooperative* unless the witness has good reasons for asserting *p*¹⁸⁹ and the testimony is relevant to and informative regarding some inquiry or interest of the hearer.¹⁹⁰ Thus, if we assume—as I do—that Grice is correct in his view that speakers and hearers do by and large obey the cooperative norms he identifies, the hearer should have some significant doubt about the truth of *p* in the normal case of testimony (in which the speaker is not, for example, trying to generate a conversational implicature). With less of the supporting machinery, Hobbes put the same point more succinctly: "[N]o man is a witness to him that already believeth, and therefore needs no witness; but to him that deny or doubt, or have not heard it."¹⁹¹ It is doubt about the subject matter of proffered testimony that enables that testimony to be cooperative—that is, doubt about *p* looks like a necessary condition (albeit a defeasible one) of the *cooperativeness* of testimony that *p*. When that necessary condition obtains, *p* should not constitute its own evidence.¹⁹² Thus, believing that *p* is very different from believing a person's testimony that *p*.

187. Again, Hobbes was on target here:

When a man's discourse beginneth . . . at some saying of another, of whose ability to know the truth, and of whose honesty in not deceiving, he doubteth not; and then the discourse is not so much concerning the thing, as the person; and the resolution is called BELIEF, and FAITH: *faith*, in the man; belief, both of the man, and of the truth of what he says.

HOBBS, *supra* note 181, reprinted in 3 THE ENGLISH WORKS OF THOMAS HOBBS OF MALMESBURY, *supra* note 181, at 53-54.

188. As Coady explains his view:

[T]estimony is the evidence of persons[,] and [condition (2)] shows in a schematic way what it is about persons that makes this sort of evidence special. . . . [In the case of testimony] we are not just believing that *p* because of something or other about the witness's utterance but we are *believing the witness*.

COADY, *supra* note 185, at 46.

189. Consider Paul Grice's maxim of quality: "1. Do not say what you believe to be false. 2. Do not say that for which you lack adequate evidence." PAUL GRICE, STUDIES IN THE WAY OF WORDS 27 (1989).

190. Compare Grice's maxims of quantity and relation. *See id.* at 26-27.

191. HOBBS, *supra* note 181, reprinted in 3 THE ENGLISH WORKS OF THOMAS HOBBS OF MALMESBURY, *supra* note 181, at 496.

192. A very helpful discussion with Catherine Elgin alerted me to a related point, which I here extend to the question of whether a testifier could cooperatively testify regarding something self-evident.

Though he does not discuss the point directly, Hart's account of epistemic deference appears to recognize this distinction. It seems fairly presupposed by his assertion that "the reason for belief constituted by a scientific authority's statement [that some proposition *p* is true] is in a sense peremptory."¹⁹³ Here it is not just the proposition that constitutes the peremptory reason, but rather the *scientific authority's statement* of it that does. Similarly, Hart maintains that when the witness satisfies certain conditions of competence, it becomes reasonable for a hearer to "accept the authoritative statement without . . . independent investigation or evaluation of [the witness's] reasoning."¹⁹⁴ Here again, though not quite explicitly, Hart seems to recognize the distinction between accepting the statement that *p* and accepting the *authoritative statement that p*, the latter of which plausibly carries with it the idea that *p* is believed because it issues from this authoritative person.

B. *Actual Versus Putative Authoritativeness*

I turn to another feature of Hart's account of epistemic authority, its requirement that a person have *actual* competence rather than merely putative competence to be considered an authority. Recall that, on Hart's account, a *putative* epistemic authority, *A*, is not an *actual* epistemic authority unless *A* "in fact" possesses sufficiently superior wisdom (etc.) making it reasonable for a deferring nonexpert, *B*, to believe what *A* says without any independent investigation by *B*.¹⁹⁵ Hart quite clearly holds this position.¹⁹⁶ For Hart, the judgment that authority is *warranted* (warranted by the *fact* of superior knowledge) is built into the concept of authority itself.

193. HART, *supra* note 179, at 261.

194. *Id.* at 262.

195. See *id.*; see also *supra* text accompanying note 180. Other theorists of practical and theoretical authority differ as to whether actual possession of superior knowledge (and related traits or information) is a necessary condition of epistemic authority. Heidi Hurd, for example, offers an account of epistemic authority that seems similar to Hart's on this point, asserting that "[t]he advice of a theoretical authority constitutes evidence at all only because that authority is more motivated to discover the truth, or is in possession of more information, or has superior inference-drawing abilities." Heidi M. Hurd, *Challenging Authority*, 100 YALE L.J. 1611, 1669 (1991). Raz's position on this point is harder to assess. On the one hand, he seems sympathetic with Hart's view in using the "dependence thesis" as an account of both theoretical and practical authority, according to which "all authoritative directives should be based on reasons which already independently apply to the subjects of the directives and are relevant to their action in the circumstances covered by the directive." JOSEPH RAZ, *THE MORALITY OF FREEDOM* 47 (1986). On the other hand, Raz also expressly denies that "authoritative determinations are binding only if they correctly reflect the reasons on which they depend." *Id.* (emphasis added). "On the contrary," he argues, "there is no point in having authorities unless their determinations are binding even if mistaken . . ." *Id.* Raz suggests that practical authorities and theoretic authorities "share the same basic structure" that is expressed by the dependence thesis. *Id.* at 53. If the analogy extends to legal authorities specifically, Raz's position is probably this: Just as a legal authority need not necessarily *be* legitimate to be a legal authority, but rather need only *claim* to be so, so an epistemic authority need not necessarily *have* the requisite epistemic competence in the subject matter of his putative expertise, but rather need only *claim* to have it, to be an epistemic authority.

196. See HART, *supra* note 179, at 262.

In my view, an account of epistemic authority should be neutral as to whether in any given instance the *granting* of that authority is warranted. Hart's conception of authority makes it difficult for an analyst to describe what is surely a common phenomenon, that of a person *A* being *treated* as an epistemic authority by some group of persons *B* even though a third-party analyst, *C*, thinks (contrary to *B*'s judgment) that *A* does not actually have superior intelligence, wisdom, etc. Accordingly, I would modify this definition in the following way (it will be modified still more in subsequent discussion): For *A* to be an epistemic authority for *B* on some subject matter, *B* *must believe that A has* some superior knowledge, intelligence, or wisdom which makes it reasonable to believe that what *A* says on that subject is more likely to be true than the results reached by *B* through *B*'s independent investigations.

C. *The Concept of Epistemic Deference*

Hart's account seems importantly correct insofar as it identifies content-independence and peremptoriness as chief features of epistemic authority (i.e., expertise). If these conditions are treated as absolute, however, the account deprives us of a useful analytical tool in examining the practice of epistemic authority. That is, Hart's analysis of the concept misses an important part of the phenomenon if it endorses the following claim: It is inherent in the structure of the concept of epistemic authority that, in order for *A* to be an epistemic authority for *B*, *B* must treat *A*'s judgments (within the sphere of *A*'s authority, as understood by *B*) as *absolutely* content-independent and peremptory.

As I have said, the basic intuition about the role of content-independence and peremptoriness seems correct and important. Surely, part of what it is for *A* to be an epistemic authority for *B* is for *B* to treat *A*'s judgment as providing a *significantly* peremptory and content-independent reason for believing what *A* says. Thus, a non-physicist does not and should not check to see what physics proposition the physicist endorses in order then to decide whether to defer to that physicist about the truth of the proposition. To do so would be precisely to *deny* the physicist's expertise and epistemic authority. But there is also good reason to believe that epistemic deference, and, concomitantly, epistemic authority, is a matter of *degree*, not an all-or-nothing relationship. For one thing, Hart himself acknowledges that, when *B* treats *A* as an epistemic authority, *B*'s deference extends *only so far as B recognizes A to be speaking within the subject area of A's expertise*.¹⁹⁷ Thus, even in paradigmatic cases of epistemic deference, the nonexpert must police the epistemic boundaries between assertions by *A* that are *within* what *B*

197. See *id.* at 261 ("It is also content-independent since its status as a reason is not dependent on the meaning of what is asserted so long as it falls within the area of his special expertise.").

recognizes to be the zone of A's expertise and assertions by A that are not within that zone. These borderlines will inevitably be fuzzy. For example, where *exactly* does the epistemic authority of a physicist end when he is testifying to the nonexpert about the advisability of nuclear energy? Not *exactly* anywhere. Even if such an expert is testifying as an "instrumentally rational" expert, one who is using his expert knowledge to advise the nonexpert about how best to achieve goals the nonexpert has chosen, the nonexpert must be ever vigilant to keep the expert within his proper epistemic domain. The price of rational deference is eternal vigilance.¹⁹⁸

Hart's all-or-nothing criterion is also too strong in that it would condemn the concept of epistemic authority to overlook a flourishing practice of epistemic deference *among epistemic equals*. This practice abounds, for example, among scientists who work together on large research projects and divide epistemic labor among themselves for the sake of efficiency, even when they are *epistemically* capable of doing the work themselves. A related phenomenon is the practice in the scientific community of scientists relying on other scientists' results cumulatively. Cumulative reliance is at the very least a familiar phenomenon within the scientific community, and some have even argued that it is a *necessary condition* of scientificity.¹⁹⁹ Cumulative reliance of this sort constitutes a type of epistemic deference that ought not to be defined away.

Hart's account also seems unable to capture the phenomenon of "persuasive authority" among what we might call epistemic "near-equals." This is a common phenomenon in legal reasoning. A "persuasive authority" functions to some degree as an epistemic authority even for decisionmakers who are themselves substantially competent in the areas the persuasive authority addresses. An eminent treatise writer might give a judge compelling reason to believe that the law is as the writer claims. Such a writer's work will often function as an epistemic authority for a judge, but it is not the case that this work is "accepted as a reason for belief without independent investigation

198. Other examples come to mind. Where exactly does the epistemic authority of a psychologist end when he is testifying about the degree to which a victim of battered-women's syndrome was responsible for her actions? Where exactly does the epistemic authority of a medical doctor end when she is advising nonphysicians at the Immigration and Naturalization Service regarding whether a homosexual alien should be excluded from the United States under a statute that forbids immigration to persons who have "psychopathic personality, sexual deviation, or mental defect"? *Hill v. INS*, 714 F.2d 1470, 1475 (9th Cir. 1983) (quoting 8 U.S.C. § 1182(a)(4) (1970)). These and many other adducible examples of the vague borders that demarcate the zone of the expert's special competence reveal that the content-independence of a nonexpert's reason for deferring cannot be absolute. *See id.* ("It would thus violate Congress' direction to allow INS officers who are not medically trained to determine psychopathic personality, sexual deviation, or mental defect by interrogation. . . . Congress intended the determination to be made solely by trained physicians.").

199. Anthony Kenny suggests in his discussion of expert testimony in courts that the possibility of cumulative reliance within a putative scientific discipline is indeed a necessary condition of the discipline's *being* a science. On Kenny's view, "though any expert *must be able to repeat the results of others he does not have to*: he can build on the foundations that others have built." Kenny, *supra* note 64, at 50 (emphasis added).

or assessment of the truth of what is stated.”²⁰⁰ Rather, it functions as persuasive, though not dispositive, *advice*. This authority’s endorsement of the propositions can function as a signal that those propositions ought to be taken very seriously, even over and above the judge’s own first impression (if he has one). The court may thus accord the authority’s view some *prima facie* weight while also making an “independent investigation or assessment of the truth of what is stated.”²⁰¹

Accordingly, I propose an additional modification of Hart’s account:

For *A* to be an epistemic authority for *B* on some subject matter, *B* must judge that *A* has some *sufficient* knowledge, intelligence, or wisdom which makes it reasonable to believe *either* that what *A* says on that subject is more likely to be true than the results reached by *B* through *B*’s independent investigations, or is *no less likely* to be true than the results that would be reached by *B* through *B*’s independent investigations.²⁰²

Having recognized that epistemic deference and epistemic authority are matters of degree, I should also observe that by no means *every* instance of epistemic deference raises the specific philosophical problem I have set out to explore. That problem pertains only to the deference that a nonexpert gives to an expert.

Although Hart clearly believes that justified epistemic deference by nonexperts to experts (“theoretical authorities,” in his terms)²⁰³ is possible, his account of epistemic authority and deference does not in any way explain *how* it is possible. What it says, slightly rephrased, is that *A* is an expert if, *vis-à-vis* the nonexpert, *B*, *A* has superior knowledge, intelligence, or wisdom that makes it reasonable for *B* to believe that what *A* says on that subject is

200. *Id.*

201. *Id.*

202. Sometimes it will be vacuously true that *B* treats *A* as an epistemic authority. For example, in situations in which *B* has not made any independent investigation on a given subject and *A* has, *B* could judge that *A* “has sufficient knowledge, intelligence, or wisdom which makes it reasonable to believe that what *A* says on that subject is more likely to be true than the results reached by *B* through *B*’s independent investigations”—simply by virtue of the fact that *B* made no independent investigation and planned never to make such investigation. Such a judgment by *B* may be vacuously true, but it would well be true nevertheless. Despite the vacuity, it is useful to illustrate this possibility with a hypothetical example. Suppose *B*, an experienced nutritionist, is hired as a consultant for *C*. *A* is a college student who works for *B*. *B* has decided it would be useful, albeit not that important in the long run, to determine how many calories, on an average daily basis, *C* consumed over a specified time. Both *A* and *B* have access to a list of all the foods and quantities of food *C* consumed during that time. It could well be the case that *B* treated *A* as an epistemic authority on the question of *C*’s daily average calorie consumption, under the following conditions: (1) *A* took the time to apply his perceptual and inferential faculties to the problem while *B* did not; (2) *B* did not think it would be worth *B*’s time to do so; even though (3) *B* also believed that had *B* taken the time to do the calculation, he would have produced a more accurate one. (Thanks to Kent Greenawalt for useful discussion on this point.)

203. HART, *supra* note 179, at 261-62. I agree with Raz: “Nowadays it is not the fashion to talk of [theoretical] authorities . . . Instead we have experts.” RAZ, *supra* note 195, at 52.

more likely to be true than the results reached by *B* through his independent investigations, so that it is reasonable for *B* to accept the authoritative statement without such independent investigation or evaluation of *A*'s reasoning. Nothing in this definition says what criteria nonexperts are to use to *identify* these epistemically superior beings, or whether, being nonexperts, they can deploy any such criteria in an epistemically warranted manner.²⁰⁴ Thus, if Hart is correct in maintaining that his analysis provides an accurate account of theoretical authority, we may conclude that such an account does not by itself provide a philosophical explanation of how justified deference to experts is possible. I am inclined to believe that, with suitably important modifications, it is an accurate account.²⁰⁵

Building on the foregoing analysis of the structure of epistemic deference, I offer the following definitions. Although I offer them as stipulated definitions, I also aspire to have them capture, refer to, and felicitously describe actual linguistic practice.

An expert is a person who has or is regarded as having specialized training that yields sufficient epistemic competence to understand the aims, methods, and results of an expert discipline.²⁰⁶ An expert *discipline* is a discipline that in fact requires specialized training in order for a person to attain sufficient epistemic competence to understand its aims and methods, and to be able critically to deploy those methods, in service of these aims, to produce the judgments that issue from its distinctive point of view.²⁰⁷ A nonexpert is a person who does not in fact have the specialized training required to yield sufficient epistemic competence to understand the aims, methods, and judgments of an expert discipline, or to be able critically to deploy those methods, in service of the discipline's aims, to produce the judgments that issue from the discipline's distinctive point of view.

Expert and *theoretical authority* are different terms for the same kind of person or group. In accord with the definition of 'expert' offered above, a 'theoretical authority' is a person or group of persons who has or is regarded

204. Note also that Hart's account does not make *knowledge* a necessary condition of epistemic authority, only

superior knowledge, intelligence, or wisdom which makes it reasonable to believe that what he says on that subject is *more likely to be true than the results reached by others through their independent investigations*, so that it is reasonable for them to accept the authoritative statement without such independent investigation or evaluation of his reasoning.

HART, *supra* note 179, at 262 (emphasis added).

205. Hart offers this as his account of both practical and theoretical authority, and shares with Raz the basic explanation of the structure of authority.

206. Though I do not try to say it here, more could be said about what constitutes the kind of "specialized training" that can yield epistemic competence in an expert discipline. For example, certain kinds of *experience*, if properly reflected upon, might well provide the requisite "training," so that a religious mystic might well be an expert on the beliefs and requirements of his religion even without having what would conventionally be called "training." (Thanks to Kent Greenawalt for helpful discussion on this point.)

207. See *supra* Section II.B (discussing axiology and point of view)

as having the competence to render judgments from a given theoretical point of view. To adopt as an epistemic rule "Whatever the Pope says is true" is to treat the Pope as a theoretical authority who is competent to pronounce what is so from the "Catholic point of view."²⁰⁸

IV. EXPERTISE: CONCEPTS AND BASIC PROBLEMS FOR THE NONEXPERT

A. *Knowledge, Warranted Beliefs, and Degrees of Epistemic Competence*

In the previous section, I defined expert (and theoretical authority) in terms of *epistemic competence*, which in turn I described using the term 'understanding.' Some explanation of the concepts of *epistemic* and *understanding* are now due. The distinctive mark of the *epistemic* is the concern with warranted belief. That is, the epistemic point of view is the view of a reasoner whose overriding cognitive goal²⁰⁹ is to acquire *warranted beliefs*. 'Warranted belief' here is a placeholder. Different epistemologies fill in this place in different ways.²¹⁰ Some declare that truth is the sole overriding cognitive goal for a properly epistemic point of view,²¹¹ while others allow a broader range of cognitive aims to play a role, even when they

208. This particular theoretical point of view serves also as a *practical* one. Indeed, it may be a distinctive feature of religious points of view that they tend to serve both functions. According to some realist theories of moral judgment, the moral point of view is also simultaneously theoretical and practical. Michael Moore construes Raz's conception of practical authority to have this kind of realist dimension:

Why isn't practical authority always irrational and thus always illegitimate in its apparent requirement that we act against (or at least not judge for ourselves) what the balance of reasons indicates we should do? Raz's answer is very attractive, given in terms of what he calls the "service conception" of authority. As the name suggests, according to the service conception, authorities are legitimate to the extent that they serve us. Authorities serve us whenever they promulgate directives which, if we follow them, produce behavior by us that better conforms to what we ought to do anyway (independently of any authoritative directive) than the behavior which would result if we calculated directly what we ought to do. This is an attractive notion of legitimate authority because it meets the irrationality objection head-on: authority is legitimate only when it is rational not to act on those reasons that would otherwise (without the authority) make it rational for us to do something else.

The service conception of legitimate practical authority softens the line between theoretical and practical authority. If one grants that there is such a thing as knowledge about what, all things considered, one ought to do, then another person is a practical authority for us usually when he is also a theoretical authority (about one area of knowledge, namely, about where the balance of our reasons for action comes out). It is this greater knowledge of the reasons that antecedently bind us that often gives someone legitimate authority over what we should do.

Michael S. Moore, *Authority, Law, and Razian Reasons*, 62 S. CAL. L. REV. 827, 830-31 (1989) (footnotes omitted).

209. See *supra* Section II.B (discussing axiology and point of view).

210. See *supra* Section II.C (discussing Rudner).

211. Bonjour, for example, appears to emphasize truth in this way:

The distinguishing characteristic of epistemic justification is . . . its essential or internal relation to the cognitive goal of truth. It follows that one's cognitive endeavors are epistemically justified only if and to the extent that they are aimed at this goal, which means very roughly that one accepts all and only those beliefs which one has good reason to think are true.

BONJOUR, *supra* note 142, at 8.

are not valued as instrumental means to achieving the end of discovering truth.²¹² In identifying the epistemic point of view with the cognitive goal of achieving warranted beliefs, I offer no strong commitment to any particular epistemic axiology, although it does seem that exclusively "vericentric" epistemologies (those that treat discovery of truth as the overriding epistemic goal) run a significant risk of misdescribing the epistemic structure of many epistemic practices, including the practice of science.

The concept of *understanding* should be an important part of any full epistemological theory. In contemporary epistemology, it has received relatively little express treatment compared to headliner concepts like *knowledge* and *justification*, and the treatments it has received have tended to focus specifically on linguistic understanding. Miles Burnyeat has begun a promising, more general line of inquiry into understanding, one very much consonant with the approach I am taking in this Article.²¹³ It comes in his discussion of the Platonic and Aristotelian conception of the relation between knowledge on the one hand, and synoptic, explanatory understanding on the other:

The important difference between knowledge and understanding is that knowledge can be piecemeal, can grasp isolated truths one by one, whereas understanding always involves seeing connections and relations between the items known. "The only part of modern physics I understand is the formula ' $E = mc^2$ '" is nonsense. "The only part of modern physics I know is the formula ' $E = mc^2$ '" is merely sad.²¹⁴

Burnyeat speaks of the philosopher who, like Plato, "wants . . . to assimilate knowledge to rational understanding."²¹⁵ Though assimilating knowledge to understanding or, perhaps even better yet, replacing the concept of knowledge as the focal point of epistemology with the concept of understanding, has its attractions,²¹⁶ I have no ambition in the present work to take on so large a task. My theoretical needs are far more modest, attempting to explicate only a notion of epistemic competence that captures and helps to explain the nature of the cognitive capacity involved in possessing scientific expertise. For that purpose, the notion of understanding as the possession of a widening, explanatory,²¹⁷

212. See, e.g., CATHERINE Z. ELGIN, *CONSIDERED JUDGMENT* (1996).

213. See M.F. Burnyeat, *Wittgenstein and Augustine De Magistro*, 61 *PROC. ARISTOTELIAN SOC'Y SUPPLEMENT* 1, 20 (1987).

214. *Id.*

215. *Id.*

216. Catherine Elgin is making a serious inroad on this project. See ELGIN, *supra* note 212.

217. Explanation is important to the conception of understanding I endorse here. Again, Burnyeat puts it well:

Plato, like Aristotle, makes it a condition on knowing or understanding that *p* that one grasps the explanation of *p*. This of course involves seeing the connection between *p* and a whole lot of other propositions, but it is not mere connectedness so much as explanatory connectedness that counts, and it is by way of this thought that Plato and Aristotle reach the conclusion that

synoptic grasp serves quite well.²¹⁸

Recall the discussion of point of view and axiology, in which I extended Larry Laudan's model of rationality into a general account of rational enterprises and their distinctive aims, methods, and factual judgments.²¹⁹ Laudan calls his model of scientific justification "reticular" to mark the way in which the aims, methods, and beliefs of science are mutually supporting and explaining, and how *each* type (aim, method, factual judgment) can occasion a change in each of the other types. A chosen cognitive aim, for example, can change or dictate choice of method—as when a psychologist chooses the double-blind experiment method—because she believes it will serve the cognitive aim of truth in psychological experiment. Note that this example also illustrates the way in which a *factual judgment* helps guide the choice of method—for it is a factual judgment in the efficacy of the double-blind experiment (and the substantially lesser efficacy of single-blind experiment) that leads her to choose *that* as a method of producing truths. Similarly, a factual judgment about the realizability of an aim can compel a change in the aim—for it makes little sense to pursue an aim that one decides, as a matter of *factual* judgment, is unachievable. Each "node" of the net can have a justificatory and explanatory impact on each of the others. This model of justification, suitably extended from science to intellectual discipline, is a holistic account that emphasizes the centrality of reflective adjustment in epistemic justification, giving it much the same prominence as in the account of exemplary argument I have offered elsewhere.²²⁰ And it is a model that gives content to the kind of latticework of explanatory relations present in the *understanding* of an expert discipline. To have epistemic competence in such a discipline is, I suggest, to be *capable of grasping and manipulating this kind of reticular structure of aims, methods, and factual judgments in an expert*

knowledge in the full sense, i.e. understanding, requires the synoptic grasp of a whole field. Burnyeat, *supra* note 213, at 21.

218. The view of understanding as possession of a synoptic grasp of explanatory relations is not uncommon among philosophers who explicitly discuss the concept. For example, Neil Cooper argues that "understanding is concerned with relations and connections" and that "[i]t is possible to have knowledge of a bitty or superficial kind, while we only have understanding when we relate or connect bits of knowledge with other bits in a more or less coherent whole." Neil Cooper, *Understanding*, 68 PROC. ARISTOTELIAN SOC'Y SUPPLEMENT 1, 3-4 (1994). To like effect is Catherine Elgin's more ambitious project of articulating an understanding-oriented, rather than a knowledge-oriented, epistemology:

'Understanding' is a better term for the epistemic achievement that concerns us here. Not being restricted to facts, understanding is far more comprehensive than knowledge ever hoped to be. We understand rules and reasons, actions and passions, objections and obstacles, techniques and tools, forms and functions and fictions, as well as facts. We also understand pictures, words, equations, and patterns. Ordinarily these are not isolated accomplishments; they coalesce into an understanding of a subject, discipline, or field of study. . . . Understanding a particular fact or finding, concept or value, technique or law is largely a matter of knowing where it fits and how it functions in a matrix of commitments.

ELGIN, *supra* note 212, at 123.

219. See *supra* notes 143-158 and accompanying text.

220. See Brewer, *supra* note 15, at 962-78.

discipline. It is precisely the lack of this kind of understanding in nonexpert legal reasoners that casts doubt on their capacity to rely legitimately on expert scientific testimony in reaching practical decisions.

One more point is important for my later assessments of cases like *Daubert*, and for the overall conclusion of this Article. Epistemic competence in an expert discipline comes in degrees; it is not an all-or-nothing “switch.” This is perhaps not surprising. Is it not a familiar fact that some mathematicians, logicians, physicists, economists, geneticists, and so forth are more skilled at grasping and manipulating the aims, methods, and factual judgments of their respective expert disciplines than are other experts in the same disciplines? Surely Isaac Newton was a more epistemically competent physicist than Isaac Asimov. By the same token, we should recognize that there is no bright line separating expertise from nonexpertise—just as there is no bright time line or light line separating night from day, even though there is clearly a difference between night and day. Not all experts are equally epistemically competent in their disciplines, nor are all nonexperts equally incompetent with regard to a given expert discipline.

B. *Practical Epistemic Deference and Theoretical Judgment*

As I have noted above, I use “practical epistemic deference” as an abbreviation for deference *by* a nonexpert practical reasoner, like a scientifically untrained judge or jury, *to* a scientific theoretical *expert*. This is the reasoning process that is my central concern. Of course, not every instance of epistemic deference by a practical reasoner to a theoretical expert is deference by a *nonexpert* practical reasoner; an epistemically competent practical reasoner could defer to an epistemic equal or near equal.²²¹ I restrict “practical epistemic” deference to nonexpert practical reasoners only for the sake of abbreviation.

A “theoretical judgment” is a judgment about what one ought to believe from an epistemic point of view. Although theoretical judgments are a central part of scientific inquiry, not only scientists make them. Religious beliefs and pseudoscientific judgments, such as those of astrology or necromancy, as well as judgments in the literary and plastic arts, are also “theoretical” judgments in this sense.²²²

C. *The Nonexpert's Selection and Competition Problems*

The nonexpert faces at least four distinct problems, which I will call “selection problems.” To explain them, I begin with a simple (and vague, but

221. See *supra* Section III.B.

222. See NELSON GOODMAN, *WAYS OF WORLDMAKING* 1-7 (1978).

nonetheless sufficient) definition. Call H_c the overall hypothesis of a case presented to a practical reasoning authority (like a judge or jury). H_c might be, for example, the prosecution's claim that Jones committed the murder, or the plaintiff's claim that Smith breached the contract. (H_c will usually be an "ultimate" issue in the case, and a mixed question of law and fact.) Call each H_i an individual hypothesis whose conjunction with all the other H_i implies H_c . (H_c need not also imply the H_i .) An evidentiary proposition (which itself can be logically simple or complex), call it e , is *objective evidence* for some H_i , just in case H_i is better warranted given the truth of e than it is given the falsity of e . An evidentiary proposition e is *rationally pertinent* to some H_i just when it constitutes objective evidence of that H_i . (That is, 'objective evidence for' and 'rationally pertinent to' are synonyms.) An evidentiary proposition e is rationally pertinent to the overall hypothesis of a case, H_c , just in case e is rationally pertinent to some H_i (which, as defined, is in the set of propositions that imply H_c). This definition is a slight generalization and amalgamation of the concepts of relevance and materiality found in the common law of evidence²²³ as well as a basic definition of objective evidence found in the epistemological literature.²²⁴ A virtue of the definition's vagueness is that it remains neutral among various standards of epistemic appraisal and attendant levels of confidence.

When a nonexpert judge or judge and jury (who may divide decisionmaking labor in the familiar ways, relying on judgments of admissibility, relevance and materiality, sufficiency, and weight) must decide whether to consult a putative scientific expert in the course of deliberating about H_c , that nonexpert faces four "selection problems": (1) determining which of the intellectual enterprises that might yield expert testimony is a *science*; (2) determining who is a *scientist* capable of using her science in a manner that satisfies the standard of epistemic appraisal and the attendant level of confidence that the practical reasoner has established; (3) determining which of the intellectual enterprises that might yield expert testimony is a science that is *rationally pertinent* to the case (that is, to H_c); (4) in cases in which there is significant doubt occasioned by task (3), determining who is capable of answering (3) in a way that can identify an expert scientific discipline capable of satisfying the chosen standard of epistemic appraisal and the attendant level of confidence.

"Competition" in expert testimony occurs when two experts testify to evidentiary propositions that are either contrary or contradictory.²²⁵ The fact

223. See *supra* note 19 and accompanying text.

224. See, e.g., Peter Achinstein, *Concepts of Evidence*, 87 MIND 22 (1978). As Achinstein discusses, this conception of evidence is "objective" in that e 's being evidence for H_i depends neither on anyone believing e or H_i nor on anything about their relation. See *id.* at 23.

225. Logically and epistemologically weaker forms of competition, such as "incoherence," are possible, but the more easily articulable and understood forms of contradiction and competition will suffice for my analysis.

that much scientific expert testimony is competitive in this way presents a particular problem and puzzle for systems in which nonexperts make decisions that rely on expert testimony. When experts disagree about the truth of some evidentiary proposition *e*, the nonexpert must decide whom to believe on the scientific issue. But, *ex hypothesi*, the nonexpert does not have sufficient competence in the expert discipline to be able to make the choice on substantive grounds, so how can the nonexpert make that choice? If we assume honesty on the part of each expert, this can seem especially puzzling in that it may look like we are expecting *greater* ability to discern the scientific truth from the nonexpert than we are from the expert. This is so because the rules of evidence that govern admissibility of expert testimony (i.e., what testimony the nonexpert jury or judge is allowed to hear) do not presuppose that all the experts are testifying to the truth. This we know in part from the basic fact that judges “qualify” experts who the judges know will testify to contrary or contradictory propositions—even when those judges are also fully aware that two evidentiary propositions that are mutually contrary or contradictory cannot both be true. But if a judge does not expect that every scientific expert is testifying to the truth (and thus, on the assumption that the expert is testifying honestly, the judge is not expecting every expert to *know* the truth either), then is the judge expecting the nonexpert judge or jury actually to do *better* than the expert at discerning the truth? It might seem so, because obviously each expert has an opportunity to hear what the opposing expert will say, and thus has as much opportunity to revise his own contrary beliefs as the jury has to form its beliefs.

There are intra- and extra-disciplinary versions of the problem of competition. The intra-disciplinary version arises when two experts within the same field, e.g., epidemiology, testify in contrary or contradictory ways about some issue. The extra-disciplinary version arises when experts from different fields (e.g., philosophy and psychiatry) testify in contrary or contradictory ways about some issue. (I assume that fields, roughly academic fields, have real epistemic significance, and are not merely matters of university administration.) There are also what I shall call problems of *actual competition* and *implied competition*. Actual competition occurs when the testimony of two or more competing experts is actually admitted at trial. Implied competition occurs when there is an expert opinion on a particular subject or topic that exists “extra-camerally,” and that, if it had been admitted, would have created a problem of actual competition. One can also imagine a kind of *diachronic competition* in expert testimony, in which claims that experts support at one time become challenged by experts at a later time.²²⁶ The basic problem about competition is how a nonexpert faced with competing expert testimony about some evidentiary proposition can decide which of the competing experts

226. I briefly pointed to this kind of competition in the discussion of *Brown*. See *supra* Section I.C.

(intra-disciplinary or extra-disciplinary, actual or implied) to believe without being able to assess the substantive merits of the competing arguments they offer to support their evidentiary judgments.

V. KNOWLEDGE VERSUS JUSTIFIED BELIEF: WHAT DO NONEXPERTS WANT FROM EXPERTS?

A. *What the Law Desires: Acquiring Justified Beliefs from Experts*

One can assess a given state of mind as simple *belief*, or as *knowledge*, or as a *belief that is well grounded* or *rational* or *justified*—and so on. These categories might be arrayed on a spectrum (for example, with simple belief at one end, knowledge at the other, and some of the additional terms of epistemic evaluation somewhere between), or might be explicated as more or less separate categories, each with its own criteria. It is the category of *knowledge* that has dominated the attention of modern epistemologists. In recent decades, this attention has often taken the form of considering the modern “classical” criteria of knowledge as *justified true belief*, and looking for additional or different criteria of the concept that are capable of handling Edmund Gettier problems and the like.²²⁷ More recently, epistemologists have offered theories containing robust explications of other terms of epistemic evaluation (though some of these have in turn been offered principally as accounts of some of the classic tripartite criteria of knowledge), such as *justification*, *coherence*, *reliability*, and *evidence*.

I am concerned in this Article with the epistemic competence of nonexpert judges and juries when, in the course of making a legal judgment, they assess putatively relevant and material scientific information. But in order to assess their epistemic competence, *I* myself must select the proper term of epistemic evaluation in terms of which to assess that competence. The term I have settled on is *justified belief*, for three basic reasons. First, it appears to be the central concept of epistemic evaluation that concerns jurists who themselves attend closely and critically to the process by which scientific expert evidence enters legal decisionmaking. Second, *knowledge*, however that concept is cashed out, seems too demanding for a system that consciously solicits *competing* expert scientific testimony (as just noted, judges routinely admit testimony by experts that is mutually contradictory, with an awareness that two contradictory factual claims cannot both constitute knowledge). Third, there turns out to be an interesting and fertile connection between epistemic justification and the justification required for legal legitimacy.

I shall amplify these three reasons a bit. Over the past several decades, jurists attentive to the doctrines and institutions of evidence have become

227. See Edmund Gettier, *Is Justified True Belief Knowledge?*, 23 ANALYSIS 121 (1963).

increasingly concerned about scientific expert testimony. Something, they think, is lost along the epistemic chain from scientific research to factfinder belief. What is it that they think gets lost? It might seem that their concern is with *scientific knowledge* possessed by scientists serving as expert witnesses but lost in the process of transmission through testimony to nonexpert judges and juries. As a result of this loss, they fear, nonexperts are relying on unjustified beliefs about scientific information when they render final decisions. Despite much talk of “knowledge” and “scientific knowledge” in some of the leading (American) court decisions and litigators’ and scholars’ arguments, I maintain that it is not actually *knowledge* with which these jurists are concerned, but rather *justified belief*. (I might put the point this way: Although many jurists seem to have *de dicto* concerns about “knowledge” and “scientific knowledge” and often conduct their analyses in just those terms, from a philosophical point of view their *de re* concern is really only with justified belief.) *Daubert* is a superb example.

Recall that in *Daubert* the Supreme Court considered the proper method by which federal judges are to evaluate proffers of scientific evidence in deciding whether to admit that evidence for consideration by scientifically nonexpert factfinders.²²⁸ The Court framed the issue of the admissibility of scientific evidence by focusing on the term *knowledge*, since that term is central to Federal Rule of Evidence 702, the rule at issue in *Daubert*.²²⁹ Interpreting the “legislatively-enacted Federal Rules of Evidence as [it] would any statute,” the Court proceeded to ascertain what the term *knowledge* meant in this rule partly by using the “plain meaning” method of statutory interpretation (a method that, as in *Daubert* itself, often amounts to little more than looking a term up in a dictionary).²³⁰ The Court’s analysis is worth quoting at length:

The subject of an expert’s testimony must be “scientific . . . knowledge.” The adjective “scientific” implies a grounding in the methods and procedures of science. Similarly, the word “knowledge” connotes more than subjective belief or unsupported speculation. The term “applies to any body of known facts or to any body of ideas inferred from such facts or accepted as truths on good grounds.” Webster’s Third New International Dictionary 1252 (1986). Of course, it would be unreasonable to conclude that the subject of scientific testimony must be “known” to a certainty; arguably, there are no certainties in science. See, e.g., Brief for Nicolaas Bloembergen et al. as Amici Curiae 9 (“Indeed, scientists do not assert that they know what is immutably ‘true’—they are committed to searching for new, temporary, theories to explain, as best they can, phenomena”); Brief

228. See *supra* note 21 and accompanying text.

229. See *supra* note 27.

230. *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 587, 590 (1993).

for American Association for the Advancement of Science et al. as Amici Curiae 7-8 ("Science is not an encyclopedic body of knowledge about the universe. Instead, it represents a process for proposing and refining theoretical explanations about the world that are subject to further testing and refinement . . . "). But, in order to qualify as "scientific knowledge," an inference or assertion must be derived by the scientific method. Proposed testimony must be supported by appropriate validation—i.e., "good grounds," based on what is known. In short, the requirement that an expert's testimony pertain to "scientific knowledge" establishes a standard of evidentiary reliability.²³¹

Is the Court really concerned with scientific *knowledge*? The Court does take quite seriously the *phrase* 'scientific knowledge,' but it is clear on reflection that this cannot quite be the same concept that has concerned traditional epistemology—at least not those epistemological theories for which *truth* is a necessary condition of knowledge. Although the Court and the traditional epistemologist agree that "the word 'knowledge' connotes more than subjective belief or unsupported speculation,"²³² it is obvious that, under the Court's interpretation, Rule 702 does *not* presuppose that every expert is testifying to the truth. Otherwise, the Court would not allow scientific experts to testify to contrary or contradictory propositions.²³³ Instead, the Court offers a more expansive explication of 'knowledge,' one that embraces "any body of known facts or . . . *any body of ideas inferred from such facts or accepted as truths on good grounds*. . . . Proposed testimony must be supported by appropriate validation—i.e., 'good grounds,' based on what is known."²³⁴ (The Court also concludes that *certainty* is not a necessary condition of "scientific knowledge.")²³⁵ In a nutshell, the *concept* of epistemic assessment with which the Court is concerned when interpreting the *term* 'knowledge' and the *phrase* 'scientific knowledge' is that of a *judgment that is supported by good reasons*.

231. *Id.* at 589-90.

232. *Id.* at 590.

233. *Cf. supra* Section IV.C (discussing "competition" among experts).

234. *Daubert*, 509 U.S. at 590 (internal quotation marks omitted). Strictly speaking, one cannot, on pain of circularity, explicate the concept of knowledge by referring to "any body of known facts," unless one goes on to give a noncircular explication of what a known fact is. *Id.* In context, the Court may escape this problem if what it is really saying is that "when the Rules of Evidence speak of 'knowledge,' they are actually referring to beliefs supported by good reasons." Even so, the Court speaks a bit too broadly in the quote in the text above. Surely it is not the case that *any* "body of ideas inferred from 'known' facts" satisfies the criteria of even the Court's weaker conception of "knowledge." *Id.* For there are, of course, a great many invalid and otherwise unacceptable types of inference possible from acknowledged known truths. What the Court really has in mind are *good* inferences (those that are "accepted as truths on good grounds," "supported by appropriate validation—i.e., 'good grounds,' based on what is known," and the like). *Id.*

235. *See id.* at 590.

We may confirm this interpretive judgment (our interpretive judgment, that is, regarding the Court's interpretation of the term 'knowledge' in the Federal Rules of Evidence) by attending to the brief written for the respondents in *Daubert*, which clearly had a substantial shaping influence on the Court's analysis. Like the Court's opinion, that brief also emphasized the distinction between *knowledge* in the stronger (philosophical) sense and *judgment supported by good reasons*. Indeed, it amplifies this distinction and, even more to the present point, acknowledges that competing testimony can all be admitted under the same requirement of "scientific knowledge" in Rule 702:

[E]ven when offering an "opinion," a scientific expert must be testifying "[t]o" "scientific knowledge."

These words naturally mean that an expert must be testifying to more than merely his or her own view on a scientific issue. Rule 702 does not allow an expert to offer "beliefs" or "hypotheses" or "theories" or "claims" or "assertions" or "evidence" or "testimony"; instead, it limits expert testimony to "knowledge." Even by itself, "*knowledge*" ordinarily requires, at a minimum, appropriate validation for the proposition—i.e., "good grounds" for the belief based on what is known. See Webster's Third New International Dictionary 1252 (1986). And when used as part of the phrase "scientific, technical, or other specialized knowledge," the term naturally refers to grounds that are deemed good by the relevant scientific, technical, or other specialized field—that is, to claims that are validated, or derived, according to the accepted standards in the relevant field. See J. Kourany, *Scientific Knowledge: Basic Issues in the Philosophy of Science* 112 (1987) (hypotheses "must prove their mettle" to become "part of scientific knowledge"). Rule 702's language, naturally read, thus requires validation to the extent possible—i.e., a foundation, or good reason for acceptance as valid—based on established standards in the expert's field.²³⁶

236. Brief for Respondent at 14-15, *Daubert* (No. 92-102) (emphasis added) (second alteration in original). The brief adds the following footnote:

It is, of course, perfectly conceivable for each of several competing scientific (or other expert) claims to be validated to the extent possible at any given time. The very reason that scientists can disagree, and that scientific knowledge advances as it does, is that what is known at a particular moment does not uniquely predetermine all answers to new questions. Accepted standards and available evidence thus may not rule out either of two competing, but well-reasoned, conclusions. By the same token, however, they do rule out some answers. What validation means, therefore—all it can mean, given the ever-evolving body of knowledge—is good reason for acceptance as true, based on what is known at the time.

Id. at 15 n.8. To similar effect are several other passages in the brief. The brief asserts, for example, that Rule 702 requires that "the specific testimony of each expert have an adequate foundation, judged by the accepted standards of the expert's field," *id.* at 12 (emphasis added); that "[i]t is the judge's fundamental duty under the Rules to screen evidence for admissibility to ensure that the body of evidence provides a rationally reliable basis for judgment," *id.* (emphasis added); that "by restricting expert testimony to 'scientific, technical, or other specialized knowledge [that] will assist the trier of fact,' Rule 702 demands that an expert's testimony be well-grounded in the standards generally followed in his or her field for validating-establishing the truth of assertions of the type offered," *id.* (emphasis added) (quoting FED. R. EVID. 702); and that "[t]he critical term 'knowledge' demands more than individual belief or speculation,

While this brief's analysis admirably identifies the term of epistemic assessment that is relevant to rules and institutions of evidence, it also highlights a deep puzzle about nonexperts' epistemic deference to experts. In effect, the brief argues that when the putatively scientific evidence proffered by a party is so weak as not to be "validated, or derived, according to the accepted standards in the relevant field," then the judge should not even allow the evidence to be presented to the nonexpert jury. But when evidence supporting contrary or contradictory propositions *is* supported by "*grounds that are deemed good by the relevant scientific, technical, or other specialized field,*" then the nonexpert judge or jury is to make the decision as to which of those competing and well-supported claims is to be accepted for purposes of the legal decision at hand. That is, on this brief's view and apparently on the view of the *Daubert* Court itself, when qualified epistemically competent experts disagree, the decision as to who is *correct* is to be given by the judge to the *least* epistemically competent institutional actor, the nonexpert judge or jury. Again, we are driven to ask, what is being expected or demanded of the nonexpert legal reasoner in assessing scientific testimony? The *Daubert* opinion and at least some sources on which it relies seem to have it thus: When the evidence is so weak that no reputable scientist in the field would endorse it, prevent the nonexpert from hearing it (and from hearing that no reputable expert would endorse it); but when the best scientific theories and methods underdetermine the result, let the nonexpert decide who is correct. How can an epistemically responsible decision emerge from that rule?²³⁷

We shall return to this puzzle later. For now, I restate the basic descriptive observation I have made in this section. What centrally concerns lawyers, scholars, and judges with regard to the cogency of scientific expert testimony is not whether the expert has—or can transmit to the nonexpert—*knowledge* in the strong philosophical sense, but rather whether the expert has and is in a position to be able to transmit to the nonexpert *a belief that is supported by good reasons*. I think it not inaccurate to go further and say that what concerns these jurists is not the epistemic concept of *knowledge*, but rather that of *justified belief*. (Obviously a good deal more evidence from the writings of lawyers, scholars, and judges would be needed to support this claim more conclusively, but I hazard the judgment that such evidence is readily available.)

I shall go beyond my descriptive claim about what type of epistemic assessment it is that concerns evidence jurists. Regardless of whether jurists concerned with the cogency of scientific expert testimony *are* specifically focusing on belief supported by good reasons—that is, on *justified belief*—rather than on knowledge in the philosophical sense, I now suggest that

but instead refers to *inferences or assertions that are grounded in the standards reliably used to support such claims*," *id.* at 14 (emphasis added).

237. I pose this question, with a different example, at the beginning of the Article. See *supra* text accompanying note 1.

that is the concept with which they *should* be concerned. Why the weaker concept only? To anticipate later discussion, while it seems that science has much of importance to tell the law about matters that are rationally pertinent to a great many legal decisions, it is also clear that scientific truth is elusive. That science is not an epistemic monolith or a univocal oracle is trite learning. In a great many cases to which some particular angle of the scientific point of view is rationally pertinent, and at every "level" of the scientific point of view (axiological aims, methods, particular judgments), there is room for skilled, learned, and reasonable scientists to disagree. Were a legal system to set its rules of procedure and evidence—the rules guiding "legal epistemology"—so as to insist on only *knowledge* (with truth as a necessary condition), the law would vastly deprive itself of counsel it *needs* to make legal decisions sufficiently *epistemically* legitimate to be *legally* legitimate. The law is wise not to have its epistemic reach so far exceed its grasp. Justified belief is all it does and all it should seek to have transmitted from the scientist-witness to the nonexpert judge or jury.

But can even that more modest goal be achieved?

B. *Testimony as a Source of Justified Belief*

I turn now to a more focused investigation of whether the nonexpert can make the epistemically cogent judgments that legitimate legal decisionmaking requires—holding off, for the moment, a discussion of the source and nature of the criteria of legitimacy.²³⁸ In accord with the conclusions reached in Section IV.C, the precise overall philosophical question involved here is this: Can a nonexpert practical legal reasoner acquire justified beliefs about scientific propositions and their rational pertinence even in the face of selection and competition problems? I am attempting to answer that question by explaining and modeling the reasoning process that underlies epistemic deference to experts about expert subject matters. What kinds of theoretical insights are available to help with this inquiry? Insights may be discerned, I suggest, in two types of philosophical analysis. One is generic epistemological analysis of *testimony* as a source of knowledge or justified belief. The other is more specific analysis by philosophers of the epistemic dimensions of *expert testimony*. I consider some of each of these contributions. One terminological device is worth using in this brief survey. Because these discussions do not consistently distinguish between *knowledge* and *justified belief*, and because for my current purposes the distinction is not important, I shall use 'KJB' to refer indiscriminately to knowledge and justified belief.

238. See *infra* Part VII.

1. *Testimony*

I begin with some philosophers' generic analyses of the epistemology of testimony. Surprisingly little explicit and sustained treatment of testimony is found in the epistemological literature, given how fecund a source of KJB it seems to be. In recent years, however, philosophical treatments of testimony have multiplied, so that the subject will soon likely take its rightful place as a major domain of epistemology. Much of the contemporary debate focuses on whether testimony can be an independent source of KJB, on par with memory, perception, and inference, or whether instead testimony derives whatever epistemic integrity it has from being reducible to other familiar sources of KJB.²³⁹

Hume offered a brief but influential account in his essay *Of Miracles*.²⁴⁰ Hume's account is reductionist. He treats the integrity of testimonial KJB as dependent on empirical confirmation; indeed, his treatment of testimony is a fairly straightforward application of the thoroughgoing empiricism he developed in the *Treatise*²⁴¹ and other works.²⁴² He begins by observing that "there is no species of reasoning more common, more useful, and even necessary to human life than that which is derived from the testimony of men and the reports of eyewitnesses and spectators."²⁴³ "[O]ur assurance in any argument of this kind," he maintains,

is derived from no other principle than our observation of the veracity of human testimony and of the usual conformity of facts to the report of witnesses. It being a general maxim that no objects have any discoverable connection together, and that all the inferences which we can draw from one to another are founded merely on our experience of their constant and regular conjunction, it is evident that we ought not to make an exception to this maxim in favor of human testimony whose connection with any event seems itself as little necessary as any other. . . . The reason why we place any credit in witnesses and historians is not derived from any *connection* which we perceive *a priori* between testimony and reality, but because we are accustomed to find a conformity between them.²⁴⁴

239. A useful discussion of reductionist and antireductionist views of testimony is found in Elizabeth Fricker, *Telling and Trusting: Reductionism and Anti-Reductionism in the Epistemology of Testimony*, 104 MIND 393 (1995) (reviewing COADY, *supra* note 185).

240. DAVID HUME, *Of Miracles*, in AN INQUIRY CONCERNING HUMAN UNDERSTANDING 46 (Charles W. Hendel ed., The Bobbs-Merrill Co. 1955) (1748).

241. DAVID HUME, *An Abstract of a Treatise of Human Nature*, in AN INQUIRY CONCERNING HUMAN UNDERSTANDING, *supra* note 240, at 186.

242. See, e.g., HUME, *supra* note 240.

243. *Id.* at 119.

244. *Id.* at 119-21.

Such an account has a ready explanation of both the reach and the limits of credulity that one ought, from an epistemic point of view, to extend to beliefs acquired from testimony: "[W]hen the fact attested is such a one as has seldom fallen under our observation, here is a contest of two opposite experiences, of which the one destroys the other as far as its force goes, and the superior can only operate on the mind by the force which remains."²⁴⁵

Several contemporary philosophers have been attracted to accounts of the epistemic integrity of testimony that have both elements of the Humean account: empiricism and reductionism. W.V. Quine and J.S. Ullian, for example, endorse an account not unlike Hume's, save for the particular naturalistic and holistic flavor familiar from Quine's general epistemology:

[W]hen we hear an observation sentence that reports something beyond our own experience, we gain evidence that the speaker has the stimulation appropriate for its utterance, even though that stimulation does not reach us. Such, in principle, is the mechanism of testimony as an extension of our senses. It was the first and greatest human device for stepping up the observational intake. Telescopes, microscopes, radar, and radio astronomy are later devices to the same end.²⁴⁶

Quine and Ullian also provide a naturalistic discussion of the legitimacy of a hearer's presumption that a "testifying" speaker is telling the truth—telling the truth both when uttering observation sentences, whose truth the hearer can check relatively easily²⁴⁷ and when uttering nonobservation sentences, which a hearer often cannot easily check, and thus for which "the danger of mistaken testimony soars."²⁴⁸ Quine and Ullian suggest that, without the presumption by a hearer of testimony that testifying speakers are telling the truth and without an extension of that presumption even to nonobservation sentences, testimony could not be a significant source of KJB. But they also readily acknowledge that the epistemic integrity of such presumptions is open to serious doubt, since knavery and fallibility attend both observational and nonobservational testimony. Even so, they argue that hearers may be justified in having some presumptive confidence that witnesses are telling the truth, a justification Quine and Ullian locate in natural features of language and language learning.²⁴⁹

245. *Id.* at 121.

246. QUINE & ULLIAN, *supra* note 148, at 33-34.

247. *See id.* at 34 ("Observation sentences, taken narrowly, are comparatively foolproof. That is what makes them the tribunal of science.").

248. *Id.*

249. *See id.* at 35. They explain:

Truthfulness is essential, in large part, to the survival of language itself. . . . Our learning of the primitive vocabulary of observation sentences consists, after all, in our learning to associate it with the appropriate sensory stimulations. Small wonder then if those same stimulations dispose us in the future to affirm the properly associated observation sentences. Lying is an effortful

Just as there is a natural tendency toward veracity in speakers, argue Quine and Ullian, there is for related reasons a natural (apparently charity-based, though they do not say so explicitly) tendency toward credulity in hearers. On the other hand, credulity is not, and should not rationally be, unlimited. Rationality reigns in credulity. On Quine and Ullian's view (as on Hume's), the empirical grounding of the integrity of testimonially acquired beliefs mandates tight constraints on rational trust in beliefs acquired from testimony:

Veracity is generally admirable, if not always prudent; but credulity, in more than modest measure, is neither admirable nor prudent.

. . . The courtroom is worthy of the attention of anyone who is inclined toward taking too much of what he is told at face value. It teaches a stern lesson. People disguise the truth in certain situations, whether out of deviousness, self-deception, ignorance, or fear. They also, of course, misremember, misjudge, and misreason.²⁵⁰

Neither Quine and Ullian nor Hume explicitly addresses the question of *expert* testimony. The difference between general testimony and scientific testimony can be quite epistemically significant, especially for a Humean account according to which the integrity of testimony depends on the hearer's ability independently to confirm or disconfirm what he has been told (at least, in a sufficiently large sample of cases). Simple, nontechnical (including observational) reports are easiest for a nonexpert to confirm. A nonexpert cannot independently and directly check complex theoretical propositions that do not have simple observational consequences or whose observational consequences themselves require complex training even to be recognized as such. Whatever checking the nonexpert can manage must rely on indirect devices like demeanor, credentials, and reputation.²⁵¹

Elizabeth Fricker offers a sustained epistemology of testimony that emphasizes the importance of a hearer's assessment of a witness's sincerity and competence.²⁵² Although she does not expressly discuss expert testimony, her emphasis on epistemic competence is illuminating and helpful here. The main relevant points of her account are these. First, it is important to distinguish between *global* and *local* reductionism in accounts of testimony. Global reductionism has two forms: (1) the thesis that it is possible to reduce all testimonial KJB to more familiar, fundamental, and less problematic epistemic sources and principles, such as perception, memory, and inference; and (2) the distinct thesis that the epistemologist must make this reduction in

deviation from the conditioned response.

Id.

250. *Id.* at 36-37.

251. I explore these devices shortly. See *infra* Section V.C.

252. See Elizabeth Fricker, *The Epistemology of Testimony*, 61 PROC. ARISTOTELIAN SOC'Y SUPPLEMENT 57, 73 (1987).

order to account for the epistemic integrity of testimonially acquired KJB. Hume seems to endorse both of these global reductionist theses;²⁵³ I surmise, but am less confident here, that Quine and Ullian do too.²⁵⁴ Local reductionism also has two forms: (1) that it is possible to reduce some, but not necessarily all, testimonial KJB to more familiar, fundamental, and less problematic epistemic sources and principles; and (2) that the epistemologist must reduce *some*, but not necessarily all, testimonial KJB in order to account for its epistemic integrity.

Fricker maintains, rightly, that a great deal of what we are inclined intuitively to acknowledge as KJB comes from testimony, and that many of those beliefs *cannot* be reduced to other sources of KJB. There is powerful support for this view—much of it marshaled by Tony Coady in his extended critique and rejection of the reductionist position.²⁵⁵ Against Hume, for instance, Coady argues that one cannot empirically consult one's personal experience to check to see whether testimony is reliable because there is too much testimony and too small a personal observation base. Moreover, much of what one would do to verify or falsify testimonial evidence is itself suffused with testimonial information; perhaps even the conceptual framework in which one describes the world and its objects and institutions has been acquired by testimony. But, as Fricker stresses, antireductionist arguments like Coady's fail to distinguish global and local reductionism, and that weakens their analysis of the independent epistemic merits of testimony. In arguing against Coady's version of antireductionism, Fricker observes that Coady denies only the possibility of *global* reductionism. Fricker allows that we seem to have no choice but to accept much testimonial information on "simple trust" in our developmental stages, in which we acquire language and concepts from parents, teachers, and peers.²⁵⁶ But we *do* have a choice once we have come of epistemic age. At that later developmental stage, she claims, it is both feasible and indeed rationally obligatory for mature epistemic actors to adopt a stringently critical stance toward testimony. Posed in this critical stance, the hearer of testimony is rationally obliged to focus on the testifier's *sincerity* and *competence*.

253. See HUME, *supra* note 240, at 119-24.

254. See QUINE & ULLIAN, *supra* note 148, at 33-34.

255. See COADY, *supra* note 185, at 79-100.

256. Fricker argues:

Each one of us, in becoming the adult master of our commonsense scheme of things, has been through a historical process of development during which her attitude towards her teachers and other informants was one of simple trust. . . . Bearing in mind the role of teaching by others whom we trust unquestioningly in our learning of language (which is not separate from learning about the world), this seems inevitable.

Fricker, *supra* note 239, at 401. Fricker also suggests that the putative KJB acquired at this stage can be confirmed in coherentist fashion as the stock of our KJB from all sources, including perception, memory, and inference, grows. She continues: "[A] belief first acquired through testimony very often gains support later on both through corroboration by other testimony, and through its coherence with what we learn from perception, and the empirical theory we base on this." *Id.* at 410.

In an effort to model the reasoning process of a hearer confronted with testimony (an effort in much the same spirit as my own in this Article, but with a different focus), Fricker claims that "common sense semantics" endorses an inference rule that allows an interpreter to move from the fact that a testifying witness has spoken a proposition to an endorsement of the proposition itself.²⁵⁷ That inference rule, which she considers to be an "an analytic truth about the speech act of assertion," is as follows: (*S* asserted that *P* at *t* and *S* was sincere, and was competent at *t* with respect to $P \rightarrow P$) where '*S* is competent with respect to *P* at *t*' =_{df} '*at t*, *S* believes $P \rightarrow P$ '.²⁵⁸

In Fricker's view, a hearer is rationally obliged to *presume* both sincerity and competence, but those presumptions are rather easy to overcome. Sincerity "can be assumed unless there are signs of its lack," but "the hearer must always be scrutinizing the speaker for telltale signs of its absence."²⁵⁹ Similarly, Fricker allows that a presumption of competence "may be assumed as the default setting."²⁶⁰ As she acknowledges, Davidsonian considerations suggest that some "charitable" presumption by the hearer of the speaker's competence (and sincerity) may be part of the nature of language; and Coady, Fricker's main target, leans very heavily on such considerations in his account. Nevertheless, Fricker's empiricist approach leads her (as it led Hume and Quine and Ullian) to conclude that a properly *rational* presumption of competence is sharply limited:

[D]espite the conceptual constraints on interpretation it remains an *empirical question* whether particular speakers, on particular occasions, are either competent or sincere; one which a self-consciously rational belief-former will wish to have positive evidence about, before he believes what he is told. Correspondingly, as to what structure of justification must support a testimony-belief, it is right to insist that a hearer must be in a position to know that the speaker is sincere and competent, and that his being so requires his possession of some particular evidence pertaining to the case at hand.²⁶¹

Fricker reveals just how weak she believes this presumption of competence is, and perforce, how weak are the "conceptual" requirements that a hearer be charitable toward testimony and testifiers whose competence may be presumed:

[W]ith respect to a subclass of tellings only, viz. those with subject matters for which commonsense psychological knowledge licenses one to expect the speaker to be competent about them: such as her name, where she lives, what she had for breakfast, what is in clear view in

257. Fricker, *supra* note 252, at 72-73.

258. See Fricker, *supra* note 252, at 73.

259. Fricker, *supra* note 239, at 405.

260. *Id.*

261. Fricker, *supra* note 252, at 77 (emphasis added).

front of her, and so forth. Again, the speaker [sic]²⁶² must be sensitive to indicators of its lack. . . . A hearer who engages in [this interpretative task] does not believe what she is told uncritically, and she has *empirical* grounds for her trust in her informant.²⁶³

To the claim that a stronger presumption of competence is rationally warranted—say, a presumption of competence in the absence of special evidence to the contrary—Fricker responds that “[t]he proportion of utterances which are made by speakers who are either insincere or incompetent is far too high for this to be an attractive policy.”²⁶⁴

Fricker argues for *local* reductionism. We cannot globally reduce testimonially acquired KJB because we cannot escape the necessity of relying on simple trust in our formative years (though even some of the beliefs acquired at this stage are subject to later coherentist confirmation). But we can, in our mature years, *locally* reduce testimonially acquired propositions to other forms of KJB—perception, inference, and memory—by performing the critical presumptive interpretive exercise outlined above.

Fricker’s account has much to recommend it. Its insights are especially valuable for their focus on a hearer’s need to bring a robustly critical stance toward both implicit and explicit claims of speaker competence. As I have argued, such a critical stance is built into the law’s epistemology in the form of rules of evidence and procedure that proceduralize the caution of the factfinder toward expert (and other) factual claims.²⁶⁵ Fricker’s fairly persuasive account suggests that this kind of proceduralized caution attends *every* rational encounter with testimony and not just testimonial encounters in the highly formalized institutional setting of a courtroom. If she is right, legal rationality in this domain is continuous with rationality more generally. Fricker’s account is also attractive for its cogent orchestration of three strong intuitions. First, one cannot, *pace* Hume, confirm by means of one’s own nontestimonial experience *all* the testimony one has heard. Second, even many of the testimonially acquired beliefs that cannot be confirmed by other means, nevertheless, do seem to produce KJB. Third, there is a limit to rational credulity, where uncritical trust spills into warrantless gullibility.

Fricker’s account does leave important questions unanswered that must be addressed before her account can provide an adequate account of the rationality of trust in testimony. She leaves us to wonder, for example, how much of what we *think* is testimonially generated KJB is *actually* KJB, because her

262. I assume this is a misprint for “hearer.”

263. Fricker, *supra* note 239, at 405 (emphasis added). How good the empirical grounds are depends, of course, on what kinds of empirical reasons there are for the presumption in favor of sincerity and competence. Fricker does not offer much discussion of those grounds in the pieces I have been discussing, but has more extended discussion elsewhere.

264. Fricker, *supra* note 252, at 75.

265. See *supra* Section I.A.

presumption about speaker competence applies only to a relatively trivial "subclass of tellings" (e.g., the speaker's name, where she lives, what she had for breakfast, etc.). Surely the real power of the intuition that KJB arises from testimony comes from its ability to explain the vast majority of our beliefs that are far more complex and that we seem not to be in a good position to confirm.²⁶⁶ Fricker's account leaves largely unexplained how and whether we can acquire KJB under these conditions.

Perhaps it is alertness to this difficulty that leads Fricker to make the sweeping claim that "the key to the epistemology of testimony is: disaggregate."²⁶⁷ She elaborates, "Disaggregate both regarding the question of whether and when we may rightly trust without evidence, and regarding the empirical confirmation of speakers' trustworthiness."²⁶⁸ This disaggregation principle does not offer any final answers to the foregoing question about the status of a great many apparently unverifiable, testimonially-generated beliefs. (Can these be real sources of KJB? Is there some way to verify them short of becoming experts in the domain of these propositions?) But taken as a regulatory rule for the project of investigating the epistemic integrity of testimony, this maxim seems unassailable. Some such principle is guiding my inquiry here into deference by nonexpert practical reasoners to scientific experts. The foregoing discussion should suggest just this: Whatever *general* account might be given of the epistemic virtue of testimony as a source of KJB, it cannot be assumed that *all* testimonial knowledge has the same virtues. There are special features of scientific knowledge that make it particularly difficult to see how they can be sources of KJB for nonexpert practical reasoners who are constrained by certain norms of epistemic accuracy and practical legitimacy.

2. *Expert Testimony*

I turn now from *general* philosophical theories of *testimony* to accounts that focus on *expert* testimony more specifically. Some (for example, those offered by Hilary Putnam and John Hardwig)²⁶⁹ focus on deference to experts in everyday life; these I refer to as "collectivist" accounts of legitimate epistemic deference to experts. Others (for example, the accounts offered by Kenny and Coady)²⁷⁰ focus more specifically, and more pointedly for my purposes, on expert testimony in courts. I refer to these as "extra-cameral"

266. John Hardwig vigorously advances this point about the complexity of the testimony that we intuitively believe produces KJB in hearers. See *infra* notes 273-285 and accompanying text (discussing Hardwig's account).

267. Fricker, *supra* note 239, at 407.

268. *Id.*

269. See HILARY PUTNAM, *The Meaning of "Meaning,"* in 2 MIND, LANGUAGE AND REALITY 215 (1975); JOHN HARDWIG, *Epistemic Dependence*, 82 J. PHIL. 335, 335 (1985).

270. See COADY, *supra* note 185; KENNY, *supra* note 64.

accounts of legitimate epistemic deference to experts. Both types of account defend the strongly held intuition that nonexperts can acquire KJB from experts—even in the face of the selection and competition tasks discussed above.²⁷¹ I shall consider how adequate these defenses are.

“Collectivist” accounts of expert testimony suggest that to understand how and why epistemic deference to experts can yield KJB,²⁷² the theory of KJB itself must depart significantly from the “individualist” epistemological model that has long dominated philosophy. That standard model is individualist in that it treats knowledge solely as the property or capacity of individual knowing minds, and what is good, reliable, warranted, or true in the way of belief is analyzed from the individual knower’s point of view. Although there are important exceptions, the dominance of this model cuts across foundationalist, coherentist, internalist, and externalist theories of knowledge.

By contrast, the collectivist model maintains that creating and transmitting KJB can be, and is, a collective enterprise, rather than solely an individual one. Collectivist theorists maintain that KJB is far too complex for an individualist account to explain fully. Hardwig, a leading recent expositor of this view, puts the intuition in a compelling way:

I find myself believing all sorts of things for which I do not possess evidence: that smoking cigarettes causes lung cancer, . . . that mass media threaten democracy, . . . that my irregular heart beat is premature ventricular contraction, that students’ grades are not correlated with success in the nonacademic world. . . . The list of things I believe, though I have no evidence for the truth of them is, if not infinite, virtually endless. And I am finite. Though I can readily imagine what I would have to do to obtain the evidence that would support any one of my beliefs, I cannot imagine being able to do this for *all* of my beliefs. I believe too much; there is too much relevant evidence (much of it available only after extensive, specialized training); intellect is too small and life is too short.²⁷³

There is indeed reason to believe that an individualist model cannot explain how we, as nonexperts, acquire KJB about a great many of the things we firmly believe we do hold *as* KJB. There is even reason to question whether the individualist model can adequately explain the KJB putatively possessed by scientific experts. Consider, for example, that empirical scientists routinely and increasingly depend on computers in constructing, verifying, and falsifying their theories. But they are usually not able themselves to verify or even to

271. See *supra* Section IV.C.

272. I continue to use “KJB” for “knowledge or justified belief” for the same basic reason offered at the outset of this section.

273. Hardwig, *supra* note 269, at 335. Since Hardwig does not deny that testimony is a form of evidence, and he clearly has *testimonial* evidence for the listed beliefs, we must take his assertion in the first sentence to mean that he possesses no *nontestimonial* evidence for them.

comprehend—without a good deal of additional training that they probably do not have the time to acquire and do not feel the need to obtain—the theoretical work that guides computer scientists when they build the computers and write the programs on which the empirical scientists rely. Thus, these scientists may be said to rely on—i.e., epistemically defer to—the work of computer scientists without understanding the details of the computer scientists' work. Even so, one would have to traverse a fair way down the path of skepticism to conclude that these deferring scientists do not have KJB about, or epistemic competence within, their own fields just because of their limited understanding of the computer science that underlies the technology on which they rely.²⁷⁴

What might a nonindividualist account of KJB look like? Hilary Putnam sketches such a theory in some brief but rich remarks about what he calls the "division of linguistic labor."²⁷⁵ Putnam addresses the question of how experts and nonexperts in a given society manage to use "expert" terms—terms that come within the special province of expert theoretical disciplines, such as the empirical sciences—with the same *meaning* even though the nonexperts are not themselves competent to know the meaning of those terms. How, for example, can nonscientist members of modern English-speaking cultures routinely use the terms 'water,' 'gold,' and 'beech tree' without knowing the chemistry, physics, or biology required to understand what such terms really refer to (so as to be able, say, to distinguish "fool's gold" from gold)?

Putnam proposes a "sociolinguistic hypothesis" to explain this phenomenon. There is, he claims, a "division of linguistic labor" in which most members of the society acquire such words as 'gold' and 'water' as part of their general vocabulary, while only a subclass of those members acquire the expert methods of recognizing whether a given item is within the scope of those words or not. That is, even though not himself an expert, an epistemic pedestrian can use "expert" terms with the same meaning as an expert:

He can rely on a special subclass of speakers. The features that are generally thought to be present in connection with a general name—necessary and sufficient conditions for membership in the extension, ways of recognizing if something is in the extension ('criteria'), etc.—are all present in the linguistic community *considered as a collective body*

. . . .
Every linguistic community exemplifies the sort of division of linguistic labor just described: that is, possesses at least some terms whose associated 'criteria' are known only to a subset of the speakers who acquire the terms, and whose use by other speakers depends

274. Hardwig offers a nice example of (what he calls) epistemic dependence among physicists. See *id.* at 346-47.

275. PUTNAM, *supra* note 269, at 227.

upon a structured cooperation between them and the speakers in the relevant subsets.²⁷⁶

Putnam's brief discussion offers at least the start of a promising account of how a community as a whole can be said to have expert knowledge even when not every member has the requisite expertise. In a community that includes both experts and lay people, the expert might be said to exercise epistemic authority over the meaning of terms whose meaning is discerned only by the use of specialized expert methods.²⁷⁷

Hardwig takes the collectivist theory much further than does Putnam, making some remarkable concessions to his individualist challengers along the way. Hardwig entertains, and comes quite close to endorsing, the idea that a nonexpert, *B*, can acquire *knowledge* of some proposition *p* (and not the more inclusive *KJB* on which I have been focusing) from an expert, *A*, even under the following conditions: (1) *B* has not performed the inquiry capable of providing evidence for the truth of proposition *p*; (2) *B* is not competent, and could never become competent, to do so; (3) *B* is not competent to assess the merits of the reasons that expert *A* offers for his opinion; and (4) *B* cannot understand what *p* means.

In Hardwig's view, it makes sense even under these conditions to say both that *B*'s belief is rationally justified *and* that *B* *knows* that *p*. His principal argument for the first of these remarkable conclusions (regarding rationally justified belief) is just that

we *must* say that *B*'s belief is rationally justified—even if he does not know or understand what *A*'s reasons [for believing that *p*] are—if we do not wish to be forced to conclude that a very large percentage of beliefs in any complex culture are simply and unavoidably irrational or nonrational.²⁷⁸

He makes the same basic argument regarding knowledge, pointing to common cases of scientific practice in which “each researcher is forced to acknowledge the extent to which his own work rests on . . . work which he has not and could not . . . verify”.²⁷⁹ “Unless we maintain that most of our scientific research and scholarship could *never*, because of the cooperative methodology of the enterprise, result in knowledge, I submit that we must conclude that the *p* is known in cases like this,” in which “each researcher is forced to

276. *Id.* at 228.

277. Putnam uses the term “division of linguistic labor” because of the particular version of realist semantics he was urging at the time. One may just as well call it a division of *epistemic* labor, as he himself implicitly acknowledges. See *id.* (“This division of linguistic labor rests upon and presupposes the division of *nonlinguistic* labor, of course. . . . [W]ith the increase of division of labor in the society and the rise of science, more and more words begin to exhibit this kind of division of labor.”).

278. Hardwig, *supra* note 269, at 339.

279. *Id.* at 348.

acknowledge the extent to which his own work rests on . . . work which he has not and could not . . . verify.”²⁸⁰

There is much intuitive appeal in the collectivist view. It does seem that nonexperts can, and do, acquire KJB concerning a great many propositions about complex scientifically articulated subject matters whose warrant can be ascertained only by the use of specialized tools that they do not possess and cannot realistically acquire.²⁸¹ But collectivist accounts like those sketched by Hardwig and Putnam are just that—sketches—and they too (Hardwig’s most clearly) offer up epistemological pills that are hard to swallow. Basically, Hardwig offers a collectivist argument that has the structure of a *modus tollens*:

- (1) *If* justified epistemic deference to experts is not possible, *then* a very large percentage of beliefs in any complex culture is irrational or nonrational;
- (2) It is not the case that a very large percentage of beliefs in any complex culture is irrational or nonrational;
- Therefore,*
- (3) Justified epistemic deference to experts is possible.

Is this argument compelling? Clearly Hardwig believes (as does Putnam) that justified epistemic deference is possible. But Hardwig’s *modus tollens* leans very heavily on a parade of epistemic horrors: “If justified deference is not possible, then see how irrational our culture would be!” Although such a parade delights the skeptic and strikes fear in the heart of every epistemically responsible citizen, *modus tollens* cannot suffice where explanation is lacking. Aside from standing on some strong intuitions, for all Hardwig and Putnam have explained, we have no less justification for running the inference this way:

- (1) *If* justified epistemic deference to experts is not possible, *then* a very large percentage of beliefs in any complex culture is irrational or nonrational;
- (2) Justified epistemic deference to experts is not possible;
- Therefore,*
- (3) A very large percentage of beliefs in any complex culture is irrational or nonrational.

One philosopher’s *modus tollens*, as the way would have it, is another’s *modus ponens*. Collectivist arguments like Hardwig’s and Putnam’s point to a conclusion that seems compelling: In a complex society, the epistemic whole

280. *Id.*

281. *See supra* notes 272-274 and accompanying text. This is the intuition to which I think Fricker is insufficiently attentive.

is greater than the sum of its parts, and the collective *as such* can know, or at least believe justifiably, far more than any member of the collective could possibly know individually. They point to something we think is true, something that many would like to believe is true, but without offering any explanation of how it could be true. Yet it is precisely the account of *how* collective knowing is possible that we seek to provide in our philosophical explanation.²⁸² Without more, these collectivist theories do not provide the necessary analysis.

To be sure, Hardwig's intuition that testimony on such matters *does* yield KJB, even under his striking conditions of hearer incompetence, is compelling, at least *prima facie*. But is Hardwig entitled, as a matter of epistemological debate, to his *modus tollens* presumption, so that the burden of proof is on the person who would deny that scientific testimony to a starkly incompetent hearer (as Hardwig concedes many of us to be vis-à-vis the testimony we receive) can yield KJB in that hearer? In my view, Hardwig is not entitled to that presumption. Although the intuitions on which Hardwig leans so heavily are somewhat compelling, we also have compelling *experiential* reason to believe that a good deal of testimony, including testimony by experts, is false. Surely Fricker and Quine and Ullian are on target in this respect. We have too much evidence of incompetence, dissembling, and epistemically distorting bias for the burden of argumentative proof to be set as Hardwig seems to claim. We need not even enter the courtroom to flood ourselves with memorial evidence of the "stern lesson" that "[p]eople disguise the truth in certain situations, whether out of deviousness, self-deception, ignorance, or fear. They also, of course, misremember, misjudge, and misreason."²⁸³

In any event, lest my specific focus here on expert *scientific* testimony become lost in more general epistemological considerations, I leave my reaction to collectivist accounts with this contention: Hardwig's *modus tollens* can be of no help to a practical legal reasoner who is faced with *actually competing* scientific experts.²⁸⁴ Short of making radical revisions to the logical principles they are willing to accept, nonexperts cannot believe all scientific experts when those experts testify in contradictory or contrary ways.

Other epistemological accounts of expert scientific testimony, specifically those that focus on testimony in legal settings, either do not endorse, or at least do not focus on, collectivist epistemic assumptions. Instead, their central concern is the manner and setting in which expert testimony is presented to

282. Nozick offers an account of one mode of philosophical explanation as the explanation of the possibility of some state (knowledge, justice, truth) in the face of other apparently true propositions that deny its possibility. See NOZICK, *supra* note 5, at 8-24.

283. QUINE & ULLIAN, *supra* note 148, at 37.

284. See *supra* text accompanying note 226 (discussing "actual competition")

nonexperts in a contentious litigative context.²⁸⁵ Proponents of what I call "extra-cameral" accounts believe that although there are obvious problems with the orderly, epistemically justified reliance on expert testimony in adversarial legal systems, these are not problems that *inhere* in the attempt to transfer expert information from experts to nonexperts. Instead, these are problems that occur only when expert testimony is presented in an adversarial context. Accordingly, these accounts propose to remove expert testimony from the courtroom (the *camera*) and to have nonexperts defer to such testimony as neutral testimony by relatively disinterested experts.

Anthony Kenny provides a philosophical theory of this type, one that is specifically directed to the question of the reliability of expert evidence in courts. Kenny begins his analysis by specifying four criteria that a putatively expert scientific discipline must satisfy in order actually to be an expert *scientific* discipline. First, it must be consistent.²⁸⁶ Second, it must be methodical.²⁸⁷ Third, it must be cumulative.²⁸⁸ Fourth, it must be predictive and therefore falsifiable, in a special sense.²⁸⁹

Having articulated the conditions that a discipline must satisfy to qualify as "scientific," Kenny considers the problem of competing expertise in the courtroom. With regard to novel (putatively) scientific expert methods, he observes, parties usually battle out in court the question whether the discipline to which the method belongs is really a science. He argues that because judges and juries lack the institutional competence to judge whether a new field really is a science, "the courtroom is not the best place, and the adversary procedure is not the right method, to decide what is and what is not a science."²⁹⁰ Like many legal commentators,²⁹¹ Kenny maintains that, within reasonable limits

285. Many of these accounts presuppose some kind of epistemic collectivism, or at least cohere better with it than with individualism, for the reasons Hardwig highlights. See Hardwig, *supra* note 269.

286. See Kenny, *supra* note 64, at 49 (stating that "different experts must not regularly give conflicting answers to questions which are central to their discipline" though there may be differences about borderline cases).

287. See *id.* at 50 ("[T]here will be agreement about the appropriate procedures for gathering information within the discipline. A procedure carried out by one expert to reach a particular conclusion is one which must be capable of duplication by any other expert.").

288. See *id.* ("[T]hough any expert must be able to repeat the results of others he does not have to: he can build up on foundations that others have built.").

289. See *id.* ("It need not necessarily predict the future (paleontology does not). But it must predict the not yet known from the already known . . ."). Note that both Kenny and the *Daubert* opinion articulate four criteria of science, and they overlap fairly closely on three of them: testing, peer review, and general acceptance. Kenny has no explicit version of the rate-of-error criterion the Supreme Court endorses. Compare *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 594 (1993), with Kenny, *supra* note 64, at 49-50. Note also that Kenny offers his criteria as "four criteria which are necessary conditions for a discipline to be scientific," Kenny, *supra* note 64, at 49, while the Court assiduously avoids treating any of its factors as either necessary or sufficient conditions, see *Daubert*, 509 U.S. at 593.

290. Kenny, *supra* note 64, at 51-52.

291. Among evidence scholars, John Langbein articulates this position well:

At trial, the battle of experts tends to baffle the trier, especially in jury courts. If the experts do not cancel each other out, the advantage is likely to be with the expert whose forensic skills are the more enticing. The system invites abusive cross-examination. Since each expert is party-selected and party-paid, he is vulnerable to attack on credibility regardless of the merits of his

of time and money, expert testimony ought to be an effort to discern the truth, but that the adversary system overwhelms the effort.²⁹² This leads to his principal recommendation:

To remedy the abuses in the giving of expert evidence we should:

... remove from the courts the decision as to whether a nascent discipline is or is not a science capable of providing expert evidence. A register should be set up of such disciplines, and those claiming to have developed a new science should seek admission to the register. . . . The essential thing is that the matter should be decided not by a judge or barrister in haste, but by experts in adjacent disciplines at leisure.²⁹³

Kenny's register would function as a kind of super-credential, the very existence of which would lend *credence* to the expert judgments issuing from those experts who were duly registered. But his and other extra-cameral proposals²⁹⁴ can neither surmount nor resolve problems of selection and competition. They perhaps relocate those problems to a different link along the epistemic chain from expert to nonexpert, but they do not resolve the problems or explain how the nonexpert practical reasoner can handle selection and competition in a nonarbitrary manner.²⁹⁵ That is, an extra-cameral proposal

testimony. A defense lawyer recently bragged about his technique of cross-examining plaintiffs' experts in tort cases. Notice that nothing in his strategy varies with the truthfulness of the expert testimony he tries to discredit.

Langbein, *supra* note 73, at 836. Langbein then quotes an article on trial strategy which reads:

"A mode of attack ripe with potential is to pursue a line of questions which, by their form and the jury's studied observation of the witness in response, will tend to cast the expert as a 'professional witness.' By proceeding in this way, the cross-examiner will reap the benefit of a community attitude, certain to be present among several of the jurors, that bias can be purchased, almost like a commodity."

Id. (quoting Joseph Ryan, Jr., *Making the Plaintiff's Expert Yours*, FOR DEF., Nov. 1982, at 12, 13) Langbein concludes:

Thus, the systematic incentive in our procedure to distort expertise leads to a systematic distrust and devaluation of expertise. Short of forbidding the use of experts altogether, we probably could not have designed a procedure better suited to minimize the influence of expertise.

Id.

292. Kenny notes: "[T]he adversary system does not fit well with the use of experts to assist the court. It leads to dangers that the experts will be more concerned to assist one or other party to win their case than to assist the court to arrive at the truth." Kenny, *supra* note 64, at 61.

293. *Id.* at 61-62. While Kenny's proposal is limited to judging the question whether a new discipline is a science, the basic problem he identifies affects competing testimony *within* acknowledged scientific fields no less than competing testimony about what is a science. (The former was arguably the situation, for example, in *Daubert*.) But that omission can be remedied, and other writers in the "extra-cameral" camp do so. Kenneth Culp Davis, for example, has proposed that Congress create "a research organization outside the [Supreme] Court to make studies at the Court's request," so that the Court could assign questions of legislative fact "to a qualified staff for a study or investigation." Kenneth Culp Davis, *Judicial, Legislative, and Administrative Lawmaking: A Proposed Research Service for the Supreme Court*, 71 MINN. L. REV. 1, 9, 15 (1986).

294. These include neutral commissions, such as Kenny proposes; special research services, and the like. See Kenny, *supra* note 64, at 61-62.

295. I discuss this criterion of arbitrariness further below. See *infra* Section VII A

like Kenny's would succeed only in relocating the competition among experts from within the courtroom, where the question is either whose testimony to *admit* and subsequently whose to *credit* among those whose testimony has been admitted, to some antechamber in which the question will be *who among the competing experts is to be appointed to the external commission?* What criteria will be used to select them, and how could this credential advance the process of reliable deference by a nonexpert to an expert? Without more, we have no reason to believe that courts (or, for that matter, legislatures) are more competent to make that judgment reliably than we have reason to believe that judges and juries can reliably defer to experts inside the courtroom.

C. *Point: The Four Possible Routes of Warranted Epistemic Deference by Nonexperts to Experts*

I have just canvassed a few epistemological accounts of testimony in general and a few accounts of epistemic deference to scientific experts in particular, but found little help in explaining how the nonexpert practical reasoner can handle the problems of selection and competition described above. I now change tack. I shall consider directly the four principal reasoning mechanisms that nonexperts, unpossessed of epistemic competence, seem forced to deploy when they defer epistemically to experts. One is the nonexpert's *epistemically substantive judgment* about the scientific evidence in question. A second is what we may call *general canons of rational evidentiary support*. A third is the expert's *demeanor*, either as he appears before the nonexpert in person or as indicated by such quasi-literary marks as the tone and authoritative style of written submissions to the court.²⁹⁶ The fourth is the expert's *credentials*. I shall consider these four methods in the order just listed.

1. *First Route: Substantive Second-Guessing in Practical Epistemic Deference*

Substantive second-guessing of the expert's judgment seems an unlikely route to rationally cogent epistemic deference. After all, the nonexpert turns to the expert precisely because the former does not have the substantive training, and consequent capacity for expert judgment, that the latter has. Indeed, the more a nonexpert relies on his own substantive assessment of scientific evidence, the less one can be said to *defer epistemically*. Though this method of nonexpert quasi-deference is thus odd to consider at all, I do so for

296. Not infrequently, expert "testimony" is offered in written form (for example through affidavits). This is especially likely to be true when the nonexpert judge, performing the *Daubert* "gatekeeping" function, is assessing the evidence in order to make the threshold decision about admissibility.

two reasons. One is that, on the model of epistemic deference developed earlier in this Article,²⁹⁷ nothing in principle rules out epistemic deference from epistemic equals or near-equals, so that nothing in principle prevents a suitably epistemically qualified practical reasoner from second-guessing the expert on the merits of his testimony. Such second-guessing does narrow the scope of the deference *as* deference, but on my account, deference is a matter of degree and not an all-or-nothing affair. Even so, considering this to be a mechanism of *practical epistemic deference* is still odd, because my stipulated concern is with the practical reasoner who is *not* epistemically competent in the scientific subject matter about which the expert testifies, even though the practical reasoner has decided that the subject matter of that testimony is rationally pertinent to a case before him and that information from the expert in that discipline is therefore worth hearing.

But there is a second reason for considering the “second-guessing” as an option for even the nonexpert practical reasoner in evaluating expert testimony: At least some prominent legal systems, including the American federal system, seem to *require* it or at least come asymptotically close to doing so. That is, they seem to require that the nonexpert judge *select* experts, “defer” to experts, or *choose* among competing experts, on the basis of an *epistemically substantive judgment* about the merits of an expert’s proffered testimony.

The Supreme Court’s *Daubert* opinion is a high-profile culprit here. Simply put, it instructs judges to make their own *independent* judgment about the scientific reliability of proffered expert scientific testimony. Recall that Judge Kozinski was the appellate judge from whose court the *Daubert* case went to the Supreme Court, and to whose court the case was remanded. His words are worth repeating:

[T]hough we are largely untrained in science and certainly no match for any of the witnesses whose testimony we are reviewing, it is our responsibility [according to the Supreme Court’s *Daubert* decision] to determine whether those experts’ proposed testimony amounts to “scientific knowledge,” constitutes “good science,” and was “derived by the scientific method.”²⁹⁸

To be sure, the Supreme Court’s *Daubert* opinion qualifies the task of the judge with the declaration that

[t]he inquiry envisioned by Rule 702 is, we emphasize, a flexible one. Its overarching subject is the scientific validity—and thus the evidentiary relevance and reliability—of the principles that underlie a proposed submission. The focus, of course, *must be solely on*

297. See *supra* Section III.C.

298. *Daubert v. Merrell Dow Pharms., Inc.*, 43 F.3d 1311, 1316 (9th Cir. 1995); see also *supra* notes 53-56 and accompanying text.

*principles and methodology, not on the conclusions that they generate.*²⁹⁹

The distinction between methodology and results of methodology is an important one. It is, for example, central to the model of scientific rationality presented by Laudan, on which I have relied in explicating the notion of axiological aims and point of view.³⁰⁰ Nevertheless, there are at least two reasons that an inquiry into methodology is no less epistemically demanding than an inquiry into the application thereof. First, in a significant percentage of cases, the boundary between methodology and application is indistinct. Second, even when the methodology is sharply distinguishable from its application, it is no less likely to be the *methodology* that presents the epistemically troublesome barrier to the nonexpert's comprehension than it is the theory that underwrites and motivates the methodology.

I take it, then, that a solution to the problems of selection and competition that counsels "make up your own mind, nonexpert" cannot be adequate. Indeed, because this is so obviously an unsatisfactory solution, it seems likely that many judges would be led to convert what is on the surface a substantive inquiry by nonexpert judges—as directed by *Daubert*—into a form of deference based on demeanor and credentials. This is predictable from the armchair, and there is evidence from the practice of courts that this has indeed been happening in at least some federal courts under the *Daubert* regime. Some courts have essentially converted the *Daubert* test into the old *Frye* test, which, in turn, rests on assessing the credibility of persons who have the "credential" of being members of the "scientific community."³⁰¹

2. *Second Route: Using General Canons of Rational Evidentiary Support*

Sometimes an expert's testimony is afflicted by a kind of rational incoherence that a nonexpert can discern even without training in the expert's field. One of the clearest examples is self-contradiction. Consider *People v. Palmer (Palmer II)*,³⁰² a criminal prosecution in which the state's expert medical witness was called to testify about whether the defendant, on trial for having stabbed his victim to death, was sane at the time of the stabbing. The medical expert testified that the bizarre behavior the defendant showed around

299. *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 594-95 (1993) (emphasis added) (footnote omitted).

300. See *supra* notes 143-158 and accompanying text.

301. See, e.g., *Zuchowicz v. United States*, 870 F. Supp. 15 (D. Conn. 1994); see also *Developments in the Law—Confronting the New Challenges of Scientific Evidence*, 108 HARV. L. REV. 1481, 1514 (1995) (discussing *Zuchowicz* and its application of *Daubert*). Although this may be within the spirit of *Daubert*, it is inconsistent with its letter, since *Daubert* expressly refused to make any one criterion of scientific reliability necessary and expressly allowed that the *Frye* criterion was a permissible one. See *supra* note 51 and accompanying text.

302. 543 N.E.2d 1106 (Ill. App. Ct. 1989).

the time of the stabbing was attributable to the defendant's faking his psychosis, that the defendant was "grossly psychotic" on the day of the stabbing, that the defendant "was able to distinguish right from wrong and could conform his conduct to the requirements of the law," and that the defendant "was not mentally ill."³⁰³ Reviewing this testimony, an Illinois appellate court held that the doctor's self-contradictory statements did not provide *any* evidence of the defendant's sanity.³⁰⁴

Self-contradiction in testimony, as in other assertions, is a hallmark of rational incoherence. It is not the only kind, however. Consider, for example, the events and legal proceedings leading to the Kentucky Supreme Court's decision in *Potter v. Eli Lilly & Co.*³⁰⁵ *Potter* arose from a former employee's shooting and killing or wounding of several of his coworkers. The employee had been taking the antidepressant drug Prozac, and the victims or their estates brought a products liability action against Eli Lilly, the drug's manufacturer. The precise issue at the trial was whether Prozac was unreasonably dangerous and defective and whether it *caused* the employee to kill or injure the plaintiffs.³⁰⁶ At trial there was a considerable amount of expert testimony about whether Prozac caused the defendant to commit the shootings. After hearing all the testimony, the jury decided for the defendant.³⁰⁷

A person who is not an expert in medicine or psychopharmacology, and who is called upon to assess expert testimony in a case like *Potter*, could, and indeed should, heed the distinction between a drug's *causing* certain behavior and that drug's *not preventing* that behavior, and impose a suitably heavy burden of proof on any expert's argument that does not respect that distinction or present an explanation in light of it.³⁰⁸ Similarly, one need not be an expert in psychiatry to discern the rational problem in the *Palmer II* expert's self-contradictory testimony, and the nonexpert court in that case properly discounted it severely. The avoidance of self-contradiction and the mindfulness of the distinction between causation and nonprevention are two examples of what we may call *general canons of rational evidentiary support*. One who is

303. *Id.* at 1107.

304. *See id.* at 1109. In an earlier ruling reached largely because of the weakness of the state expert's testimony, the Illinois appellate court that decided *Palmer II* had held that the defendant was not guilty by reason of insanity, thus overturning a jury verdict of guilty but insane. *See People v. Palmer (Palmer I)*, 487 N.E.2d 1154 (Ill. App. Ct. 1985). At issue before the appellate court in *Palmer II* was whether the Double Jeopardy Clause of the U.S. Constitution permitted Illinois to retry the defendant after the court's ruling in *Palmer I*. The court held that the state expert's self-contradictory testimony was so weak that the earlier ruling went to the *sufficiency*, and not merely to the weight of that testimony, and thus that the defendant could not be tried consistent with double jeopardy principles. *See Palmer II*, 543 N.E.2d at 1109.

305. 926 S.W.2d 449 (Ky. 1996).

306. *See id.* at 451.

307. The trial and appellate courts ultimately disposed of the case on the basis of a settlement the parties reached before the jury rendered its verdict. *See id.*

308. Jury deliberations are not reported, and there is no indication of the extent to which the jury relied on this distinction in deciding in favor of the manufacturer Eli Lilly.

not expert in a given discipline can sufficiently understand and use canons like this to assess expert testimony in an expert discipline.³⁰⁹ It is beyond this Article's scope to enter into detailed discussion of such canons, though such a discussion would, I think, be of considerable interest and value. Here, it is enough to identify the existence of such canons, with the two quick examples presented above, and consider the extent to which such canons might enable a nonexpert to evaluate expert testimony in a rationally cogent manner.

To answer that question, let us identify a spectrum along which there are varying degrees of *obscurity* in failures of rational evidentiary support. The obscurity of a message is in the ears of its hearer, and the obscurity with which I am concerned here is the obscurity *to* a nonexpert *of* the failure of rational coherence in an expert's testimony. At one end of the obscurity spectrum are those failures that are *least* obscure and are therefore *easiest* for a nonexpert to discern in an expert's testimony. At this end, or close to it, would be the expert's testimony in *Palmer II*—assuming that the nonexperts in that case readily understand (as they seem to) that a person cannot be both “grossly psychotic” and “sane” at the same time. At the other end of the spectrum are those failures that are *most* obscure, and are therefore *hardest* for a nonexpert to spot in an expert's testimony. Much closer to this end would be, for example, the testimony of Dr. Bruce Weir, a statistician and population geneticist who served as a prosecution expert witness in the O.J. Simpson case. In his original testimony, Weir gave the jury an analysis that failed to account for certain DNA characteristics in crucial blood samples, characteristics that were *possibly* but not *definitely* present in some of those samples.³¹⁰ The result of this error, as Weir later conceded under cross-examination, was that his analysis of the probabilities that various combinations of randomly selected individuals would have certain DNA types, was inaccurate and biased (in a probabilistic sense) against the defendant.³¹¹ It seems reasonable to regard this failing of probabilistic statistical analysis as a failing in the rational coherence of this expert's testimony, but it is a failing that would require a good deal of sophistication in the expert's field to discern.

With the spectrum identified, we can assess the question: In what percentage of cases is it likely that nonexperts will be able to evaluate rationally expert testimony by deploying general canons of rational evidentiary support? For at least three related reasons, I speculate (and do not claim greater certainty) that it is only a relatively small percentage. First, it seems likely that failures of rational coherence in an expert's testimony will most

309. Socrates—at least Plato's Socrates—deployed general canons of rational evidential support to question, challenge, and embarrass many of the “experts” he encountered in Athens. See PLATO, *The Apology*, in *THE LAST DAYS OF SOCRATES* 96 (H. Tredennick trans., 1969).

310. For discussion, see D.H. Kaye, *The DNA Chronicles: Bad Numbers, Good Lawyering, and a Better Procedure*, available in 1995 WL 564589.

311. See *id.*

often be closer to the *obscure* end of the spectrum than to the nonobscure end. *Palmer II* seems the unusual case; Weir's testimony in the Simpson case, the more usual. Second, and relatedly, many expert witnesses are repeat players in the "game" of giving expert testimony. It would not take long for word to get out to the trial bar about experts whose testimony has been so unartful as to appear to a nonexpert, nonobscurely, insufficient to satisfy general canons of rational evidentiary support. Indeed, one would hope that someone "qualified as an expert" by a court would know enough about the substance of her field not to render such testimony. Third, when the failure of the expert testimony does occur toward the more obscure end of the spectrum, it is left to a sufficiently tutored opposing counsel, perhaps aided by his own opposing expert, to point out the failing to the jury; this is precisely what happened with Weir's testimony. But the more obscure the expert's failure of rational coherence, the more comprehension of the expert discipline one must have in order to see that it *is* a failure. The nonexpert will thus be at a serious epistemic disadvantage in discerning such failures. This problem will be exacerbated in the many cases in which, unlike Weir, the expert *denies* that his testimony suffered from any failure of rational coherence. In those cases, the nonexpert will be little or no better off deploying general canons of rational evidentiary support than he would be in trying to make a substantive assessment of the expert's testimony. For, in such cases, it will be difficult for the nonexpert to judge *on the merits* whether there really is a failure of rational coherence, because it will require considerable information about the expert's discipline even to know whether there was such a failure, and this is precisely the kind of information the nonexpert is, by hypothesis, unlikely to have.³¹²

312. In most of my analysis, I assume for the sake of argument that experts are sincere and testify in good faith, but we should not wholly overlook those who are not. Consider the following speech, by an engineer who often served as an expert witness to other prospective expert witnesses, showing them the ropes:

The way I counteracted the thing, I used another technique. I used the technique as [sic] science as a foreign language. I made a statement to the attorney that absolutely nobody could understand. Now, what it amounts to, it's going to terminate the cross-examination, and it's going to terminate it in a hurry.

I want the jury to understand what I say when I feel there are certain conditions. Under direct examination, the jury understands everything that I say. Under cross-examination, there are some things I will allow the jury to understand and there are some things which I will not allow the jury to understand.

If you don't want the jury to understand something, then what you do is you answer the question precisely, you see. If somebody is working with a form of inertia, why I use a form of inertia. I say, "Do you mean the second bolt above the first bolt," you know. Just get into something which is a very precise way of saying something.

The interval of minus infinity to plus infinity of X times X , X^2 , and you know the—no one is going to be able to do much with that kind of thing.

And he says, "Can you simplify it?" You say, "See, there's too much simplification already. This is the only way that I can state it to you so there will be no misunderstanding."

Sanchez v. Black Bros. Co., 423 N.E.2d 1309, 1320 (Ill. App. Ct. 1981) (emphasis omitted) (determining that a trial court's refusal, during cross-examination of a manufacturer's expert witness, to permit questioning about this speech was reversible error).

3. *Third Route: Evaluating Demeanor in Practical Epistemic Deference*

As I discussed in Section V.B, several philosophers have remarked on the importance of a speaker's demeanor as an epistemic tool by which a hearer assesses and evaluates that speaker's testimony. Fricker makes the rebuttable presumption of sincerity on the part of a witness a centerpiece of her account.³¹³ Were Quine and Ullian to offer a more thoroughgoing account of testimony consistent with Quine's general epistemology (an ambition they seem to have in the joint work³¹⁴), they would surely argue that it is both possible and necessary for a language-learner to distinguish sincere assertions of belief by an expert from insincere ones. Hume, too, was sensitive to the dynamics of demeanor in his treatment of testimonially acquired KJB.³¹⁵

There is indeed a proper epistemic role for judgments of demeanor in the assessment of testimony, both expert and nonexpert. One might even go so far as to conclude that a hearer's capacity to assess accurately the demeanor of a witness is a necessary condition of the acquisition of KJB from that witness. The hearer should be able to discern whether the speaker is dissembling, and, when she is dissembling, the hearer will usually decline to endorse the testimony reported. Even when the hearer discerns that the speaker is dissembling, however, he need not reject her testimony, for it is possible that the prevaricating witness may bungle the effort to lie in a way that still allows the testimony to provide useful evidence.

But assessment of demeanor is unlikely to be accurate enough *in general* to provide a basis for an explanation of how a nonexpert can acquire KJB from an expert. Demeanor is an especially untrustworthy guide where there is what we might call a lucrative "market" for demeanor itself—demeanor has "traded" at high prices since the days of the sophists and finds exceptionally robust business in adversarial legal systems. When judges and juries use demeanor as a test for the credibility of expert evidence, they face this severe difficulty: Epistemic warrant and persuasiveness diverge, *especially* when the "persuadee" has too limited an epistemic capacity to be able to assess competently the epistemic warrant of testimony *independently* of the criteria that make an expert seem persuasive.

Demeanor is perhaps the chief of these criteria, as Aristotle explained.³¹⁶ He maintained that there are three principal means of persuasion—appeal to reason (*logos*), appeal to emotion (*pathos*), and appeal to the character of the speaker (*ethos*)—and that, of these three, *ethos was the most effective*, more

313. See Fricker, *supra* note 239.

314. See QUINE & ULLIAN, *supra* note 148, at 33–41.

315. See HUME, *supra* note 240, at 120 ("We entertain a suspicion concerning any matter of fact when the witnesses . . . deliver their testimony with hesitation or, on the contrary, with too violent asseverations.").

316. See ARISTOTLE, RHETORIC 75 (A. Jebb trans., Cambridge Univ. Press 1925).

effective than appeal to reason (not surprising, perhaps) or appeal to emotion (surprising, but the point does survive careful reflection). The demeanor of an expert witness is precisely what Aristotle referred to as the *ethos* of that "speaker." But as theorists of KJB, we have no reason to believe that an expert witness's persuasive demeanor has any particular connection to the epistemic warrant for what the witness asserts. This is the basic epistemic obstacle to the use of demeanor as a route to legitimate practical epistemic deference in legal systems (like the American) in which there is a market for demeanor. Judges, lawyers, and commentators are thoroughly aware that lawyers choose expert witnesses at least as much because they will appear to a jury to be competent as because (in the lawyer's judgment)³¹⁷ the experts actually are competent. A brief look at some of the actors in this market is instructive.³¹⁸

A 1967 survey of judges, lawyers, and doctors in the Los Angeles area found that "[o]ver three-quarters of the attorneys responding . . . indicated that some factor other than medical expertise—usually an impressive 'courtroom manner'—often determines the choice of an expert witness."³¹⁹ An article in a litigator's trade magazine describes the selection of experts as follows:

Usually, I like my expert to be around 50 years old, have some grey in his hair, wear a tweedy jacket and smoke a pipe

. . . .
You must recognize the jurors have prejudices, and you must try to anticipate those prejudices

*Some people may be geniuses, but because they lack training in speech and theater, they have great difficulty conveying their message to a jury.*³²⁰

Another trade magazine instructs that an expert witness must "exude confidence, create empathy, and seem and be completely sincere and convincing."³²¹ A law review article similarly notes that "the selection process involves more than securing an expert who will render a favorable opinion. The credibility and persuasiveness of an expert are equally important concerns."³²² Another author adds that "[t]he best expert is one . . . who

317. Notice that when the judgment of the lawyer is also nonexpert, as it often is, the lawyer may not even be in a good position to decide on substantive grounds which experts are in fact competent. That is, the lawyer's relative lack of epistemic competence compounds the problem of possible divergence between warranted assertion and persuasiveness.

318. I draw on material collected in Samuel R. Gross, *Expert Evidence*, 1991 WIS. L. REV. 1113, 1126-36. Similar materials are gathered in Langbein, *supra* note 73, at 835-41.

319. Note, *The Doctor in Court: Impartial Medical Testimony*, 40 S. CAL. L. REV. 728, 728-29 (1967). It is not clear whether the authors of the survey were attentive to lawyers' relative inability to judge the epistemic merits of experts' testimony.

320. Hyman Hillenbrand, *The Effective Use of Expert Witnesses*, BRIEF, Fall 1987, at 48, 49 (emphasis added).

321. Stephen E. Nagin, *Economic Experts in Antitrust Cases*, LITIGATION, Winter 1982, at 36, 37.

322. Thomas V. Harris, *A Practitioner's Guide to the Management and Use of Expert Witnesses in Washington Civil Litigation*, 3 U. PUGET SOUND L. REV. 159, 161 (1979).

has . . . qualities that give a certain 'glow' to an otherwise acceptable position. In fact, the best expert testimony in the world may be utterly useless unless it is presented by someone whose other attributes can add a ring of truth to it."³²³ Lawyers are of course being prudent when they choose experts who will favor their side *and* who will do so with convincing demeanor. But because, *ex hypothesi*, nonexpert factfinders do not have epistemic competence, they are not in an epistemic position to be convinced by substantive arguments—that is, they cannot be convinced by what Aristotle called the reason (*logos*) behind an expert judgment because they cannot understand those substantive arguments.³²⁴ In an adversarial setting, the criterion of being convincing to the nonexpert subordinates the criterion of being competent to produce accurate expert scientific judgments.³²⁵ My point here is not that the market for demeanor is biased in selection toward false or ignorant experts. Rather, I am suggesting that given what the market is selecting for (something that will convince jurors who are not competent to judge substantive scientific argument), there is no reason to believe that epistemic warrant has any particular connection with what chosen experts will say.

4. *Fourth Route: Evaluating Credentials*

Credentials (along with reputation, which I treat as a species of credentials) is probably the most important device relied upon by philosophers and jurists to explain how practical epistemic deference can yield KJB. Collectivist and extra-cameral accounts of epistemic deference share the assumption that nonexperts can use credentials to acquire KJB from experts. This same basic assumption also motivated the *Frye* rule, a rule that many evidence scholars still support. When coupled with a fairly accurate capacity to use an expert's demeanor as a guide to his sincerity, the nonexpert's judgment of credentials seems the most promising means by which to explain how a nonexpert can acquire KJB from an expert scientist.

I will now investigate this mechanism to see whether it is likely to produce KJB in a nonexpert. I assume for the purpose of this investigation that the epistemic device of credentials is coupled to that of demeanor, and that the nonexpert who uses demeanor "evidence" is a fairly accurate judge of when the expert is being sincere. The simple reason for these related assumptions is that if indiscernible prevarication were a habit among experts, credentialism alone would be incapable of generating KJB. By assuming that the credentialed

323. Albert Momjian, *Preserving Your Witness's Stellar Testimony: How To Qualify Your Expert to the Court*, FAM. ADVOC., Summer 1983, at 8, 8.

324. Cf. *supra* Section IV.A (discussing understanding and epistemic competence).

325. Samuel Gross makes a related but slightly different point: "The confident expert witness is less likely to have been chosen because she is right, than to have been chosen because she is confident whether or not she is right." Gross, *supra* note 318, at 1134.

expert is sincere and is accurately perceived as sincere by the nonexpert, I am able to consider credentialism as a potential route to KJB in the setting in which credentials are likely to be most helpful.

The use of credentials (assuming sincerity) as a route to practical epistemic deference has both strengths and weaknesses. I begin by mentioning some of the weaknesses and then setting these against the strengths. There are at least three closely related reasons that use of credentials seems unlikely to provide the nonexpert practical reasoner with KJB: regress, question begging, and underdetermination. These reasons are so closely related that traversing the path along any one of them soon leads to one or both of the others.

a. *The Regress Problem*

Regress can involve one or more of the *selection* problems, or one or more of the *competition* problems identified in Section IV.C. Recall that the selection problems are: (1) determining which of the intellectual enterprises that might yield expert testimony is a *science*; (2) determining who is a *scientist* capable of using her science in a manner that satisfies the standard of epistemic appraisal and the attendant level of confidence that the practical reasoner has established; (3) determining which of the intellectual enterprises that might yield expert testimony is a science that is *rationally pertinent* to the case; and (4) in cases in which there is significant doubt occasioned by task (3), determining who is capable of answering (3) in a way that can identify an expert scientific discipline capable of satisfying the chosen standard of epistemic appraisal and the attendant level of confidence. For the purposes of this discussion, it is not important to determine exactly which of these selection problems the nonexpert faces, for the regress problem can arise regarding each one (and several, though perhaps not all, combinations of them).

The basic problem of *competition* is how a nonexpert can rationally decide which of the competing experts (whose competition is intra-disciplinary or extra-disciplinary, actual or implied) to believe when the nonexpert is not competent to assess the substantive merits of the experts' competing arguments. When experts testify to contrary or contradictory propositions, the nonexpert must decide whom to believe on the scientific issue. But, *ex hypothesi*, the nonexpert does not have sufficient competence in the expert discipline to be able to make the choice on substantive grounds, so on what rational basis can the nonexpert make that choice?

A solution to these related problems commonly offered by both jurists and philosophers is to maintain that nonexperts can and do acquire KJB from experts by relying on *credentials*. Kenny's solution to the problem of expert

testimony, for example, is a kind of super-credentialism.³²⁶ Although Putnam and Hardwig are less explicit about it, their nonexpert epistemic communalists would presumably consult credentials to identify the "scientist" whose referential terms are to be deferred to (Putnam) or who is the expert to be accorded deference in the collective (Hardwig).³²⁷ This same basic approach underlies the *Frye* rule that *Daubert* displaced,³²⁸ and even after *Daubert* many federal and state courts have gravitated back to it.³²⁹ Typical of post-*Daubert* endorsement of *Frye*'s "credentialist" solution to the problem of expert evidence is this assertion by an evidence scholar:

Science is the only source of its own reliability. Anything less than complete deference to the weight of credible scientific opinion concerning the reliability of scientific evidence means going outside science—to the judge or jury . . . to resolve a scientific dispute. The resulting judgment cannot be scientific and therefore we cannot honestly speak of the evidence as having "scientific" reliability. . . .

. . . .
 . . . [T]he "real" issue is whether good scientists consider the evidence reliable at this time.³³⁰

These commentators argue that the more modest task that the credentialist solution sets for judges³³¹ is much better suited to their limited capacities to understand complex scientific evidence.³³² Whereas *Daubert* requires courts to judge whether some given evidence is scientifically reliable, what I call the "*Frye* solution" is to have judges ask whether scientists *think* that the evidence is reliable.

But *which* credentials indicate membership in the scientific community? An Ed.D.? A Th.D.? A Ph.D. from a correspondence school? A degree in "creation science"? Analogously, would a Ph.D. in philosophy from such an unlikely place as the University of Pittsburgh³³³ be worthy of respect were one looking for philosophical expert testimony?³³⁴ Clearly, in an age in

326. See Kenny, *supra* note 64, at 61-62.

327. See *supra* notes 273-286 and accompanying text.

328. See *supra* Section I.B.

329. *Daubert* made the *Frye* test one of its four factors of scientific reliability. Some federal courts have resuscitated the *Frye* test while ostensibly applying the *Daubert* rule, and many state courts have expressly rejected the *Daubert* rule and expressed continuing allegiance to the *Frye* test when applying state rules of evidence. See *Developments in the Law—Confronting the New Challenges of Scientific Evidence*, *supra* note 301, at 1514 n.40 (citing cases).

330. Milich, *supra* note 68, at 923-24 (emphasis added).

331. I say "judges" because at the stage of litigation to which *Frye* is relevant, the question is one of *admissibility*. Obviously, at a later litigative stage, factfinding juries can also rely on credentials in assessing the *weight* to be given to evidence that a judge has seen fit to admit.

332. See, e.g., Milich, *supra* note 68, at 918-20.

333. Most jurors presumably would give less weight to a degree from Pittsburgh than from, say, Harvard, since they would be ignorant of Pittsburgh's lofty reputation in philosophy.

334. Cf. *supra* note 60 (discussing a case in which philosophers' testimony was taken).

which formal credentials have significant market value in many different kinds of markets, the nonexpert needs guidance through the thicket of would-be experts, wannabe experts, and magic elixir mongers. Here, a new solution presents itself (actually, once again, it is the old solution relocated): Have the nonexpert judge or jury consult some kind of “meta-expert” (someone who is an expert *about* expertise in a given area) for a list or specification of the credentials that a nonexpert could reliably use to pick out competent experts in the scientific field. But then how can the nonexpert rationally identify the proper “meta-experts”? On what basis is the nonexpert to identify those meta-experts who have KJB *about* the proper credentials? Must not the nonexpert rely on credentials (including reputation) to identify the appropriate meta-experts as well?

Thus, it seems that the “*Frye* solution”—ask those with the credentials of science whether an expert has the credentials of science—threatens to slide into an epistemically unworkable regress. Using credentials only pushes the inquiry back a step without resolving the basic problem. If nonexpert judges and juries are not competent to judge the content of expert information, how are they going to be competent to judge credentials of those who would give expert information? If the answer is to ask credentialed “meta-experts” what the proper credentials are, the regress has begun. Yet the “*Frye* solution,” so common in one form or another in analyses by jurists and philosophers, cannot let the regress slide on infinitely *if* these analysts truly intend to explain how the nonexpert’s use of credentials can serve as a *possible* or *actual* means of acquiring KJB from an expert. Nonexperts certainly cannot indefinitely continue to ask expert after expert about proper credentials. Somehow, the regress must be stopped.

b. *The Question-Begging Problem*

Can the nonexpert stop the regress without vicious question begging? In many—I do not say all—cases, credentials will be of little help, for they will either reproduce the problem (leading to regress) or cause the nonexpert to settle on one competing expert without having a good reason (thereby begging the question). We have seen how the credentializing solution (like the *Frye* solution) can lead to regress. Such a solution can also lead to question begging, as the following example indicates.

*McLean v. Arkansas Board of Education*³³⁵ was one of the early federal creation science cases dealing with the constitutional merits of a statute that mandated equal classroom time for evolution and “scientific creationism.” Relying on expert testimony, the district judge concluded that “scientific creationism” could not pass muster under the Establishment Clause because *it*

335. 529 F. Supp. 1255 (E.D. Ark. 1982), *aff’d*, 723 F.2d 45 (8th Cir. 1983).

was *not science* but a religious doctrine that public schools could not promulgate. But assuming that the judge was not an expert on science (or, for that matter, philosophy or religion), whom should he have asked about the identity of the appropriate scientific expert on whether creation science is real science—a creation scientist or a Darwinian? Either answer begs the question.³³⁶ Moreover, to make matters at the very least somewhat more difficult for the nonexpert, “creation scientists” are quite careful to proclaim their own credentials *as scientists*. Indeed, the very use of the terms ‘creation science’ and ‘Christian science’ are efforts at establishing credentials. Philip Kitcher criticizes creation scientists for just this kind of “credential mongering”:

Creationist claims about credentials look better when presented in soft focus. . . . On closer inspection, the “21 scientists who believe in Creation” [listed in a creationist publication] hardly constitute a distinguished panel of experts on the origins of life: three hold doctorates in education; two are theologians; five are engineers; there is one physicist, one chemist, a hydrologist . . . one entomologist, one psycholinguist, and someone who holds a doctorate in Food Science Technology; finally, there are two biochemists . . . an ecologist, a physiologist, and a geophysicist. While the last five may have some expertise in related areas, the credentials of the others are utterly irrelevant to many of the questions Creationists address. The “authority” of these men should not convince us that there is a scientifically reputable alternative to a major *biological* theory. The word of just any “scientist” is not enough. I am prepared to bet that Creationists, like the rest of us, take care to consult the *appropriate* experts. I doubt that they take their sick children to the vet.³³⁷

One ought to concede to Kitcher that it would be far too quick a skepticism to conclude from the possible fact of disagreement that no one can ever know the truth of the matter or have decisively good reasons that overcome other reasons, and I do *not* draw that conclusion here. That is, nothing in my argument denies that there are good, or even decisive, arguments on such questions as whether creation science is “real” science.

But my current concern is not whether there are compelling arguments—*expert* arguments such as might be made by a philosopher of

336. Of course, there are versions of this dilemma that pit traditional science (the science of “established” universities and learned societies) against “nontraditional” science more directly. There are cases in the American courts, for example, dealing with the desire of Christian Scientist parents not to allow their gravely ill children to receive conventional medical care. See, e.g., *Newmark v. Williams*, 588 A.2d 1108 (Del. 1990). These cases turn in part on whether the child is actually receiving adequate medical care. Whom should the judge ask about whether Christian Science healing methods have due regard for the traditional medical facts, or indeed whether the traditional medical facts are the only relevant facts to be known—the Christian Scientist or a member of the traditional medical establishment?

337. PHILIP KITCHER, *ABUSING SCIENCE: THE CASE AGAINST CREATIONISM* 179 (1982).

science—for the view that creationism is only ersatz science. Rather, my concern is with a nonexpert's epistemic capacity to use credentials as a rationally warranted means of resolving that debate. Kitcher himself helps to make my point on this separate question. After offering the remarks quoted above, Kitcher argues that “the crucial issue is not whether some people who possess doctoral degrees *say* that there is a case for Creationism, but whether they are *right* in saying so. To settle that issue, it is wiser to look at the evidence itself.”³³⁸ Very well, but now we have come full circle, for looking at the *nontestimonial* evidence to decide who, among competing “credentialed” experts is right, is *precisely* what the nonexpert is incapable of doing. From the point of view of the nonexpert, relying on Kitcher or Stephen Jay Gould as experts is no less question begging than relying on “Dr. Henry Morris” who proclaims himself to be “recognized as one of America’s greatest authorities on scientific creationism,” who is “[a]rmed with three earned degrees (including a Ph.D.) in the sciences,” and who “served as department head or professor at four famous institutions, Louisiana University, the University of Minnesota, Rice University, and Virginia Polytechnic Institute.”³³⁹ My only contention is that nonexperts are not in a position to judge *who* is in a position to judge such matters without begging the question. Whether such question begging is vicious, harmless, or even virtuous, awaits discussion of the role of nonarbitrariness as a practical aim governing the legal reasoner’s epistemic deference to experts.³⁴⁰ I should also hasten to add that, though my example may be an unusual one, it is actually not unrepresentative of the kind of epistemic predicament in which the nonexpert practical reasoner typically finds himself.³⁴¹

338. *Id.*

339. HENRY M. MORRIS, *THE REMARKABLE BIRTH OF PLANET EARTH* at back cover (1972), quoted in KITCHER, *supra* note 337, at 178-79.

340. See *infra* Part VII.

341. One example (and there are many like it) is found in the following case, which addressed the same issue as in *Daubert*, namely whether Bendectin could cause birth defects:

Have the plaintiffs established by a preponderance of the evidence that ingestion of Bendectin at therapeutic doses during the period of fetal organogenesis is a proximate cause [i.e. does it in a natural and continuous sequence produce injuries that would not have otherwise occurred] of human birth defects? . . . The jury unanimously answered no. Judge Rubin denied a post-trial motion for j.n.o.v. by the plaintiffs because “[b]oth sides presented testimony of eminently qualified and highly credible experts who differed in regard to the safety of Bendectin.” The great weight of scientific opinion, as is evidenced by the FDA committee results, sides with the view that Bendectin use does not increase the risk of having a child with birth defects. Sailing against the prevailing scientific breeze is the DeLucas’ expert Dr. Alan Done, formerly a Professor of Pharmacology and Pediatrics at Wayne State University School of Medicine, who continues to hold fast to his position that Bendectin is a teratogen. In spite of his impressive curriculum vitae, Dr. Done’s opinion on this subject has been rejected as inadmissible by several courts.

DeLuca v. Merrell Dow Pharms., Inc., 911 F.2d 941, 945-46 (3d Cir. 1990) (citations omitted). In a footnote, the court added:

Dr. Done served as a Special Assistant to the Director for Pediatric Pharmacology of the FDA’s Bureau of Drugs from 1971 to 1975. In this role, Done aided in the provision “of FDA input on research involving children and fetuses, and development of guidelines for pre-clinical safety

c. *The Underdetermination Problem*

It is really underdetermination that gives rise to both the problem of regress and the problem of question begging rehearsed above. Underdetermination creates a difficulty for credentialist approaches to explaining the legitimacy of epistemic deference to experts: When the credentials of the experts are, to the eyes of the nonexpert, evenly matched *for all the nonexpert justifiably believes*—that is, when they underdetermine the credibility of the competing witnesses—it is very difficult to see how credentials could provide an epistemically legitimate method the nonexpert can use to resolve selection and competition problems.

D. *Counterpoint: The Anti-Skeptical Response and the Dialectical Impasse*

The foregoing skeptical considerations,³⁴² however, may seem too quick, too cheap, too thin. It is unduly skeptical to deny that nonexperts can *ever* use credentials as a tool to acquire KJB on the basis of epistemic deference. Surely, even nonexperts can judge credentials well enough to handle what might be called the *crank factor*,³⁴³ also familiarly recognized as the Flat

evaluations of drugs for use in children and in pregnancy” He also participated in publishing a paper called “General Guidelines for the Evaluation of Drugs to be Approved for Use during Pregnancy and for the Treatment of Infants and Children,” in conjunction with the American Academy of Pediatrics in 1974. Dr. Done’s opinion that Bendectin is a teratogen largely rests on inferences he draws from epidemiological data, most of which he contends are the same that was utilized by the experts, including the FDA committee, to whom Merrell Dow cites to bolster its contention that Bendectin does not cause birth defects.” The principal difference is that Dr. Done analyzes that data using an approach, advocated by Professor Kenneth Rothman of the University of Massachusetts Medical School, that places diminished weight on so-called “significance testing.”

Id. at 946 n.7 (citations omitted); cf. K.J. Rothman, *A Show of Confidence*, 300 NEW ENG. J. MED. 1362 (1978) (arguing that significance testing is misleading).

342. Concerns about regress, question begging, and underdetermination are present in ancient skeptical (specifically, Pyrrhorean) challenges to the claim that we can know anything. See JULIUS ANNAS & JONATHAN BARNES, *THE MODES OF SKEPTICISM* 19-30 (1985) (discussing “ten modes” of Aenesidemus).

343. Judge Posner described the crank factor with typically unvarnished asseveration:

[The witness’ testimony was] either [that] of a crank or, what is more likely, of a man who is making a career out of testifying for plaintiffs in automobile accident cases in which a door may have opened; at the time of trial he was involved in 10 such cases. His testimony illustrates the age-old problem of expert witnesses who are “often the mere paid advocates or partisans of those who employ and pay them, as much so as the attorneys who conduct the suit. There is hardly anything, not palpably absurd on its face, that cannot now be proved by some so-called ‘experts.’”

Chaulk v. Volkswagen of Am., Inc., 808 F.2d 639, 644 (7th Cir. 1986) (Posner, J., dissenting) (quoting *Keegan v. Minneapolis & St. L.R.R.*, 78 N.W. 965, 966 (Minn. 1899)). One can be forgiven for wondering to what extent Posner’s view is driven not so much by a concern for the expert witness’s epistemic competence as by a strong disagreement with the expert over the normative attractiveness of the expert’s views:

It is not the law, in Wisconsin or anywhere else, that the standard of care is set by the designers of \$60,000 automobiles, so that the omission of any safety device found in such automobiles is negligent. . . . The buyer of a Mercedes 560 may be willing to pay extra for minuscule, perhaps wholly theoretical, improvements in safety, but such a buyer’s willingness to buy the ultimate refinement in safety technology does not define the standard of care for the whole

Earth Society phenomenon. Presumably the admission of crank science is, after all, what *Daubert* seeks to reduce by having the trial court judge play a “gatekeeping” role, using his assessment of scientific reliability as a criterion of admissibility. The skeptic, however, will insist in response: But how often can a nonexpert *justifiably* dismiss an expert’s credentials as cranky? Even if the nonexpert’s use of credentials could help weed out cranks by weeding out egregiously uncredentialed putative experts, in a great many cases the credentials of experts will remain—to the eyes of the nonexpert—evenly matched.

Let us suppose with the anti-skeptic that there is an epistemically valuable role for credentials in a nonexpert’s assessment of expert testimony. What might that role be? Coady provides a modest and reasonable answer:

We have certifying bodies and institutions and their various certificates and, typically, the courts require that the [expert] witness be shown to have some relevant certification from such bodies. Doubt can arise, of course, about the credentials of supposedly expert institutions . . . but usually the courts do not doubt such credentials. Were they to require for every such certifying body some proof of its credentials, it is hard to see what could be forthcoming, other than more of the same.³⁴⁴

Universities, colleges, and scholarly associations are the leading examples of “certifying institutions” that play the credentialing role. Certainly in our everyday lives and work we make many judgments on the basis of credentials from these institutions. And certainly many feel that this manner of credentialism works fairly well in those spheres. Our teeth get their cavities replaced; our computers get their hard drives fixed (and built in the first place) and run programs that perform wonders—wonders verifiable to all but Cartesian skeptics; our microwave ovens verifiably cook food in very few seconds; our cars and planes verifiably carry us at high speeds or altitudes; our home entertainment systems verifiably deliver larger and larger sights and sounds from smaller and smaller systems of audio and visual information. We are aware, indeed, too often reminded, that behind each technological miracle stands a network of credentialed inventors, technicians, and theorists. All of this is powerful evidence that something is not rotten in the world of credentialed epistemic authorities.

industry.

Id. at 644–45. This is perhaps another instance in which the borderline demarcating the expert’s zone of competence is blurry and in need of policing. It is also relevant to the question of underdetermination to note that the *Chaulk* majority characterized the expert as “an engineer with expertise in automobile safety.” *Id.* at 642.

344. COADY, *supra* note 185, at 282.

Still, questions remain. Coady frankly acknowledges one problem with such certifying institutions—their “inbuilt tendencies towards intellectual conservatism and towards the monopolization of social control over knowledge conceived of as a kind of commodity.”³⁴⁵ That is certainly an important problem, assuming that commodified monopolization of this sort has an epistemically distorting effect, as it surely can. (It is in effect a problem of competition, either intra- or extra-disciplinary, actual or implied.) How is the nonexpert to become aware of, or resolve, this particular problem of competition? Coady offers little in the way of a persuasive answer. He suggests that “the courts should give initial credence to the verdicts of such bodies as universities on the issue of bogus science, though they should be *prepared to hear argument about the matter if it can be produced.*”³⁴⁶ But what kind of argument should they be prepared to hear, and how would they assess it if they heard it? What is Coady supposing the nonexpert *can* do in making such an appraisal—that she can do a *better* job of adjudicating between competing experts (including would-be monopolists and those seeking to raise the barriers to epistemic entry) than the experts themselves can do?³⁴⁷ As long as judges and juries lack epistemic competence, what reason do we have to believe that they will be able to make a justified judgment about the arguments they are “prepared to hear” that contravene the judgments of the certified experts?

Before moving on, let me sum up the problems that remain for credentialism as a proposal for solving the related problems of selection, competition, and underdetermination. Coady’s solution is to have nonexperts give *prima facie* weight to credentials—principally, memberships in reputable universities and learned societies. This solution could work only if the weight of credentials is clearly on one side; but often the nonexpert justifiably believes that credentials are not so clearly weighted. The underdetermination difficulty with credentials is that when the jury hears contradictory testimony from two experts who seem to have even credentials, these credentials cannot yield even *prima facie* weight. Coady argues that we can endow credentials with *prima facie* weight by stamping them with the imprimatur of a leading university or learned society. Three problems remain for this suggestion. First, it brings back the related regress and question-begging problems: Being a famous university in general is not the same as being a leading university in a particular field (the University of California at San Francisco may not be a “leading university,” but, we are *told*, it is a leading center for medical research). We can construct an analogy of proportion—UCSF : medical research :: University of Pittsburgh : philosophical research. Indeed, many such examples can be

345. *Id.* at 286.

346. *Id.* at 287 (emphasis added).

347. I considered a very similar question in connection with *Daubert*, see *supra* Section I.B, and at the beginning of this Article, see *supra* note 1 and accompanying text.

found. In order for the nonexpert to find out which institutions were "leading" in the proper way, she would have to find an expert already endorsed by one, thus either begging the question or regressing. Another problem lingers even after the credentialist solution. It is not clear how that purported solution can handle cases of *intra-disciplinary* competition of credentialed experts. Such competition occurs when two sets of witnesses who purport to be expert in the same area (e.g., statistics, economics, genetics, epidemiology) *and* whose credentials are evenly matched testify to contradictory or inconsistent propositions. Nor is it clear how credentialism can handle cases of *extra-disciplinary* competition of credentialed experts. This type of competition occurs when two sets of witnesses who do *not* purport to be expert in the same area, but whose credentials are evenly matched, offer testimony that is in some way mutually undermining. Kenny provides a charming example, arguing that the concept of the "irresistible impulse," brought into the criminal law by expert psychiatric testimony, is philosophically incoherent and thus unworthy of any serious credence in a courtroom:

The only remedy for this state of affairs will presumably be for the prosecution to call a philosopher to testify that there cannot be any such thing as an irresistible impulse, and therefore the accused cannot have acted on one, any more than he can have murdered a married bachelor or stolen a square circle. The desperate nature of this proposal will, I hope, bring home vividly the indefensibility of the present state of the law.³⁴⁸

And if Kenny, as credentialed as he is in the academic world, can lob such extra-disciplinary firebombs at psychiatry, imagine what the inarguably well-credentialed Paul Feyerabend and Richard Rorty of the world could do to challenge the KJB-producing capacities of physics, biology, and mathematics, were their expert testimony admitted in a trial. Extra-disciplinary challengers like these well-credentialed scholars might not be correct on the merits, but one must wonder how a nonexpert, using the credentials of academic prestige as her guide, could make a justified judgment to reject their arguments. (This kind of competitive testimony would, for the most part, have to be implied, since such testimony is rarely admitted. But is it *justifiably* excluded by a nonexpert judge?)

We reach a dialectical impasse, an aporia—our escape blocked by opposing educated intuitions. On one side is the intuition that credentials *must* be sufficient to enable KJB to arise from practical epistemic deference. On the other side is the (to my mind) equally strong philosophical "intuition" that without epistemic competence, credentials quickly crumble under scrutiny into a pile of regressive, question-begging, underdeterminative heaps of unjustified

348. Kenny, *supra* note 64, at 56.

belief. The way through this impasse, I suggest, is by studying with meticulous care, and *rationaly reconstructing*, the step-by-step reasoning process a nonexpert judge or juror must use in order to assess expert scientific testimony in the course of reaching a conclusion in a legal dispute. As we shall see, the inference process known as *abduction* plays a critical role in that reasoning process. And it is some crucial features of abductive inference that will lead us out of the impasse I have identified. I turn, then, to present a model of the reasoning process the nonexpert uses to assess expert testimony, explaining the role of abduction along the way.

VI. BREAKING THROUGH THE DIALECTICAL IMPASSE: A MODEL OF RATIONAL EPISTEMIC DEFERENCE TO EXPERTS

I shall begin with some preliminaries. As I discussed above,³⁴⁹ I assume that there is a useful distinction to be made between practical and theoretical reasoning and between the practical and theoretical points of view from which that reasoning proceeds. In light of that assumption, I argue that there are two distinct kinds of “practical priority” involved in practical epistemic deference. Relying on a simple model of the practical syllogism, I refer to one kind of practical priority as “major premise” practical priority and to the other as “minor premise” practical priority.

Major premise practical priority is a direct result of—perhaps even just another way of expressing—the familiar view that one cannot “derive an ought from an is,” that in any valid practical syllogism, the set of propositions from which a prescriptive conclusion is inferred must contain at least one prescriptive premise that logically subsumes the subject of the prescriptive conclusion. *Minor premise practical priority* is less noticed, though not deservedly so. When a nonexpert practical reasoner solicits the view of a theoretical expert in the course of making a practical decision, the minor premise of the practical syllogism is actually the *conclusion of a distinct syllogism*; it is the conclusion of an independent chain of reasoning by the practical reasoner *about* the theoretical reasoning offered by the expert, which functions as a lemma for the principal syllogism.

A. The Concept of “Practical Priority”

There are necessary limits to practical epistemic deference, even when the nonexpert expressly seeks the guidance of the theoretical expert. The explanation of “practical priority” in two premises of the standard practical syllogism will bring out two of the most significant limits. According to a standard model, adequate for my purposes here, the practical syllogism

349. See *supra* Section II.C.

contains two types of proposition: prescriptive propositions, and “descriptive” or “theoretical” ones. Thus, the standard pattern for practical reasoning has the following form:

Major premise: universal prescriptive proposition.

Minor premise: singular theoretical proposition.

Conclusion: singular prescriptive proposition.³⁵⁰

Slightly less abstract, a typical “legal syllogism” has this idealized form:

(1) All thieves ought to be hanged.

(2) Jones is a thief.

Therefore,

(3) Jones ought to be hanged.³⁵¹

I am interested in practical reasoning in cases in which the second premise of the practical syllogism is a *theoretical* proposition that is capable of being established by expert theoretical methods, such as those of science.

“Practical priority” refers to a simple feature of the practical syllogism, that the major premise of any practical syllogism is a prescriptive practical proposition. The major practical premise is “prior” to the minor theoretical premise in that it determines the type of theoretical proposition that is relevant for the purposes of making a practical judgment. The story could of course become more complex if one sought to reflect in the schema for the practical syllogism the possible occurrence of “thick concepts” like *theft*, *courage*, *murder*, and the like.³⁵² Philosophers most often recognize one type of

350. The analysis of practical reasoning could become more complicated than the simple syllogism in the text reflects were one to reflect in the model of practical reasoning the complete structure of singular propositions. Classical categorical syllogistic logic calls for special treatment of singular propositions (e.g., “Socrates is a man”). On the one hand, as Immanuel Kant observed, “Logicians are justified in saying that, in the employment of judgments in syllogisms, singular judgments can be treated like those that are universal.” IMMANUEL KANT, *CRITIQUE OF PURE REASON* 107 (Norman Kemp Smith trans., Macmillan 1965) (1781). On the other hand, such a treatment, while reflecting the universality of the singular proposition (by treating the subject term as a unit class), runs the risk of overlooking the singular proposition’s existential import (i.e., the proposition’s assertion that the unit class is not empty). One solution is to treat the singular proposition as the conjunction of a universal affirmative (e.g., “All men are mortal”) and a particular affirmative (e.g., “Some men are mortal”). See IRVING M. COPI & CARL COHEN, *INTRODUCTION TO LOGIC* 412-14 (9th ed. 1994).

Note also that, according to many philosophers, defeasibility is a feature of every practical syllogism. Although defeasibility is not reflected in the simple practical syllogism above, I do account for it in the model of practical epistemic deference presented below. See, e.g., *infra* Subsection VI.C.3 (describing steps (7) and (8) in my model).

351. For discussion of this form of the practical syllogism (using an example very similar to this one), see GEORG HENRIK VON WRIGHT, *THE VARIETIES OF GOODNESS* 162 (1963). Other forms of the practical syllogism are possible. See, e.g., ROBERT AUDI, *PRACTICAL REASONING* 17-24 (1989); RAZ, *PRACTICAL REASON*, *supra* note 132, at 17-24; VON WRIGHT, *supra*, at 160-71. I believe, however, that this one will suffice for my purposes here.

352. For example, in the syllogism above, premise (2) might be considered either theoretical or prescriptive, depending on one’s account of thick practical concepts. I am inclined to think that thick practical propositions, like (2), contain two separable components, one prescriptive and one theoretical. That

practical priority—what I refer to here as “major premise” practical priority—when they endorse the view that one cannot make a valid inference to a particular prescriptive proposition unless somewhere in the set of premises there appears a prescriptive proposition that logically subsumes the particular. The claim of major premise practical priority really amounts to no more than the much discussed claims that one cannot “derive an ought from an is” and that there is a fundamental metaphysical distinction between fact and value, and I do not dwell on it here. Instead, I turn to the feature of the basic practical syllogism that has not been much remarked, but is of vital importance for understanding practical-theoretical deference.

B. “Practical Priority” in the Minor Premise of a Practical Syllogism

The foregoing section discussed practical priority in the major premise. There is yet another location of practical priority in practical reasoning. I refer to it as “practical priority in the minor premise,” but that is only partially accurate. The fuller and more accurate claim is that when a practical reasoner deploys a practical syllogism, the minor premise *necessarily* serves as *both* the minor premise of one argument *and* the *conclusion of a distinct argument*. I shall refer to these arguments as “primary” and “secondary,” respectively.

Consider the following argument, whose three steps constitute what I am calling a “primary” argument:

- (1) This jurisdiction must convict all and only the persons who commit crime X (major premise).³⁵³
 - (2) Jones committed crime X (minor premise).
- Therefore,
- (3) This jurisdiction must convict Jones.³⁵⁴

debate, however, is beyond the scope of this Article. For discussion of thick *ethical* concepts, see BERNARD WILLIAMS, *ETHICS AND THE LIMITS OF PHILOSOPHY* 128-31 (1985). With obvious minor changes, Williams's account can be extended beyond the realm of ethics to that of practical reasoning generally.

353. Obviously this is highly idealized. It is possible that there is no actual legal system that even *aspires* to this degree of accuracy, much less one that achieves it. It is accepted, and probably inevitable, that rules of criminal substance and procedure are both overinclusive and underinclusive, as measured by their background justifications. See P.S. ATIYAH & ROBERT S. SUMMERS, *FORM AND SUBSTANCE IN ANGLO-AMERICAN LAW: A COMPARATIVE STUDY OF LEGAL REASONING, LEGAL THEORY, AND LEGAL INSTITUTIONS* 70-95 (1987); FREDERICK SCHAUER, *PLAYING BY THE RULES: A PHILOSOPHICAL EXAMINATION OF RULE-BASED DECISION-MAKING IN LAW AND IN LIFE* 31-34 (1991). In the United States, when the crime in question is a capital crime, there is under Supreme Court doctrine a demand for “heightened reliability” in the process of assessing guilt and making the decision to mete out the “ultimate punishment.” But even heightened reliability is not thought by advocates of capital punishment to require *absolute* reliability in determining who actually committed a capital crime. Some of these advocates acknowledge that some mistakes will be made, with the result that the state will execute (and has executed) some innocent people. But, these advocates argue, overinclusiveness and underinclusiveness is a necessary feature of all rules, and capital punishment is desirable enough that we should tolerate this slippage. Some even argue for an analogy: The innocent executed are like civilian casualties in a “just war.”

354. I assume for the sake of argument either that the predicate of the crime (e.g., “murder”) is not a thick practical concept, or, if it is one, that it can be broken down into prescriptive and descriptive

The warrant for premise (1) is practical, since it states a rule that prescribes conduct, in this case, the conduct of the legal system in a given jurisdiction. A proposition like (3) cannot be derived by valid rules of inference from a proposition like (2) alone (at least when construing (2) as a descriptive proposition³⁵⁵); some prescriptive proposition like (1) is needed to make the inference to (3) valid. In this sense, (1), the major premise of this practical syllogism, is *logically prior* to (2) in the resulting valid syllogism (although of course the placement of (1) and (2) vis-à-vis each other in the set of premises from which (3) is inferred is a matter of logical indifference). I have referred to this phenomenon of the logic of practical reasoning as “major premise practical priority,” in which the practical major premise is logically prior to the minor theoretical (descriptive) premise.

Now I want to focus on premise (2). I argue that when a theoretical premise enters a practical syllogism of the sort previously illustrated (let us call this the “primary argument”), it is always itself the *conclusion* of an independent argument (let us call this the “secondary argument”). That is, (2) serves double duty in a pair of nested syllogisms. At the “top” of that independent, secondary argument is an additional *practical* premise. Put the same point another way: Every theoretical premise in a *primary* practical syllogism is, as it were, the conclusion of a *secondary* syllogism in which there is also practical priority. This is the phenomenon I will refer to as “minor premise practical priority.”

Whether or not the practical reasoner is seeking to solicit instruction from—and to defer epistemically to—a theoretical expert, this separate syllogism is always enthymematically presupposed by the overall practical syllogism. In most discussions of the practical syllogism, this separate syllogism is left wholly enthymematic.³⁵⁶ It is the separate argument that requires several distinct but closely related judgments that the practical reasoner must make in order to endorse as true the theoretical, descriptive judgment that will serve as the minor premise of the primary syllogism. These distinct judgments are reflected in the premises of the secondary argument, which concludes with the theoretical judgment. Among these closely related judgments reflected in the secondary argument, two are especially significant:

components (including a descriptive component like “killed the victim” and a prescriptive component like “killed the victim without adequate justification”), and that the theoretical judgment is a judgment about whether the defendant’s action satisfied the criteria of the descriptive predicate.

355. See *supra* note 352 and accompanying text (discussing how I would handle the kinds of “thick” practical concept-terms that occur in many authoritative legal norms, such as “murder,” “theft,” “assault,” and “negligence”).

356. Extending tradition, we might call it an enthymeme of the “fourth order.” Some writers distinguish “orders” of enthymeme according to which line of the syllogism is unexpressed: “first-order” if the major premise is unexpressed, “second-order” if the minor, and “third-order” if the conclusion. COPI & COHEN, *supra* note 350, at 294-95. I suggest “enthymeme of the fourth order” to reflect the fact that in most rational reconstructions of the practical syllogism, the only step in the argument that is *included* is the conclusion of the secondary argument.

a judgment about the level of epistemic confidence the practical reasoner requires for her ultimate practical purposes (the purposes that guide the *primary* argument); and a judgment about *whether* and *how* the epistemic method on which the practical reasoner has chosen to rely (e.g., her own perception, memory and inference, or expert testimony) meets the required level of confidence.

This is quite abstract, and I shall explain it with several examples. I shall begin by pointing out that the judgment that a practical reasoner must make about the proper level of confidence required to arrive at the conclusion of the secondary argument, which then serves as the minor premise of the primary practical syllogism, is familiar in legal systems. Indeed, such systems have elaborate evidentiary and procedural rules to guide legal decisionmakers in making such judgments. The rules of what I have referred to as the "law's epistemology" (rules governing admissibility, relevance, materiality, testimony, documentation, hearsay, and judicial notice),³⁵⁷ as exemplified in *Brown*³⁵⁸ and *Daubert*,³⁵⁹ are concerned with guiding judges and juries, and guiding judges in the guiding of juries and other factfinders, in making these decisions. In effect, these rules require the nonexpert practical legal reasoner to *proceduralize his caution* about any theoretical claim about the world, including any scientific claim, that is offered as a "candidate" for the minor premise of the primary practical syllogism. Guided by the norms of legal epistemology, the practical reasoner recognizes a practical obligation to be cautious about scientific claims (indeed, about all expert claims). The caution mandated by these norms is, as it were, *institutionalized* by procedural rules that operate as *presumptions* against accepting scientific (and other) theoretical claims in the course of applying a law to a person.

One might sum up the suggestion I am making here about the institutionalized and proceduralized caution with which a practical reasoner approaches theoretical claims as follows: What the facts are from a *legal* point of view is not necessarily what the facts are from a scientific point of view.³⁶⁰ This is the basic idea of "minor premise practical priority." The idea that one should view facts as relative to the point of view in which facts are assessed might seem to reinforce or at least cohere well with arguments, which have some currency in both philosophical and legal scholarship, that "facts are purpose-relative."³⁶¹ With some such idea in mind, one might be inclined to distinguish "scientific facts," facts that are relevant for scientific purposes, from "legal facts" (or "practical facts"), facts that are relevant for legal

357. See *supra* Section I.A.

358. *Brown v. Board of Educ.*, 347 U.S. 483 (1954); see *supra* Section I.C.

359. *Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579 (1993); see *supra* Section I.B.

360. Again, this is a familiar feature of legal systems in which it is perfectly coherent to say both that Jones *actually committed* criminal act X but is not *legally guilty* of having committed act X.

361. See, e.g., HILARY PUTNAM, REASON, TRUTH AND HISTORY 127-49 (1981).

purposes (or other practical purposes). But here we must be careful, for some of the “relativistic” theories, to which my own claim here might be likened, are quite metaphysically suspect. Three more precise claims might be advanced by the vaguer assertion that “facts are purpose-relative”: (1) different facts are *salient* from different points of view; (2) facts are *actually different* from different points of view; and (3) from different points of view, different levels of confidence (and possibly also different standards of epistemic appraisal) are required to conclude that a putative fact is an actual fact.

Claim (1) seems uncontroversial and easily supported. I endorse it. Claim (2) is fatally metaphysically suspect; it is far too idealist for comfort. Claim (3) does not go nearly as far as (2) in the direction of questionable metaphysics, but differs from and makes an epistemically more informative statement than (1). It is all I will commit myself to here. Thus, taking advantage of the “point of view” framework established earlier,³⁶² it is in the sense expressed by (3) that one should understand my point about the proceduralized caution of the practical legal reasoner and my attendant claim that what the facts are from a *legal* point of view is not necessarily what the facts are from a *scientific* point of view.

Some legal reasoners are well aware, and as a whole there is in the legal system increasing awareness, of the nature and importance of these different points of view. A cogent articulation of this point is found, for example, in *DeLuca v. Merrell Dow Pharmaceuticals, Inc.*³⁶³ That case, decided by the Third Circuit, dealt with the same issue treated in *Daubert*, namely whether the “morning-after” drug Bendectin could have caused the plaintiff’s birth defects. The Third Circuit reversed a trial court judgment that expert testimony by a well-credentialed epidemiologist was not admissible under the Federal Rules of Evidence. Having discussed some of the basics of epidemiological analysis, including the role of the “null hypothesis” in such research,³⁶⁴ the court stated that on remand, the district court judge must keep in mind that the “fact that a scientific community may require a particular level of assurance *for its own purposes* before it will regard a null hypothesis as disproven *does not necessarily mean that expert opinion with somewhat less assurance is not sufficiently reliable to be helpful in the context of civil litigation.*”³⁶⁵

Highlighting the difference between the level of epistemic confidence required from a legal point of view and that required from a scientific point

362. See *supra* Sections II.B-C.

363. 911 F.2d 941 (3d Cir. 1990).

364. See *id.* at 945-49. Epidemiologists use the “null hypothesis” as a device for testing the accuracy of a statistical correlation that has been discovered between some harm and a substance that might have caused the harm. The null hypothesis is the hypothesis that—contrary to some *prima facie* statistical finding—there is actually no correlation between the two variables (harm caused and what might have caused it). The technique is to assume *arguendo* that the “null hypothesis” is true, and then try to falsify it.

365. *Id.* (emphasis added).

of view is an important part of my overall analysis, and I return to it below.³⁶⁶ For the moment, I want to analyze the impact that this difference makes on the structure of reasoning that a practical reasoner deploys when soliciting expert scientific information from a theoretical expert. For heuristic purposes, I will move toward presenting a complete model of this reasoning process (doing the kind of philosophical analysis sometimes referred to as "rational reconstruction") in slow steps.

Before considering an example of practical epistemic deference in a legal setting, I begin with a somewhat simpler example of the kind of practical moral reasoning in which the reasoner does not solicit *expert* information to make the theoretical judgment that constitutes the minor premise of the (primary) practical syllogism, but instead relies on her own epistemic competence to make that judgment.³⁶⁷ Assume that the following is a sound syllogism (a valid inference with true premises) in which Jones (the referent of 'I' in premise (2)) reasons about his moral obligation to Williams:

(1) Every person always ought to keep his promises.

(2) I [Jones] promised to meet Williams for lunch.

Therefore,

(3) I ought to meet Williams for lunch.

This simple syllogism is a bit of practical reasoning about what is required of Jones from a moral point of view. The syllogism Jones constructs consists of two prescriptive propositions, (1) and (3), and a theoretical proposition, (2). I claim that (2) must be understood as the *conclusion* of an argument that is independent of the syllogism in which it serves as the minor premise. Proposition (2) rests on (is warranted by) a chain of propositions of which it is the conclusion. Jones, the practical reasoner, is warranted in asserting (2) in part because he ought to believe that (2) is true. The "ought" in (2) is an epistemic one,³⁶⁸ which seeks to connect the practical norm expressed in (1) to some feature of the world (that is, to what it is warranted to believe about this feature of the world), namely, that Jones actually performed the actions that constitute promising. By contrast to the two "oughts" in propositions (1) and (3), both of which are practical (and in this case, moral), the minor premise connects the moral norm in (1) to the world.

I maintain that the proposition that Jones ought (epistemically) to believe proposition (2) is itself an inference from further propositions, such as that the belief stated in this proposition was produced by a *sufficiently warranting*

366. See *infra* Section VI.C.

367. Of course, moral reasoners can and often should solicit expert information in order to make sufficiently justified *moral* decisions. For a powerful and elegantly concise suggestion along these lines, see Peter Singer, *Moral Experts*, 32 ANALYSIS 115 (1971-1972).

368. We may say that the reasoner ought to believe (2) because it is a warranted belief.

epistemic procedure. Perhaps this procedure consists in Jones's consulting his knowledge of the language of promising, his senses, and his memory for events that surrounded his act of promising. (I am assuming that Jones, unlike a thoroughgoing skeptic, believes the evidence of his own senses and memory and everyday knowledge, and that he does not treat this practical judgment about Jones's obligations as one that calls for expert evidence.) Again, the judgment of sufficient warrant is an epistemic one; Smith relies on the "testimony" of his memory and senses and everyday knowledge because he believes he has good reason to rely on them as a procedure for producing truths about the world.

If I am right, what this simple example reveals is that the minor premise of a practical syllogism, which is a theoretical proposition, rests enthymematically on a series of related epistemic judgments. Given the putative relation between theoretical judgments and facts about the world, this is not surprising. But a while back I began this argument by claiming that there was *practical priority* even in the minor, theoretical premise of a practical syllogism. So far, we have seen only additional theoretical propositions supporting it. Where is the "practically prior" premise?

The answer, I believe, is in the practical reasoner's judgment of *sufficient warrant*. Recall that one of the underlying judgments that warranted Jones's endorsement of minor premise (2) (namely, that Jones promised to meet Williams for lunch) was an additional judgment that Jones ought epistemically to believe that the minor premise was true, because he also believed that the judgment in the minor premise was produced by a sufficiently warranting epistemic procedure. But the phrase "sufficient warrant" fails to capture the full judgment that Jones must make. More precisely, he must decide what *quantity* of warrant or what *quality* of warrant (if it does not admit of quantification) he needs *for practical purposes*.³⁶⁹ To explain this point, I call again on Laudan's axiological model of a rational enterprise,³⁷⁰ here the "enterprise" of moral reasoning. The moral reasoner has certain overall aims (which might be explained in deontological or teleological terms) and deploys methods to serve those aims, which in turn produce particular moral judgments. Consider again the simple syllogism in the example above, in which Jones reasons about how he ought, from a moral point of view, to behave toward Williams. Let us suppose that Jones seeks to make sure that he keeps his promise to Williams. One of the *methods* Jones might choose to deploy to help bring about that end is to consult his own memory regarding the exact content of that promise. Jones would be deciding not just that the testimony of his memory and senses and everyday knowledge was "warranted," but that it was *sufficiently warranted* for his moral (practical)

369. See *supra* Section II.C (discussing quantity and quality of warrant).

370. See *supra* notes 143-158 and accompanying text.

purposes. Using that method, he could produce the individual judgment that he ought to meet Williams for lunch. Given a different practical task, governed and guided by different or additional practical norms, he might well have concluded that this kind of testimony was not adequate for his purposes.

Consider now a different practical syllogism:

(1) One always ought to assassinate a politician whose continued life is a serious threat to the political liberty of some nation(s).

(2) Politician *H*'s continued life is a threat to the political liberty of some nation(s).

Therefore,

(3) One ought to assassinate politician *H*.

As with every practical syllogism, the major premise establishes criteria whose satisfaction in a particular case (for a particular politician) it is the job of the minor premise to ascertain; that is, it is up to the minor premise to feed into the practical decision some relevant information about the world (information made relevant by the major premise). Surely for such criteria as the practical norm (1) establishes, a practical reasoner would want a better warranted *theoretical* test than he would for a decision about whether to keep a promise to meet a friend for lunch.³⁷¹ That is, although the theoretical "testimony" of everyday knowledge, the senses, and memory might be sufficiently warranted for *some* practical purposes, it will not be adequate for *every* practical purpose. Because every practical reasoner must decide the quantity or quality of warrant that is *practically* necessary for his decision, even his assertion of a theoretical premise depends on a *practical* decision about the quantity or quality of warrant he needs. That is the feature of practical reasoning I am calling "minor premise practical priority." The procedural mechanisms in the American courts, some of them constitutionally grounded, exemplify minor premise practical priority in the different "burdens of persuasion" that such rules establish for criminal prosecution (the state must prove guilt "beyond a reasonable doubt"³⁷²) and for civil suit (usually, the plaintiff must prove his claim by a "preponderance of the evidence"³⁷³).

Presented schematically (and in the first person, though obviously it could be easily adapted to second- or third-person assessments of practical duty), the practical syllogism about promise keeping looks like this:

371. I am assuming, of course, a moral reasoner whose morality could countenance killing for this reason—presumably a judgment far more congenial to teleological than to deontological systems. It is also possible that a utilitarian calculator might well factor in even an admittedly small chance of achieving a hugely important outcome, and allow such a calculation to lower the level of proof of (2) she requires before reaching the conclusion in (3).

372. See *In re Winship*, 397 U.S. 358, 364 (1970).

373. See, e.g., CAL. EVID. CODE § 115 (West 1995) ("Except as otherwise provided by law, the burden of proof requires proof by a preponderance of the evidence.").

(1) I always ought to keep my promises.

(2c) The “testimony” of my everyday knowledge of promising behavior, my senses, and my memory is sufficiently warranting for the purposes of guiding my promise-keeping behavior.

(2b) The judgment that I promised to meet my friend for lunch is the result of a sufficiently warranting process (namely, the “testimony” of my everyday knowledge of promising behavior, my senses, and my memory).

(2a) I ought (epistemically) to believe that I promised to meet my friend for lunch.

(2) I promised to meet my friend for lunch.

Therefore,

(3) I ought (morally) to meet my friend for lunch.

The indented propositions (2c) to (2a) represent the independent argument of which (2) is the conclusion. While (2b), (2a), and (2) are *theoretical* propositions, governed by epistemic rather than practical norms, (2c)—the judgment that a given theoretical-judgment-producing process is sufficiently warranting for practical purposes—is a *practical* proposition, governed by *practical* norms. Every minor premise in every practical syllogism rests, ultimately, on some practical norm like (2c), which governs the independent secondary argument that feeds into the primary argument consisting of propositions (1), (2), and (3). It is in this way that the two intersecting arguments exhibit minor premise practical priority.

I turn now to the more complicated case of practical reasoning by a nonexpert who solicits expert testimony to help reach a practical judgment that is the conclusion of practical reasoning. My goal here is to show how minor premise practical priority obtains in such cases as well. Consider the following very abstract syllogistic representation of a definition of a legal concept of a type quite common in statutory, administrative, and common law:

(1) All persons who have performed actions Φ have committed actions Θ .

(2) Williams performed actions Φ .

Therefore,

(3) Williams has committed actions Θ .

Propositions like those represented by the schema in (1) perform two “speech act” functions. One is to offer stipulative definitional criteria (necessary or sufficient conditions) for legal concepts; these stipulated criterial propositions have the form, for actions Φ and legal concepts Θ , of “All instances of Φ are Θ ,” or “To be an instance of Θ , an act must be Φ ,” or “An act is an instance of Θ if and only if it is an instance of Φ .” Consider, for example, the following criterial proposition, drawn from a state statute, which offers a stipulative sufficient condition (i.e., the linguistic predicate for the actions Φ)

for "Driving with Excess Blood Alcohol content" (i.e., the linguistic predicate for the legal concept Θ): "It is unlawful and punishable as provided in § 28-692.01 for any person to drive or be in actual physical control of any vehicle within this state while there is 0.10 or more alcohol concentration in the person's blood or breath at the time of the alleged offense."³⁷⁴ The second "speech act" function of these stipulative criterial definitions is to give the definition *force of law*; the statute begins with the words 'It is unlawful,' words which have the same effect in context as if the statute had begun, 'It is hereby declared unlawful.' Usually such definitions are accompanied by some statement of or reference to the legal effect of performing actions Φ ; in the proposition above, note the phrase "punishable as provided in § 28-692.01." Although the example above is from a criminal statute (which has since been amended), the same basic framework of stipulated criterial definitions mandated with force of law explains definitions in civil law. It also explains such definitions as they are promulgated in administrative regulations and in judicial decisions.

Stipulative criterial definitions like proposition (1) are practical legal propositions³⁷⁵ that link the performance of actions Φ to the commission of actions described by legal concept Θ . They also serve as major premises in the practical syllogisms that legal reasoners use to apply the defined legal concepts to individual cases. My special concern is with instances in which the nonexpert practical reasoner solicits evidence from a scientific expert in order to adopt and endorse a *minor* premise in the practical syllogism. Continuing the example of the stipulated definition of "Driving with Excess Blood Alcohol Content," the syllogism fashioned by the practical nonexpert judge or jury considering a case in which Williams, a defendant, was charged under this statutory proposition is as follows:

Major Premise: (1) All persons who drive or are in actual physical control of any vehicle within the state while there is 0.10 or more alcohol concentration in the person's blood or breath at the time of the alleged offense are subject to [specified] legal sanction.

Minor Premise: (2) Williams drove or was in actual physical control of a vehicle within the state while there was 0.10 or more alcohol concentration in his blood or breath at the time of the alleged offense.

Conclusion: (3) Williams is subject to [specified] legal sanction.

374. ARIZ. REV. STAT. ANN. § 28-692(B) (West 1989) (amended 1993).

375. On some positivist views, these are not practical but theoretical propositions. See *supra* note 3. My analysis of epistemic deference and its rational structure does not depend on accepting or rejecting such views. If legal propositions are theoretical, then what I am calling "minor premise practical priority" could be reframed as something like "minor premise priority."

It is common for a jury or judge that is applying the legal concept specified in the major premise, (1), to call on expert scientific testimony in order to establish the minor premise, (2). As in the case law applying the variety of "driving under the influence" provisions that appear in criminal statutes clearly reflects, there are many ways in which expert scientific evidence can be both relevant and material to the outcome of a case. Experts might be called upon to determine the blood alcohol content of an arrested driver at some time after arrest, or to establish what his blood alcohol content was at the time of arrest based on an extrapolation from his blood alcohol content at the time of testing (which is often more than an hour after arrest). Testimony on these issues might also involve testimony about the scientific reliability of the methods used to test blood alcohol content or to "relate back" the content at the time of testing to the content at the time of arrest.³⁷⁶

In a case in which the nonexpert judge or jury solicits expert scientific information in order to apply a legal concept like "driving with Excess Blood Alcohol content," the nonexpert reasoner is seeking expert advice in order to decide which *minor premise* to endorse—i.e., to determine whether to accept or reject the prosecution contention that

(2) [the defendant] performed actions Φ .³⁷⁷

When one reconstructs the nonexpert's syllogistic reasoning, one might conclude that (2) is simply the statement made by the expert to the judge or jury,³⁷⁸ but that would not be an accurate reconstruction of the nonexpert's

376. To take just one of (at least) hundreds of possible case law examples, in *State ex rel. McDougall v. Albrecht*, 811 P.2d 791 (Ariz. Ct. App. 1991), the court held that a defendant's failure to pass field sobriety tests, coupled with his speeding and failure to stop at a red light, provided sufficient evidence for the admission of his blood alcohol level at the time of testing, which was significantly after the time of arrest. This evidence was admissible, held the court, because the evidence of speeding, of failure to stop, and of failure to pass field sobriety tests constituted sufficient evidence for the expert to "relate . . . back" the blood alcohol content at the time of testing to that at the time of arrest. *Id.* at 795. The court also *rejected* some of the expert testimony in this case. The expert used evidence of the field sobriety test, coupled with the evidence of the post-arrest blood alcohol content, to conclude that there was a 67% chance that Williams had a blood alcohol content greater than 0.10%. *See id.* at 793. Rejecting the admissibility of this particular calculation, based solely on the post-arrest blood alcohol content and the failure to pass field sobriety tests, the court stated that the expert's "characterization of the field sobriety tests was misleading in that the jury may have given the tests undue significance as scientific truths, when, in fact, they measure only gross neurological impairment." *Id.* at 795-96. The court continued: "We have concern about the misleading influence [that] such speculative conclusions unsupported by controlled experiments may have on a jury." *Id.* at 796 (footnote omitted).

377. As I have already mentioned, this analysis applies just as well to "thick legal concepts" like *murder* and *reckless endangerment* as it does to *blood alcohol in excess of 0.10*. For thick legal concepts, the scientific expert testifies to the truth or falsity of the descriptive evidence.

378. As noted *supra* Section I.B, rules of evidence divide decisionmaking labor between two types of practical reasoner—judges and juries. The rules allow the judge to decide which experts, and which information, is relevant to a given practical decision; the jury then hears from those experts that pass that test. The jury then listens to the screened experts and decides to what extent to credit the testimony in determining whether the defendant's conduct satisfied the predicate in question (e.g., "murder"). Sometimes the judge himself is the factfinder, and so the same person performs both tasks; while this is quite rare in

full chain of reasoning. Although (2) is indeed a theoretical proposition, it is a theoretical proposition made by the practical reasoner on the basis of expert evidence. That is, (2) represents the *conclusion* of a chain of reasoning that includes a set of related judgments *about* the reasoning that the expert himself used to arrive at the judgment he reports testimonially to the practical reasoner. To reconstruct that chain in a plausible manner, we might retroduct back from (2) itself (the conclusion of the “secondary” argument, distinct from the primary argument in which (2) is the minor premise) to those implicit judgments that would, from the practical reasoner’s point of view, warrant the practical reasoner’s assertion of (2).

Underlying (that is, offering warrant for) proposition (2) is some proposition to the effect that “we (the practical reasoners) ought (epistemically) to believe that Williams committed actions Θ .” Underlying that proposition, in turn, is a set of propositions to the following effect:

The judgment that Williams committed actions Θ is the conclusion of an expert-scientific process (call it *P*), and we ought to convict on the basis of the results of *P*, because *P* produces sufficiently warranted beliefs, and the law ought to convict on the basis of judgments yielded by expert-scientific processes that produce such beliefs because acting on them is an acceptable way to achieve the practical goal of treating all persons who have committed actions in accord with the legal sanctions (or legal benefits)³⁷⁹ that the law specifies for those who commit actions.

C. *A Simplified Model of Practical Epistemic Deference*

We may present this reasoning more schematically as an inferential chain that presents the proposition that appears in the minor premise in the primary syllogism (i.e., proposition (2)) as the conclusion of a distinct secondary argument whose conclusion is (2) itself. I now present the abstract form of this distinct inferential chain, with some comments on the source of each of the premises. What I present in this section is only a preliminary version of the model of this reasoning process—to be made more complex, and more explanatorily adequate below.³⁸⁰ I begin with a wholly abstract statement of the “secondary” argument that a nonexpert practical reasoner must use in deferring to a scientific expert. Then I offer detailed step-by-step analysis.

criminal cases, it is less so in civil ones. That different persons perform these tasks is not important for my purposes here.

379. This model of the practical legal reasoner’s reasoning applies equally to criminal sanctions and to the benefits parties can obtain from the “enabling” rules of contract, property, tax law, etc.

380. See *infra* Sections VI.D-E.

1. *Summary Presentation of the Model*

(1) If an expert's scientific process (*P*) produces a judgment (*j*) that rises to the *level of confidence* of the appropriate *standard of epistemic appraisal* specified by the practical reasoner (call the specified level *L*), then the judgment that *P* produces is *true for given practical purposes* (call these purposes *R*).

(2) If *j* is true for *R*, then if a practical reasoner has *R* (and has no other inconsistent practical purposes), then that reasoner ought to infer *j*.

(3) If a practical reasoner ought to infer *j*, then *j*.

(4) *P* produces judgments that satisfy *L*.

(5) *j* is the result of *P*.

(6) *j* is true for *R*.

(7) If a practical reasoner has *R* (and has no other inconsistent practical purposes), then that reasoner ought to infer *j*.

(8) The practical reasoner has *R* (and has no other inconsistent practical purposes).

(9) The practical reasoner ought to infer *j*.

Therefore,

(10) *j*.

2. *Comment on Step (1)*

If an expert's scientific process (*P*) produces a judgment (call it *j*) that rises to the level of confidence of the appropriate *standard of epistemic appraisal* specified by the practical reasoner (call the specified level *L*), then the judgment (call it *j*) that *P* produces is *true for given practical purposes* (call those purposes *R*).

Step (1) consists of the *practical* judgment, made by the deferring nonexpert practical reasoner, about which expert's use of scientific processes produces judgments that are epistemically satisfactory for the practical purposes at hand.³⁸¹ The reference to the *expert's* scientific process (rather than simply to expert scientific processes) reflects the fact that it is the expert's

381. To anchor this abstraction with an example, recall the case of *McDougall*, in which the Arizona criminal court ruled inadmissible the scientific expert's testimony that there was a 67% chance that the defendant had been driving with a 0.10% blood alcohol content. The court stated:

A courtroom is not a research laboratory. The fate of a defendant in a criminal prosecution should not hang on its ability to successfully rebut scientific evidence which bears an "aura of special reliability and trustworthiness," although, in reality the witness is testifying on the basis of an unproved hypothesis in an isolated experiment which has yet to gain general acceptance in the field.

McDougall, 811 P.2d at 796 (quoting *United States v. Brown*, 557 F.2d 541, 556 (6th Cir. 1977)). In the terms of my analysis, the Arizona court decided that the scientific method the expert had used to arrive at the 67% figure did *not* produce judgments that were epistemically satisfactory for the practical legal purpose of effecting a *just* conviction of a criminal defendant. I discuss the normative constraints involved in this kind of decision in Part VII.

use of the process, and not the process itself, to which the nonexpert defers.³⁸² One could, I suppose, consider the overall process to include both the scientific techniques deployed and the person deploying them, but keeping them separate seems to allow for more targeted diagnoses of failures and successes.

There are two distinct terms of epistemic valuation that must be carefully distinguished in (1). One is what I shall refer to as the *level of confidence*, labeled by the variable *L* to indicate that different practical reasoners will set different required levels of confidence. The other is what I shall refer to as the *standard of epistemic appraisal*, by whose metric the level of confidence is measured. Because, as I will explain, different standards (and attendant levels of confidence) are possible, practical reasoners must also choose one or another from among the possibilities (in a moment, I explain why I refer here to practical reasoners and not just to one practical reasoner). In step (1), the practical reasoners must make a decision about, and adopt, *both* a standard of epistemic appraisal and a level of confidence that is measured by that standard.

I refer to practical reasoners as the decisionmakers in step (1) because here, as in other areas of legal epistemology, we must be sensitive to the division of labor among legislature, judge, and jury. The practical reasoners principally responsible for setting the standard of epistemic appraisal and level of confidence are legal officials, like legislatures and judges. These officials reflect their choices about standards of appraisal in rules of evidence and procedure, jury instructions, and other such devices. Note, however, that different jurisdictions, different courts within a jurisdiction, or even different judges within the same court, will make different decisions on the issue. It is in that way that a “choice” must be made among distinct “possible” standards of epistemic appraisal.

In what sense must these practical authorities “choose” from among different possible standards of epistemic appraisal, and in what sense are several such standards “possible”? Here yet another distinction is important, a distinction between two senses in which the practical authority might make a commitment to a standard of epistemic appraisal (and corresponding level of confidence).

One is a “thick” commitment to a deep epistemological theory—that is, a full-blown theoretical commitment to the truth of a particular epistemological theory. Such commitments are clearly made by some evidence scholars and some judges regarding the question of how best to explain the kinds of epistemic judgments that judges and juries make when they evaluate evidence. The leading debate on this issue among evidence jurists is whether a factfinder’s judgments are best explained in probabilistic terms or instead in

382. See *supra* Section III.A (explaining the distinction between believing a person and believing a proposition).

nonprobabilistic ones. The debate has tended to focus on the question of what kind of reasoning process a juror or judge is using when she “weighs” evidence and arrives at a belief on the basis of that weighing; is she performing a probabilistic calculation (perhaps tacitly) or using some other kind of rational cognitive processing? Evidential “probabilists” answer this question in the affirmative.³⁸³ This debate among evidence theorists parallels, and often draws on, similar debates in general epistemology (where the champions of probabilism are often found in the ranks of reliabilists)³⁸⁴ and philosophy of science. A “thick” theoretical commitment by a practical reasoning authority to a probabilistic theory of evidential judgment can be reflected in judicial and legislative rules of evidence and procedure, advisory committee notes, and jury instructions, as well as in other ways. I shall play out some of this debate with an example just below. First, however, I should offer a word about the oddity or perhaps even the implausibility of claiming that legal officials commit themselves and their jurisdictions to “thick” epistemological theories concerning the nature of evidential assessment.

In this area of law, as in many others, there is an intellectual division of labor between “high theory” workers and the appliers and administrators of theory-motivated doctrines. The paradigm for this division of labor is the common law itself. In that system, some judges, scholars, and lawyers take the lead in organizing, systematizing, analyzing, rationalizing, and revising doctrines and the theories that motivate them (e.g., theories of justice and equity in contract, tort, constitutional, and property law; theories of mind and motivation in the criminal law; economic theories throughout public and private law). These are the Holmeses, the Cardozos, the Brandises, the Learned Hands, the Posners, and the Corbins, as well as innumerable scholars. These jurists organize and reorganize whole lines of cases, propose values to explain and criticize and motivate changes in common law doctrines. These “high theory” jurists can indeed quite plausibly be seen as making thick theoretical commitments to metaphysical and epistemological theories of the sort seen in probabilistic accounts of factfinding judgments. But of course not all jurists, and certainly not all judges, make or even attempt to make deep theoretical commitments of this sort. Many *defer epistemologically* to their high-theory brethren, *administering* doctrines articulated by the high theorists, but without engaging in sophisticated high theory themselves. These judges tend only to administer the doctrines that high theorists create for the law’s epistemology. They tend to make only the incremental changes that are inevitable in the face of gaps, conflicts, and ambiguities that attend any system of laws. Quite often they deploy the resources of analogy to make these incremental changes, not least in using analogy-warranting *rationales*

383. Some of the classic arguments in this debate are cited and discussed below. See *infra* note 385.

384. See, e.g., ALVIN I. GOLDMAN, *EPISTEMOLOGY AND COGNITION* (1986); NOZICK, *supra* note 5.

developed by high-theory judges. And as it is in the common law, so it is in the amalgam of common law, legislation, and administration that comprises the official rules of legal epistemology.

I asserted that there are two senses in which legal officials can make a commitment to an epistemological theory when they choose from among different possible standpoints of epistemic appraisal. To complement the “thick” sense of full-blown, high-level theoretical commitment, there is also a “thin” sense in which the legal official is concerned, not so much with the ultimate truth about belief (say, jurors’ beliefs formed in assessing evidence), but rather with the proper way explicitly to instruct jurors and judges to think when they assess evidence. The thin account is not concerned with ultimate truth but with an empirical judgment of the likely impact of different kinds of instructions given to factfinders. Here again there are probabilist and anti-probabilist camps. The former believe that factfinders ought to be told and taught explicitly to use probabilistic methods in assessing evidence (typically, they endorse Bayesian methods). To be sure many, perhaps even all, of these probabilists are also committed to probabilism as a “thick epistemological” account of the assessment of evidence, but there is no necessary connection between thick and thin views. In the anti-probabilist camp, one might well find theorists who believe that probabilism is the correct “thick” account of the nature of evidential judgments by factfinders, but who also believe that it would be a mistake for courts to adopt a “thin” evidentiary practice of instructing factfinders to try consciously to assess evidence in probabilistic terms. A thin doctrinal practice of that sort, they might argue, is likely to create significantly greater factfinding errors than there would be when factfinders did not try to “do probabilities” explicitly. (Analogously, a “cooking theorist” might think a cook better advised to think in terms of “pinch,” “dash,” and “twist” than to try consciously to deploy more precise quantitative measures, even though every pinch, dash and twist can be fairly precisely measured.)

One should understand *my own* claim that the practical reasoners must “choose” from among “possible” standards of epistemic appraisal as a claim that is made at the meta-level. I am not endorsing a claim that there *really are* several distinct standards of epistemic appraisal—it may well be that there is *actually* only one. But even if one account, such as the “thick” probabilistic account, turns out to be the truth about epistemic appraisal, it is also clear that there exist competing theories about which standard best captures the process of evidentially-based belief formation—that is, about which “thick” account is correct. Moreover, as I have just suggested, there are even competing views about whether there is indeed only *one* correct standard of epistemic appraisal to which all others are reducible, or whether instead there is a plurality of standards. Again, my quite limited point here is that the “decision” that practical reasoners must make in step (1) is either a commitment to a thick

metaphysical and epistemological theory or a commitment to a thinner view of how the factfinder ought to be instructed to think about evidence. Which of these types of commitment the legal system and its coordinated decisionmakers make in step (1) is not important for the analysis here; what is important is to note that one or the other of these commitments must be made in the first step of practical epistemic deference.

An example will surely help. Suppose the case presented to the practical reasoner is a tort case for wrongful death. The case involves a fatal hit-and-run vehicle collision on an enclosed high-security military base; an army officer is killed in the collision. The case is brought in a state court. The plaintiff is the wife of the deceased officer; the defendant another officer, who drives a jeep. The state has typical rules of procedure and evidence; specifically, the burden of proof it imposes in this (and most other) civil actions requires that the plaintiff prove his case by a "preponderance of the evidence."

The high-security nature of the base is such that experts and their attorneys can gather exact information about every vehicle that was present on the base (in working order, etc.) at the time of the accident. An imprint of a kind of steel bumper that is unique to a particular brand of military jeep is found on the wrecked car driven by the deceased, and both sides concede that this bumper imprint was caused by the offending vehicle. A forensic expert (trained in the engineering of "accident reconstruction," for example) testifies that, as the result of a study of all the jeeps on the base that contained this type of bumper, it is 51% likely that the defendant's jeep, which is equipped with the type of bumper that could have caused this imprint, caused the accident.³⁸⁵ The trial proceeds, and no other evidence is introduced (this is something of a stylization, but it makes my point simpler to explain). Just before the jury retires for deliberation, the court instructs that the "preponderance of the evidence" standard governs this case, and explains this burden of proof as follows:

385. I offer one version of an example familiar in the pro- and anti-probabilist literature. In a seminal article, Laurence Tribe offers the "blue bus" hypothetical to illustrate problems with probabilism in a civil case. In this hypothetical, the plaintiff seeks recovery after being struck by a blue bus in a town in which four-fifths of the blue buses are operated by the defendant. See Laurence H. Tribe, *Trial by Mathematics: Precision and Ritual in the Legal Process*, 84 HARV. L. REV. 1329, 1340-41 (1971). L. Jonathan Cohen offers the "gate crasher" hypothetical to raise some of the same issues. Suppose one thousand people are seated in seats at the rodeo, but only 499 have paid. Payment was in cash, and there is no other proof regarding whether any given individual paid. Can the rodeo owner collect from (or win a civil or criminal action against) a randomly chosen person? Can he collect against every person in the rodeo? Cohen argues no. See L. JONATHAN COHEN, *THE PROBABLE AND THE PROVABLE* 75-81 (1977). Charles Nesson offers a famous example in the criminal setting. Suppose that in a prison yard, there is clear evidence that 24 out of 25 prisoners participated in the murder of a guard. There is no other evidence regarding any of the individual prisoners. Can one prisoner of the 25, randomly chosen, be convicted of murder on this evidence? Nesson argues no. See Charles R. Nesson, *Reasonable Doubt and Permissive Inferences: The Value of Complexity*, 92 HARV. L. REV. 1187, 1192-99 (1979).

The most acceptable meaning to be given to the expression, proof by a preponderance, seems to be proof which leads a jury to find that the existence of the contested fact is more probable than its nonexistence. Thus the preponderance of the evidence is your belief in the preponderance of probability, which can be restated as the burden of showing odds of at least 51 to 49 that such and such has taken place or is so.³⁸⁶

Relying on the expert testimony, the jury finds the defendant liable.

This court (I assume) both "thickly" and "thinly" endorses a subjective probabilistic interpretation of the "preponderance of the evidence" burden of proof.³⁸⁷ On this interpretation, the burden of proof is measured by a probability that reflects not the "objective" relative frequency of the event (the fatal crash with this particular defendant's vehicle) in repeated trials—the crash is, after all, a unique event. Instead, according to the subjective probabilistic interpretation, a factfinder's judgment that a given factual claim is supported by a preponderance of the evidence reflects a rational juror's willingness to bet, given even odds, that the event was more likely to have occurred than not. In the terms I offered above, subjective probability is the *standard of epistemic appraisal* that the court has directed the jury to use. The jury's specified *level of confidence is greater than 50%*. This example thus illustrates my claim about the exact types of epistemic "decision" a practical reasoner must make in step (1) of the overall process of deferring epistemically to a scientific expert. The nonexpert practical reasoner must decide both what standard of epistemic appraisal to use and what specific level of confidence, as measured by that standard, is required for his practical purposes. In my example, the judge, perhaps guided by a legislative rule, decides to use a subjective probabilistic standard with a level of confidence of greater than 50%.

A jurist's adherence to a probabilistic explanation of burdens of proof can lead that jurist (judge, legislator, or scholar) to adopt a probabilistic standard of epistemic appraisal. As a "thick" theoretical explanation of long-existing practice with burdens of proof in legal systems, the probabilistic explanation does indeed have significant explanatory virtues. One of those virtues is its capacity elegantly to account for the different burdens of proof that courts (and legislatures) impose on plaintiff or prosecutor for different kinds of action.³⁸⁸

386. I have amalgamated this example of a jury instruction from CHARLES T. MCCORMICK, MCCORMICK'S HANDBOOK OF THE LAW OF EVIDENCE 794 (Edward W. Cleary ed., 2d ed. 1972); and *Davies v. Taylor*, 1974 App. Cas. 207, 219 (Eng.).

387. Some "thickly theoretically" inclined courts do indeed view the preponderance of the evidence standard this way. One British court, for example, asserted that "the concept of proof on balance of probabilities, which can be restated as the burden of showing odds of at least 51 to 49 that such and such has taken place or is so." *Davies*, 1974 App. Cas. at 219.

388. An official commission comment on the California rules of evidence discusses different burdens of proof in this way:

Usually, the burden of proof requires a party to convince the trier of fact that the existence of a particular fact is more probable than its nonexistence—a degree of proof usually described

It is perhaps worth emphasizing the importance of keeping distinct the burden of proof a jurisdiction imposes on a litigant (preponderance of evidence, clear and convincing, beyond a reasonable doubt) and the standard of epistemic appraisal that a factfinder uses to assess a litigant's factual claims. The latter is an interpretation and explanation of the former. Some jurists explain and interpret the preponderance burden of proof in probabilistic terms, whether subjective or objective. Others interpret that and other burdens in nonprobabilistic ways.

Having argued that standards of epistemic appraisal are *interpretations* of burdens of proof, I must also explain why the burdens of proof are not themselves standards of epistemic appraisal in my sense. To be sure, it seems likely that judges and legislatures originally adopted the familiar phrases associated with different burdens of proof (preponderance, beyond a reasonable doubt, etc.) as standards of epistemic appraisal, rather than as propositions that can be *interpreted* by probabilistic or nonprobabilistic standards. But over the course of the common and statutory law of evidence, these phrases have become canonical and relatively independent of the original intentions of their framers. It is by virtue of this relative independence of the canonical phrases that we can and should see standards of epistemic appraisal, such as probabilistic and nonprobabilistic standards, as interpretations of burdens of proof.

I observed above that a probabilistic explanation of burdens of proof has explanatory virtues that lead some jurists to recommend probabilistic standards of epistemic appraisal. But not all jurists endorse probabilistic standards, and even those who believe that the probabilistic "thick" theoretical explanation of factfinders' judgments is correct can consistently decline to endorse a probabilistic standard of epistemic appraisal as the best explanation of legal burdens of proof. Moreover, not every court or legislature is committed, either thickly or thinly, to this standard (and its attendant level-of-confidence measure). To see how the "anti-probabilist" views are among the possible choices an epistemically deferring practical reasoner can reasonably make, recall the ongoing debate among Anglo-American evidence jurists and philosophers about whether the various legal burdens of proof can or should be theoretically explained as quantified subjective or objective probabilities

as proof by a preponderance of the evidence. . . . However, in some instances, the burden of proof requires a party to produce a substantially greater degree of belief in the mind of the trier of fact concerning the existence of the fact—a burden usually described by stating that the party must produce clear and convincing proof . . . or, with respect to the prosecution in a criminal case, proof beyond a reasonable doubt

CAL. EVID. CODE § 500 cmt. (West 1995). Probabilists might suggest that the appropriate level of confidence for the "preponderance" burden is 51%, for the "clear and convincing" burden something like 75%, and for the "beyond a reasonable doubt" burden something like 90%. Thus, probability as the standard of epistemic appraisal yields a very clear ordering system for these different levels of confidence. This is true whether the probabilistic standard is considered to be objective, as in assessments of relative frequency over repeated trials, or is considered to be the subjective rational assignment of betting odds.

(thick commitment) or whether juries should be instructed to think of them in those terms (thin commitment). *Anti-probabilists* claim that nonprobabilistic standards of epistemic appraisal and attendant levels of confidence best represent the juridical factfinding process, and one can indeed find many statements by judges that seem to cohere significantly better with a nonprobabilistic standard. One court, for example, stated that the "[p]reponderance of the evidence is sufficient if it inclines an impartial and reasonable mind to one side rather than the other."³⁸⁹ We must do a bit of interpretive work to discern the standard of epistemic appraisal that underwrites this court's assertion. Even so, it seems fairly clear that the standard of appraisal presupposed by the court's statement (something like "assessment by an impartial and reasonable mind") is not intended to be probabilistic, and that the level of confidence (perhaps something like "*inclination to believe, all things considered*"), is not intended to be quantified in probabilistic terms either.

As suggested above, probabilistic standards of epistemic appraisal (whether subjective or objective) can yield different levels of confidence ordered on the scale set by the standard—for example, 51% for the "preponderance" burden of proof, 75% for the "clear and convincing" burden, 90% for the "beyond a reasonable doubt" burden. Nonprobabilistic statements of epistemic appraisal are also capable of yielding different levels of confidence to reflect different burdens of proof. For example, different levels of confidence are possible under the standard of epistemic appraisal "assessment by an impartial and reasonable mind." Suppose the burden of proof that the law requires is not "preponderance of the evidence," but instead, "clear and convincing evidence" (the strongest burden in the civil setting). Under the "impartial and reasonable mind" standard, a court (or legislature) might require that the jury not simply be "inclined" to believe the truth of the proposition at issue, but something stronger, perhaps "firmly inclined." And were the case a criminal one, for which the "beyond a reasonable doubt" burden of proof was mandated by a legislature and court, the level of confidence measured by the "impartial and reasonable mind" standard of epistemic appraisal might be something like "conviction to a moral certainty."

Anti-probabilists offer nonprobabilistic standards of epistemic appraisal (and attendant levels of confidence) even when interpreting the not infrequent assertions made by various kinds of jurist that expressly use such terms as 'probable' and 'likely' in explicating the different burdens of proof. One finds

389. *Moss-Am., Inc. v. Fair Employment Practices Comm'n*, 317 N.E.2d 343, 351 (Ill. App. Ct. 1974). A similar standard of epistemic appraisal and level of confidence is used in *Livanovitch v. Livanovitch*, 131 A. 799 (Vt. 1926), in which an appellate court held that the trial court properly instructed the jury regarding the requirements of the preponderance of evidence test with this charge: "If . . . you are more inclined to believe from the evidence that he did so deliver the bonds to the defendant, even though your belief is only the *slightest degree* greater than that he did not, your verdict should be for the plaintiff." *Id.* at 800.

an example of this kind of probabilistic assertion in a venerable and influential evidence treatise that declares:

The most acceptable meaning to be given to the expression, proof by a preponderance, seems to be proof which leads the jury to find that the existence of the contested fact is more probable than its nonexistence. Thus the preponderance of evidence becomes the trier's belief in the preponderance of probability.³⁹⁰

One finds many similar statements by courts and other official bodies and commentators.³⁹¹ Anti-probabilists maintain that even these apparently overt references to probabilistic judgments are best interpreted as using the language of probability to convey a nonprobabilistic concept. For example, Charles Nesson (a leading anti-probabilist) argues that probabilistic terminology in standards of proof are best understood as expressing political-moral ideals, not mathematizable calculations:

My thesis, broadly stated, is that "probability" as we use the term in law, particularly in the civil standard of proof, is not a hard-edged mathematical concept. It is, rather, a concept that incorporates less rigid ideas of justice and reflects the judicial function of resolving disputes in the real world, where values shift and knowledge is uncertain. *An outcome is "probable" if it best accomplishes a just and acceptable resolution of the dispute. Probability, as a legal concept in the law of proof, suggests wisdom, probity, and approbation—not favorable betting odds.*³⁹²

Again, one would have to do some rational-reconstructive work to discern the precise standard of epistemic appraisal and level of confidence recommended by an anti-probabilist approach of this sort. Indeed, an important project in "legal epistemology" (beyond the scope of the present work) is to examine the different analyses courts and commentators offer of the various burdens of proof, carefully unpack the presupposed standards of epistemic appraisal and attendant levels of confidence, and assess them from both epistemic and practical points of view. Notice also that a given jurisdiction—court or legislature—would probably select one standard of epistemic appraisal for both civil and criminal trials, but vary the level of confidence required for either conviction, in the criminal setting, or verdict for the plaintiff, in the civil.

390. MCCORMICK, *supra* note 386, at 794.

391. See, e.g., CAL. EVID. CODE. § 500 cmt. Overt reference to probabilistic standards is also frequently encountered in the judgment of *relevance*, a necessary condition (under most U.S. rules of evidence) of *admissibility*.

392. Charles Nesson, *Agent Orange Meets the Blue Bus: Factfinding at the Frontier of Knowledge*, 66 B.U. L. REV. 521, 521 (1986) (emphasis added).

One final note about step (1). The consequent of (1) speaks of judgments *true for given practical purposes*. This phrase is best understood not as the claim that facts are *actually different* from different points of view, but rather as the claim that different points of view can require different levels of confidence and different standards of epistemic appraisal to conclude that a putative fact is a fact for the aims at hand. Premise (1) focuses on the deferring practical reasoner's point of view.

3. *Comment on Steps (2) to (10)*

Step (2) is a premise that unpacks the judgment that practical reasoners implicitly make when they adjudge something to be true for their purposes. Step (3) presents the principle that allows the practical reasoner to move, in the inferential chain, from the conclusion that he ought to infer a judgment (because it is the result of an expert's scientific process that satisfies *L*, the level of confidence of the appropriate standard of epistemic appraisal that the practical reasoner has specified) to the judgment itself. The judgment thus inferred is in the right form to serve as the minor premise of the primary practical syllogism. Because the inference of *j* from the conclusion that the practical reasoner ought to infer *j* is so closely linked to the idea of truth for given practical purposes, we might call this the "principle of practical purpose rationality."

In step (4), the practical reasoner must assess whether the judgments that the expert offers in testimony as the product of his scientific process, namely *P*, satisfy the level of confidence that is referred to in step (1), namely *L*. Again, the simple example is of a jury whose chosen standard of epistemic appraisal is subjective probability, and whose chosen level of confidence is greater than 50%. This practical reasoner looks to the expert to specify the level of probabilistic confidence the evidence warrants. If that level is 40%, then for that jury *L* is not satisfied. For any number greater than 50%, *L* would be satisfied. Step (4) reflects a practical reasoner's judgment that *L* is satisfied.

The practical reasoner looks to the expert for statements that produce the inference of step (5). In those statements, the expert tells the practical reasoner that the expert's scientific process *P*—already adjudged in Step (1) to meet the requirements of *L*—actually produces a given judgment. For example, the expert might testify: "The method I used to relate back the data from the defendant's blood alcohol level at the time of testing to his level at the time of arrest shows that there was a 67% chance that he was driving with a 0.10% level."³⁹³

Step (6) is true by (1), (4), and (5). Step (7) is true by (2) and (6). Step (8) is a new premise. It reflects the fact that, in the setting of practical epistemic

393. For a brief discussion of a case in which an expert offered this testimony, see *supra* note 376.

deference I am modeling, the practical reasoner has been presented with a given practical decisionmaking task (as a judge or jury is presented with the practical task of determining how applicable laws apply to the conduct of a party to a civil or criminal proceeding). To have such a task at hand (and no other overriding or inconsistent task) is to "have those practical purposes." Note that the clause 'and has no other inconsistent practical purposes' allows for the defeasibility of practical judgments, a reasoning process that can itself be further modeled.³⁹⁴

Step (9) is thus true by steps (7) and (8). Finally, step (10) is true by (3) (the "principle of practical-purpose rationality") and (9). Note that judgment *j* is the conclusion of the "secondary" argument that begins with step (1). Step (10) is the minor premise of the primary syllogism for which the secondary argument does its work. The conjunction of (1) through (9) as antecedent with (10) as consequent might be thought of as a lemma to the primary syllogism, or as a "practical theorem." According to the claim about practical reasoning that I am labeling "minor premise practical priority," every minor premise in every practical syllogism in which the practical reasoner lacks requisite expert theoretical competence, is actually the *conclusion* of an argument. The chief major premise of this argument is the *practical* premise in which the *practical reasoner* sets both a standard of epistemic appraisal and a related level of confidence. In the abstract formulation above, this practical premise was step (1).

D. *Oversimplification in the Foregoing Model of Practical Epistemic Deference*

The foregoing model is too simple to capture adequately that reasoning process of practical epistemic deference. The chief oversimplification is its failure to take into account the fact that a nonexpert practical reasoner is often actually faced with not just one expert, but with several who present competing testimony about the same factual issue. Thus a critical part of the reasoning process involved in practical epistemic deference is a decision about which of the competing experts to believe. This is a decision over and above the decisions, marked in the model above, about which expert's scientific procedure meets the standard of epistemic appraisal and attendant level of confidence set by the practical reasoner.

It is in the crucial reasoning about which among competing experts to believe that the real problems for epistemic deference appear. At least two significant problems—both identified in Section IV.C—face the deferring nonexpert, problems that must be resolved in a way that is *sufficiently epistemically warranted for practical (legal) purposes*, i.e., from the practical

394. See Brewer, *supra* note 15, at 1017-21.

(legal) point of view: the problem of *selection* of the particular expert and the expert scientific discipline and the related problem of *competition* among experts.

The problems of selection and competition are formidable, and one or more of them is faced by every nonexpert reasoner who solicits scientific information from experts. No model of the process of practical epistemic deference can be adequate if it does not reflect the rational decision procedures nonexperts use to resolve these problems. In this way, the model offered above is deficient in its explanation. To remedy the deficiency, I must return to the inference form of *abduction* and explain its crucial role in practical epistemic deference.

E. *Breaking the Dialectical Impasse and Completing the Model:
Abduction in Legal Reasoning*

Abduction is a pattern ubiquitous in legal reasoning. I have discussed elsewhere at some length its basic structure, its logical limits (as an invalid form of inference), and its concomitant pragmatic strengths (as a rationally disciplinable method of discovery).³⁹⁵ I have also shown that it plays a critical role in the process of analogical reasoning.³⁹⁶ I will not repeat my analysis of analogical abduction here, but instead offer a label for it with only the briefest summary, to help distinguish it from two other types of abductive inference. I refer to it as *analogy-warranting rule abduction*. My task now is to call attention to two other types of, and roles for, abduction in legal reasoning, both of which are necessary elements in the epistemic task that faces one or another of the nonexpert practical reasoners (judge, judge plus jury, even lawyer) in practical epistemic deference.

The basic pattern of abductive inference, shared by all three of the types I will identify, is the argument form:

$$\begin{array}{c} \Theta \\ \Phi \rightarrow \Theta \\ \text{Therefore,} \\ \Phi \end{array}$$

where Θ is some explanandum, Φ some explanatory hypothesis (that itself has a conditional logical structure), and ' $\Phi \rightarrow \Theta$ ' the proposition that Θ would follow from or be explained by Φ if indeed Φ were true or otherwise adequately warranted. The assertion of Φ in the conclusion of an abduction marks the fact that the rational abducting reasoner has settled tentatively on Φ

395. See *id.* at 945-49, 978-82, 1021-26.

396. See *id.*

as the proper explanatory hypothesis.³⁹⁷ Although the pattern of abduction is invalid, there are ways of “settling” on Φ that are pragmatically valuable. The aware reasoner understands that the conclusion of a valid deductive argument is held with certainty, and also understands that the conclusion of an inductive argument is held only with varying degrees of probability, always less than 100% (the more cogent the argument, the higher the degree of probability). Such a reasoner also realizes that Φ is asserted in an abductive conclusion not as a certain truth, but instead as a tentatively held hypothesis that is sufficiently likely to be the proper explanation of Θ that it is worth the effort of confirming or disconfirming it. She further recognizes that every abductive conclusion needs some kind of confirmation.

In legal reasoning, there are different types of explananda and explanatory hypotheses. According to the type of each that appears in the particular context of legal reasoning, the type of abductive inference will itself differ. There are three types: First, in *analogy-warranting rule abduction*, the reasoner seeks to abduce a rule that specifies the relevant similarities between a set of example cases (sources for the analogy) and some target case about which he has a question. The rule can specify necessary conditions, sufficient conditions, or necessary and sufficient conditions (but in legal argument usually one or the other). What he seeks to explain here is the properly similar (or different) treatment of the target case or cases as indicated by the relevant features of the source case or cases.³⁹⁸ Second, when the “abduced” explanatory hypothesis explains an empirical fact, the legal reasoner engages in *factual hypothesis abduction*, or, as I shall refer to it, *fact abduction* (an abbreviation only, since it is not the fact itself, but a hypothesis that explains the fact that is abduced). This is the effort to discover a factual explanatory hypothesis, Φ , for some fact

397. Paul Thagard argues that abduction is better understood as an inference to the *best explanation* of Θ by Φ than as an inference that Θ follows deductively from Φ . See Paul R. Thagard, *The Unity of Peirce's Theory of Hypothesis*, 13 *TRANSACTIONS PEIRCE SOCIETY* 112, 116-17 (1977). Thagard's argument is persuasive. Although in the text I sometimes treat abductive inference in the standard Peircean manner, i.e., relying on a premise ' $\Phi \rightarrow \Theta$,' I do think the relation of Φ and Θ is that the Φ advanced is, in the judgment of the abductive reasoner, the best available explanation of Θ .

398. The following sums up in greater schematic detail the two types of analogical rule abduction: Where $y_1, y_2, y_3, \dots, y_n$ are “target” items; $x_1, x_2, x_3, \dots, x_n$ are “source” items; $F_1, F_2, F_3, \dots, F_n$ are shared characteristics; and $H_1, H_2, H_3, \dots, H_n$ are inferred characteristics, the task of analogy-warranting rule abduction is to “discover,” for some items x_i and y_i , and some characteristics F_i and H_i , a rule of the form “if there is anything [in the jurisdiction] that has F and also has H , then everything [in the jurisdiction] that has F also has H ”—when a premise stating “ x is an F and x is an H ” is part of the argument, this abduced rule in turn entails a rule of the form “All F are H .” Disanalogy-warranting rule abduction involves much the same structure, with the following changes. In addition to target, source, shared, and inferred characteristics, $G_1, G_2, G_3, \dots, G_n$ are *unshared* characteristics that the source item(s) has, but the target item(s) does not. The task of disanalogy-warranting rule abduction is to “discover,” for some items x_i and y_i , and some characteristics F_i, G_i , and H_i , a rule of the form “by itself, the presence of F in an item is not a sufficient condition of H , but the presence of F and not- G are jointly sufficient conditions for H .” Note that reasoners abduce disanalogy-warranting rules when there is some *prima facie* reason to believe that the compared items x_i and y_i do, by virtue of sharing characteristics F_i , also share the inferred characteristics H_i , even though the reasoner's ultimate conclusion is that only x_i , and not also y_i , has the inferred characteristic. See generally Brewer, *supra* note 15.

or event, Θ . Of course, as always with abductive inferences, once abducted, Θ must be confirmed or disconfirmed. Fact abduction is the type of abduction familiar in philosophy of science, and it is what came to Peirce's mind when he himself "abducted" abduction. It also plays a powerfully important role in legal reasoning and, more specifically, *in the process of practical epistemic deference I have been exploring*.

A third type of abduction plays a role in legal reasoning generally as well as in practical epistemic deference more specifically. We may call it *legal rule abduction*. In this type of abduction, the reasoner is once again faced with a set of facts that call for explanation. And, as in factual hypothesis abduction, the explananda are considered to be facts that occurred in the world. But the *type* of explanation sought here is not empirical. It is not an explanation from a *scientific* point of view (an explanation that proceeds by selecting cognitive aims and methods that both serve those aims and produce scientific judgments). Instead, legal rule abduction aims to explain facts with special regard to the aims, methods, and judgments specific to *legal reasoning* as a distinct rational enterprise.³⁹⁹ It is a type of reasoning every lawyer must do when a client walks in the door complaining of something that happened to him (e.g., someone failed to exercise due care on the sidewalk in front of his house). In the American federal system, such reasoning is also required of a judge before she can dismiss a complaint for "failure to state a claim on which relief can be granted."⁴⁰⁰ United States rules of pleading allow a very vague summary of the facts that are the basis of complaint. They do not require the early characterization of those facts *in legal terms*—that is, a well-pleaded complaint need not present the litigant's own *legal* explanation of the facts. When it does not present such an explanation, the judge must seek to abduce a legal rule that might give the complainant a sustainable cause of action *if* the facts alleged are later proven. Legal rule abduction has this particular structure:

P
if T then (If P then Q)
Therefore,
 T ,

where T is a plausible *theory of the case* as well as a "valid" legal rule of the jurisdiction, one that links the facts a plaintiff claims he can prove to a remedy he desires in that jurisdiction; P is the set of facts the plaintiff thinks he can prove (or the judge thinks the plaintiff might be able to prove); Q is the remedy the plaintiff desires (or the judge thinks the plaintiff might desire). The reasoner's task in legal rule abduction is to "abduce" the legal rule (the legal theory, i.e., T) that makes "legal sense" of the facts of the case. As with all

399. See *supra* Sections II.B-C.

400. FED. R. CIV. P. 12(b)(6).

abductive inferences, the rule abducted must be confirmed or disconfirmed; what it means to "confirm" a legal rule (or legal theory) that has been abducted is to establish that the legal rule (or theory) is a "valid" rule in the jurisdiction.⁴⁰¹

All three types of abduction can take place in a complex pattern of legal reasoning in a single case. There are especially close holistic connections between legal rule abduction and factual hypothesis abduction. One such connection arises from the strategic need of the lawyer to abduce (and then argue to the court) only those legal theories (if T then (If P then Q)) whose required factual predicate (P) he thinks he can prove if and when necessary. There is another connection between fact abduction and legal rule abduction that is of direct concern to my project here. On the division of labor made in the American federal system, the judge decides whether a given complaint brought by a plaintiff states a cause of action upon which relief can be granted. In deciding that a complaint does state such a cause, the judge perforce sets the parameters for the decision about what kinds of scientific testimony will be rationally pertinent to the case. Now, the factfinder has the task of *abducting the factual hypothesis* that would best explain the plaintiff's contention. In *Brown*,⁴⁰² the factfinder (ultimately, the Court itself) abducted the factual explanation that state-mandated segregation caused psychological harm.⁴⁰³ Next, having already abducted and confirmed the *legal rule* reflected in the

401. An example will help. In *Searight v. New Jersey*, 412 F. Supp. 413 (D.N.J. 1976), a troubled man went to court, representing himself and complaining that the state of New Jersey more than a dozen years earlier injected him with a radium electric beam as the result of which he heard voices talking to him inside of his brain. He came into federal court, although it was doubtful whether the federal court had jurisdiction over his case since there was neither clear federal question jurisdiction nor diversity jurisdiction. Moreover, the state statute of limitations on his tort claim had run. Yet there is a rule that requires a judge to consider all reasonable, plausible grounds for a cause of action before dismissing the claim. In effect, this rule requires the judge to try to *abduce* the best legal rule that might be *adduced* to explain the facts of the case. With a sneering tone unbecoming a judge, this federal judge did indeed abduce several possible federal question theories of recovery for the troubled plaintiff. The judge first considered whether federal statutory civil rights law might afford him a remedy (no, because the plaintiff must first bring the action in state court when it does not "rise to a constitutional level," and this case, in the judge's view, it did not so rise). Here is the sneering part: The judge then concluded that the facts taken as true (the judge is required to assume that the facts pleaded are true at this stage of litigation) show at most "unlicensed radio transmission" by someone, *id.* at 414, but this was within the sole jurisdiction of the Federal Communications Commission, and so the case did, after all, have to be dismissed.

The judge's best effort to abduce a legal rule that would "explain" this litigant's case from a legal point of view in a way that would allow the case to proceed failed to produce such an explanation. In schematic form, the abduction in *Searight* looks like this: Plaintiff claims P , that while he was in custody, defendant injected him with a radium beam, that this was unlawful under some relevant overall legal theory, T , and consequent legal rule, *If P then Q* (that is, the plaintiff claims that a valid legal rule in the jurisdiction is one of the form $T_i \rightarrow (P \rightarrow Q)$, and that the judge's abductive task is to try to discover whether there really is such a rule in the jurisdiction); and that he was thereby entitled to legal remedy Q , i.e., money damages of \$12 million. The judge's abductive task is to discover, if possible, some legal theory and corresponding rule that might yield a remedy. Two "abducted" candidates for testing: (1) ($T_1 \rightarrow (P \rightarrow Q?)$); (2) ($T_2 \rightarrow (P \rightarrow Q?)$); where T_1 = violation of civil rights law; and T_2 = violation of FCC regulations. The judge then works to confirm or disconfirm P —and in this case disconfirms each candidate T_1 and T_2 .

402. *Brown v. Board of Educ.*, 347 U.S. 483 (1954).

403. See *supra* Section I.B.

Equal Protection Clause and its attendant doctrines (often the abduction of legal rules requires the court to resolve vagueness, and often vagueness is resolved by the use of exemplary reasoning),⁴⁰⁴ the Court granted the plaintiff the remedy sought.⁴⁰⁵ In the underlying *Daubert* case,⁴⁰⁶ the factfinder (ultimately, the Ninth Circuit Court of Appeals) abducted a factual explanatory hypothesis regarding the existence of the plaintiff's birth defects. Having abducted the factual explanation that the defendant's drug *caused* that injury, but then having *disconfirmed* that explanation, the court applied the tort law (products liability law) it had already discerned and confirmed in legal rule abduction to give the defendant the victory.⁴⁰⁷ In both *Brown* and the Ninth Circuit's final *Daubert* opinion, the factfinder turned to scientific experts to abduce explanations of the facts alleged in the complaint.⁴⁰⁸

Recall that I came back to the topic of abduction having reached an impasse in thinking about how the nonexpert practical reasoner can go about resolving selection, competition, and underdetermination problems in a legitimate manner, when it seems that such resolution can be achieved only by a reasoner who has the degree of epistemic competence that a nonexpert, *ex hypothesi*, does not have.⁴⁰⁹ How can abduction help us here? In the main, it will help by revealing to a greater level of analytical detail than the oversimplified model offered in Section VI.C just what it is that the nonexpert reasoner must do to perform selection tasks in the face of competition by the experts.

Abduction guides practical epistemic deference in several interconnected ways. The judge must first abduce and confirm that there is a legal theory valid in the jurisdiction that could give the complainant the remedy desired *if* the complainant can prove the facts asserted. The reasoner (judge or judge plus jury) must then hear the proof of the facts and decide whether the facts are as alleged. This task, as argued in the previous section, requires that the reasoner both abduce and then confirm or disconfirm an explanation of the facts from a legal point of view. Sometimes this leads the practical reasoner to consult a scientific expert, depending on the nature of the theory of the case the lawyers and the judge have already abducted using legal rule abduction.

404. In the context of legal reasoning, analogy-warranting rule abduction is a special type of legal rule abduction.

405. See *Brown*, 347 U.S. at 495.

406. *Daubert v. Merrell Dow Pharms., Inc.*, 727 F. Supp. 570 (S.D. Cal. 1989).

407. See *supra* Section I.B.

408. The process by which this scientific information is absorbed into the practical reasoner's overall reasoning, which I have called "minor premise practical priority," is outlined *supra* Section VI.B. It involves the practical reasoner (court or legislature, sometimes dividing labor with a jury) adopting some standard of epistemic appraisal, some attendant level of confidence, and then relying on it in soliciting expert information from scientific experts whose disciplines the practical reasoner has judged to be rationally pertinent to the case at hand.

409. See *supra* Section V.D.

When expert testimony is available, the nonexpert must make several closely related judgments, *each* of which is reflected in the major premise of the nested syllogism, but some of which are not captured in the oversimplified model presented in Section VI.C. These include: (1) a judgment about the proper standard of epistemic appraisal (usually set by court or legislature for the factfinder); (2) a judgment about the proper attendant level of confidence (also usually set by court or legislature under the rubric of the burden of proof); (3) an abductive judgment about the factual hypothesis that best explains the case; (4) a judgment about whether there is one or more expert scientific disciplines that are rationally pertinent to the case and thus ought to be consulted in aid of that abductive inference; and (5) when the answer to (4) is yes, a selecting judgment about which purveyor of an expert discipline that passes the test of (4) ought to be deferred to, even when there is actual or implied competition among the experts whose testimony has been admitted.

I contend that practical reasoners (sometimes operating as a group with a coordinated division of epistemic labor—as between judges and juries, for example) *must make this complex network of judgments in every act of practical epistemic deference*. Although these judgments can be modeled in various ways, I propose the following model, which marks a first step toward bringing the simple model offered above to a level of complexity that can adequately capture the reasoning process:

(1) If an expert's scientific process (call it *P*) (a) produces a judgment (call it *J*) that rises to the level of confidence of the appropriate standard of epistemic appraisal specified by the practical reasoner (call the specified level Φ), and (b) those judgments are rationally pertinent to the factual question at issue, and (c) *P* offers the best explanation of the factual question among the live competitors, *then those judgments are true for given practical purposes* (call them *R*).

Most of the reasons for the additional components of (1) are offered in the discussion just above it. One point worth mentioning here is that the judgment in (1)(c) reflects an understanding of abductive inference as an inference among live competitor explanations. This is perhaps implicit in the original Peircean formulation, but it becomes more explicit—and rightly so—in recent treatments.⁴¹⁰ The abductive model offered in the artificial intelligence work done by John Josephson, for example, expressly treats abductive inference as a choice among competing explanations:

410. Thagard's argument is much to the same effect. See Thagard, *supra* note 397.

- (1) *D* is a collection of data (facts, observations, givens).
- (2) *H* explains *D* (would, if true, explain *D*).
- (3) No other hypothesis can explain *D* as well as *H* does.

Therefore,

- (4) *H* is probably true.⁴¹¹

Even more to the point for my purposes, Josephson's account is sensitive to the role of standards of epistemic appraisal and levels of confidence in abductive inference generally. Discussing what it takes to confirm or disconfirm an abduced explanation, he offers the following criteria:

- (1) How decisively *H* surpasses the alternatives; (2) How good *H* is by itself, independently of any consideration of the alternatives (we should be cautious about accepting a hypothesis, even if it is clearly the best one we have, if it is not sufficiently plausible in itself); (3) Judgments of the reliability of the data; (4) *How much confidence there is that all plausible explanations have been considered* (how thorough was the search for alternative explanations); (5) Pragmatic considerations, including *the costs of being wrong and the benefits of being right*; (6) *How strong the need is to come to a conclusion at all, especially seeking further evidence before deciding*.⁴¹²

Josephson's criteria (4) and (6) cohere especially well with observations and arguments I have made throughout this Article. Criterion (4) reflects the importance within the theory of abductive inference of recognizing what I have referred to as implied competition. It is especially useful to keep implied competition in mind as we seek to explain and understand practical epistemic deference, since the practical reasoner cannot make a cogent judgment simply by confining her judgment to the experts that the lawyers happen to offer. Though this is a tricky matter, I am strongly inclined to the view that rational abductive inference requires that the reasoner make *some* judgment about other expert (or nonexpert) disciplines that might offer superior competing explanatory accounts of the data.

Criterion (5) calls attention to the importance of setting a level of confidence that is appropriate to the type of case presented.⁴¹³ Josephson's model is also friendly to my contention that nonprobabilistic standards of

411. See John R. Josephson, *Conceptual Analysis of Abduction*, in *ABDUCTIVE INFERENCE: COMPUTATION, PHILOSOPHY, TECHNOLOGY* 5 (John R. Josephson et al. eds., 1994).

412. *Id.* at 14 (emphasis added). Josephson appears to treat criteria (1) to (4) as going to "[t]he judgment of likelihood associated with an abductive conclusion," and criteria (6) and (7) as a separate consideration (one "[b]eyond the judgment of . . . likelihood") regarding the reasoner's "willingness to accept the conclusion." *Id.* I do not see these as separate types of consideration, so I have included them on one list in the text above.

Criterion 5 is very close to the point Rudner makes in his ultimately unsuccessful argument that the scientist as such must make moral decisions. See *supra* Section II.C.

413. See *supra* Section II.C (discussing Rudner).

epistemic appraisal are often chosen by the practical decisionmaker in step (1)(a).⁴¹⁴

Before showing the value of this additionally "complexified" model of practical epistemic deference, let me present the whole model in accord with the additional judgments reflected in step (1):

(1) If an expert's scientific process (call it *P*) (a) produces a judgment (call it *j*) that rises to the level of confidence of the appropriate standard of epistemic appraisal specified by the practical reasoner (call the specified level Φ), and (b) those judgments are rationally pertinent to the factual question at issue, and (c) *P* offers the best explanation of the factual question among the live competitors, *then those judgments are true for given practical purposes* (call them *R*).

(2) If *j* is true for *R*, then if a practical reasoner has *R* (and has no other inconsistent practical purposes), then that reasoner ought to infer *j*.

(3) If a practical reasoner ought to infer *j*, then *j*.

(4) *P* produces judgments that satisfy Φ and those judgments are rationally pertinent to the factual question at issue and *P* offers the best explanation of the factual question among the live competitors.

(5) *j* is the result of *P*.

(6) *j* is true for *R*.

(7) If a practical reasoner has *R* (and has no other inconsistent practical purposes), then that reasoner ought to infer *j*.

(8) The practical reasoner has (singular practical purpose) *r* (and has no other inconsistent practical purposes).

(9) The practical reasoner ought to infer *j*.

Therefore,

(10) *j*.

Step (4) suggests that the nonexpert reasoner cannot avoid taking epistemic responsibility for judgments regarding: (1) the rational pertinence of an expert method; (2) the required standard of epistemic appraisal and level of confidence; and, perhaps even more importantly, (3) the conclusion that one of several competing expert methods *produces the best available explanation of the fact at issue*. In light of this more complex model of deference to experts, two strong claims lead me to doubt that a nonexpert can perform these

414. He writes:

It has been suggested that we should use mathematical probabilities to help us choose among explanatory hypotheses If suitable knowledge of probabilities is available, the mathematical theory of probabilities can, in principle, guide our abductive evaluation of explanatory hypotheses to determine which is best. However, in practice it seems that rough qualitative confidence levels on the hypotheses are enough to support abductions, which then produce rough qualitative confidence levels for their conclusions [F]or the most part numerical confidence estimates are unavailable and unnecessary for reasoning. People are good abductive reasoners without close estimates of confidence.

Josephson, *supra* note 411, at 26-27.

tasks in a manner that is *legitimate* from the practical point of view of the legal system.

To articulate that doubt, three steps remain for this Article. First, I conclude my earlier discussion of the problems of selection and competition by bringing this more complex model to bear on it. Second, I show that, on balance, we have strong reason to doubt that the judgments made in steps (1) and (4) can be made in a manner that is not *arbitrary* from an *epistemic* point of view. Finally, in Part VII, I show that, from a legal point of view, an epistemically arbitrary judgment in the process of practical epistemic deference is not legitimate.

We have already wrestled with conflicting intuitions about a nonexpert's ability to acquire KJB from experts in the face of problems of selection and competition.⁴¹⁵ It seemed on the one hand that credentials *must* be sufficient to enable KJB to arise from practical epistemic deference, but it also seemed that the use of credentials was subject to forceful challenge insofar as such use occasioned regress, question begging, and underdetermination. How can abduction help illuminate this problem?

First, keep in mind that we do not expect that the nonexpert can acquire KJB from the expert based on second guessing the substantive judgment of the expert.⁴¹⁶ Also, keep in mind that we are assuming sincerity and good faith on the part of the competing experts.⁴¹⁷ Thus the nonexpert is attempting to *discover* which discipline to select and which expert (among competing experts, actual or implied) to believe on the basis of the credentials (including the reputation) of sincere experts. What is it that could get this judgment *about* credentials, and about *credentials as an index to warranted expert beliefs about the world*, off the ground? The nonexpert must consult his own experience, memory, and prior judgments; where else can he begin? "[W]hat every juror ought to do in arriving at a verdict," as one court aptly explains, is

use all his experience, his knowledge of human nature, his knowledge of human events, past and present, his knowledge of the motives which influence and control human action, and test the evidence in the case according to such knowledge and render his verdict accordingly. A juror who did not do this would be remiss in his duty. The trial judge in considering the verdict must do the same, or fail in the discharge of that function which the law has laid upon him.⁴¹⁸

This means that what the practical reasoner (judge or judge plus jury) must bring to the table *regarding credentials* is some *explanatory* judgment about the *relation between credentials and scientific expertise*. In modern society,

415. See *supra* Section IV.C.

416. See *supra* Subsection V.C.1.

417. See *supra* Subsection V.C.4.

418. *State v. Hammond*, 604 A.2d 793, 795 (Conn. 1992).

almost all of us have experience with those who appear to us to be well-credentialed and expert in some discipline. We encounter teachers with credentials (more credentials as we climb the academic food chain), doctors with credentials, other professionals with credentials, television experts with credentials. Moreover, we have some reasonably confirming and disconfirming experiences with the success of these credentialed experts at resolving particular problems. We acquire the habit of extrapolating, by abductive-cum-inductive inference, from our success with one expert's credentials to an expectation of success with another expert who has the same credentials.

The nonexpert practical reasoner brings all this (implicit) reasoning about credentials with her to the judge's chamber or jury box. Such reasoning can indeed serve us well in everyday life, and it can account for the widely held view (in accounts like those of Kenny, Hardwig, Putnam, and Coady) that credentials are an adequate device by which a nonexpert can acquire KJB from an expert. It *may* even be that these considerations about the role of credentials in everyday life, and the extrapolation from that role into the domain of practical legal reasoning, are sufficient for the purposes of the legal system.⁴¹⁹ But there are at least three reasons to doubt seriously that these considerations are adequate and, though it is a close question, I am inclined to think they are not.

First, what is good enough for oneself in one's own life in the way of believing credentials and their experts is often not sufficient for deciding the fate of someone else who is being hauled about in civil or criminal process with life, liberty, property, or reputation at stake. (Explaining this suggestion is part of the burden of the next section.) Second, the kinds of expert judgments that are rationally pertinent to legal decisions are not infrequently at the cutting edge of scientific theory (for example, DNA fingerprinting, causation of harm by cigarettes or other consumer products, or causation of psychological harm), or at the cutting edge of particular scientific methods (which themselves cannot be kept sharply distinct from theories). Even applications of scientific methods that involve widely confirmed and accepted methods often involve complex mathematical formulae, including probabilistic and statistical judgments that are notoriously counterintuitive. As suggested above, to use credentials as an index of expertise, the nonexpert must extrapolate from prior experience with and judgments about credentialed experts. But even this generalization itself can be accomplished only with the help of an abductive inference, namely an inference to a hypothesis that

419. I should acknowledge that my approach to the question of the reasoner's experience with the success of credentials and extrapolation therefrom draws its energy from a moderate empiricist approach. Detailed discussion of why I am attracted to that approach is beyond the scope of the present work. I would begin by defending an empiricist account with the kinds of modifications cogently suggested by Fricker. See Fricker, *supra* note 239.

explains the pattern of successes and failures with prior credentialed experts as purveyors of KJB about the world.

I assume that this abductive inference can be folded into judgment (1)(c) in the complex model, but it could be exploded and analyzed into its own distinct set of steps. Also, I should explain that every inductive generalization relies on abductive inference to generate the categories to be tested and confirmed or disconfirmed by observation. The reason for this partakes of an observation also relied on in my discussion of analogy elsewhere.⁴²⁰ Every item has an indefinite number of features, from which some enormously narrowing selection must be made to get to the point of applying some method like John Stuart Mill's methods of confirmation or disconfirmation. A white swan is also a feathered creature, a biped, a fleshy creature, a carbon-based creature, a noncarnivorous creature, a creature with at least one limb, a creature without gills, a creature that weighs less than the earth, and a creature that travels more slowly than the speed of light. She who would like to confirm some truth about swans, such as that they are all white, or that most of them are white, must select from this welter of characteristics and place those characteristics selected into an explanatory pattern that is ready-made for observation, verification, and falsification. That selection *is* abductive inference.⁴²¹ The upshot of this is that no nonexpert can inductively generalize from experience with credentialed experts without relying on a logically prior step of abduction.

It is difficult to see how the nonexpert has a large enough base of experiences with experts to make good plausible abductive-cum-inductive inferences about the epistemic "warrantingness" of credentials. Even a successful experience with a doctor may not be best explained by the fact that he went to a good medical school; maybe a midwife or a witch doctor would have done as well because the ailment was psychosomatic and responded to a placebo effect.⁴²² Indeed, in a skeptical mood, one might well undermine, or at least raise serious doubts about, virtually every conclusion a nonexpert makes about the KJB-producing capacity of credentials. But even in a less skeptical mood, we should acknowledge that a nonexpert's base of extra-judicial, pre-cameral experience with credentialed experts is likely to be small, and some significant portion of it is likely to be shaky.

Finally, even apart from the adequacy of the base of data on which the nonexpert would rely in *abducting* a hypothesis about credentials, there is the far more daunting problem of *confirmation* or *disconfirmation* of whatever hypothesis is abducted. All abductions require confirmation or disconfirmation,

420. See Brewer, *supra* note 15, at 932-33.

421. Josephson also offers an argument to show that "it is possible to treat every good (i.e., reasonable, valid) inductive generalization as an instance of abduction." Josephson, *supra* note 411, at 19.

422. See the interesting discussion in JEROME D. FRANK, *PERSUASION AND HEALING: A COMPARATIVE STUDY OF PSYCHOTHERAPY* 136-64 (2d ed. 1973).

but the nonexpert's lack of epistemic competence threatens to deprive her of precisely the kind of understanding she would need to be able to confirm or disconfirm a hypothesis about credentials and their capacity accurately to identify which experts are capable of producing KJB and which are not. Such a hypothesis would include judgments about how important it is to the process of KJB formation for the expert to have a degree, which kind of degree, how important reputation is distinct from other credentials, and in what way reputation is important.

Somehow, with this last consideration, it seems I have come full circle (hoping not to have argued that way). It is difficult to see how a nonepistemically competent practical reasoner could make a cogent abductive inference about the KJB-signaling capacity of credentials, and confirm or disconfirm it, without having epistemic competence in the credentialized disciplines. In the absence of some reason to believe that the reasoner can make a cogent abduction of this sort, and in the absence of some reason to believe that the nonexpert even possesses a sufficient base of data on the basis of which to abduce a plausible hypothesis (about which credentials are KJB-signaling) in the first place, the judgment by the nonexpert in reliance on that abduction seems *epistemically arbitrary*.

I have just argued that in at least some cases in which competing expert testimony is presented, a nonexpert's judgment in reliance on an abduction *about credentials* will be arbitrary. The question naturally arises: In what percentage of cases? A fully skeptical view on this question would be that such judgments are *inevitably* arbitrary; that is, given these epistemic constraints on the nonexpert, *no* judgment about scientific evidence that itself relies on an abductive inference about the KJB-signaling power of credentials *can* be nonarbitrary. Although I am somewhat inclined toward this more skeptical view, I should emphasize that I do not need to go that far to establish that there is considerable epistemic arbitrariness in nonexperts' judgments that rely on abductions about credentials. I call this the "moderately strong" skeptical view, in contrast to the immoderately skeptical route of asserting that *all* judgments by nonexperts about credentials are epistemically arbitrary. According to more moderate skepticism, judgments about experts' scientific propositions will be arbitrary *at least* when the following condition is satisfied: Whenever the criterion of credentials *underdetermines* what scientific proposition is endorsed—that is, when two roughly equally well-credentialed experts (to the eyes of the nonexpert) endorse competing propositions, either about scientific theory, about scientific method, or about the application of scientific theory and method to a particular case.⁴²³ Let us refer to this as the "underdetermination condition." Although it would be difficult to estimate

423. See the discussion of Laudan's reticular account of scientific inquiry, which I track here. See *supra* Section II.B.

accurately the exact percentage of cases in which the underdetermination condition is in fact satisfied in the litigation setting, or in other settings, it is clearly a very significant percentage. Indeed, we should recognize that relevant kinds of disagreement between competing experts (i.e., those disagreements in which roughly equally well-credentialed experts endorse competing propositions) occur at all three levels that comprise an expert "point of view"—namely, the level of theory, the level of method, and the level of application. Recognizing that fact about experts' disagreement allows us to see that the underdetermination condition is satisfied in a far greater percentage of scientific testimony cases than we would notice were we to focus only on experts' disagreements about theory or method. For example, a very large percentage of cases in which scientific testimony is presented deal with "accident reconstruction" in tort suits.⁴²⁴ In these cases, both the theory and basic methods of science are usually not in dispute; what is in dispute is which expert's application of accepted theories and methods (mostly physics and biology) provides the *best explanation* of a particular incident. There is competing testimony by roughly equally well-credentialed experts in a large percentage of these cases.

Thus, according to the moderately strong skeptical position I am here endorsing, there are serious epistemic defects in the process by which a nonexpert extrapolates from prior (pre-judicial, if not prejudicial) experience with the success and failure of credentials as signals of KJB production. These epistemic defects are such that, when faced with competing, sincere, and roughly equally well-credentialed experts (i.e., when the underdetermination condition is satisfied), a nonexpert will on average do no better in selecting

424. An article in a leading litigator's handbook describes "accident reconstruction" and expert testimony in this way:

Whenever one is confronted with difficult liability issues in a substantial motor vehicle injury case, a dissection of *how* the accident happened, is essential. This is particularly significant when the victim is one who is involved in a multi-vehicle crash situation. Under those circumstances, a firm grasp of the dynamics of speed, road surface, metal damage, skid marks, gouge marks, debris, scuffing of roadway, and other factors, are paramount in reconstructing the events that led to the accident in question. The burden of reconstruction (which falls upon the party asserting the claim or defense) can be met in but one of two methods of proof: The first option is to produce facts through witnesses and documents that will create sufficient inferences, thereby drawing the jury to the desired conclusion. The other methodology is to produce a professional witness called an "accident reconstruction specialist." Such an expert is one who is usually a licensed professional engineer with a specialty in the myriad of dynamics involved in a complex motor vehicle accident. Essentially, such a witness, once qualified, provides testimony that is usually identical with the ultimate or threshold issue of the case. In essence, such a witness furnishes the accusatory opinion that incriminates one or the other operator involved in the accident. While the argument can be raised that the ultimate opinion reached by such an expert is a usurpation of the jury function, it remains, notwithstanding, as opinion evidence, subject to the usual instruction by the Court as to its acceptance or rejection by the jury. Moreover, strong and direct accident reconstruction testimony is extremely persuasive and oftentimes represents the difference between winning and losing.

Leonard L. Finz, *Accident Reconstruction: A Very Special Art*, in LITIGATION 177, 179-80 (PLI Litig. & Admin. Practice Course Handbook Series No. H4-5012, 1987).

which scientific expert to believe than one would by *tossing a coin*. That is, when a nonexpert is faced with competing testimony by roughly equally well-credentialed experts, and that nonexpert does manage to acquire a *true* belief about the scientific matter at hand, we have no reason to believe that the true belief was arrived at other than by *accident*.

There is enormous complexity among competing theories of knowledge, but for all the very significant differences among them, in this they seem to converge: A method of acquiring belief that produces only *accidentally* true beliefs is *epistemically arbitrary* and incapable of producing KJB. It is hard to improve upon Bernard Williams's succinct statement of this view:

[I]f we are speaking *in general* about knowledge . . . [w]hat is necessary—and what represents the undoubted fact that knowledge differs from mere true belief—is that one or more of a class of conditions should obtain, which relate the fact that A has this belief to the fact that the belief is true: conditions which can best be summarised by the formula that, *given the truth of p, it is no accident that A believes p rather than not-p. This formula is vague and over-generous, but it gets us, I think, on the right line . . .*⁴²⁵

Time to sum up. I have argued that reliance on the credentials of (even) sincere competing experts requires the nonexpert to abduce and to confirm or disconfirm a hypothesis about the KJB-producing capacity of credentials as signals, but that the nonexpert's lack of epistemic competence will prevent him from executing the first step in the chain of practical epistemic deference in a nonarbitrary manner, at least when the "underdetermination condition" is satisfied, that is, when roughly equally well-credentialed experts offer testimony that competes at the level of theory, method, or application. Moreover, competition by such experts occurs in a fairly large percentage of cases of scientific testimony—especially since there is large room for disagreement about application even when the basic theory and method are not in dispute among the relevant experts. The defect in the first step will cascade through the rest of the steps (2) to (10), rendering the whole chain *arbitrary, from an epistemic point of view*, when the "underdetermination condition" is met. The final question for us is: What if anything has the legal system to say about practical epistemic deference that is *epistemically arbitrary*?

425. B.A.O. Williams, *Knowledge and Reasons*, in PROBLEMS IN THE THEORY OF KNOWLEDGE 1, 5 (G.H. von Wright ed., 1972). In the omitted parts of this passage, Williams firmly commits himself to an externalist approach to knowledge.

[N]ot only is it not necessary that the knower be able to support or ground his true belief by reference to other propositions, but it is not necessary that he be in any special state with regard to this belief at all, at least at the level of what he can consciously rehearse.

Id. Elsewhere, the paper flirts with a causal account. I would subscribe to neither epistemological view, but I think virtually all theories would reject the merely accidentally true belief as either justified belief or knowledge.

VII. INTELLECTUAL DUE PROCESS

One value of the closely related ideas of the axiological structure of an intellectual enterprise and the point of view⁴²⁶ is that they provide us with a clear way to examine the interaction of the reasoning of practical reasoners and theoretical reasoners when the former solicit expert information from the latter. These concepts facilitate the separation of the *practical* aims, methods, and judgments of a legal reasoner from expert *theoretical* aims, methods, and judgments. It is especially important for us to have some such analytical tool because, on the surface, the distinctive points of view of the expert scientist and the judge or jury can seem hard to keep separate when the judge or jury seeks in the course of legal decisionmaking to make or at least endorse theoretical judgments (in cases like *Brown* and *Daubert*).

A. *Epistemic Nonarbitrariness as a Practical Constraint on Legitimate Epistemic Deference*

My goal for the present section is to explicate some of the overall normative aims in the “practical point of view” from which a legal system ought to evaluate the transfer of scientific information from scientific experts to nonexpert judges and jurors. The normative aims that are such an important element in the practical point of view of a legal system are articulated and relied upon in many decisions by courts dealing in one way or another with the rationality of legal decisionmaking in cases to which complex scientific information is rationally pertinent. I discuss a few such cases to help explicate what those normative aims are.

The central idea animating these practical norms is that certain *rule-of-law* values require *epistemic nonarbitrariness* in factfinding reasoning, as in other types of reasoning. Thus, if the nonexpert cannot acquire scientific beliefs from competing experts in a way that is nonarbitrary, from an *epistemic* point of view, those beliefs will therefore not be legitimate from the *practical* legal point of view. That is, according to this practical rule-of-law norm, at least in cases in which life, liberty, or property is at stake, *epistemic* nonarbitrariness in the process of “finding” scientifically discerned facts is a necessary condition of the *practical* legitimacy of a decision that relies on that factfinding.

One finds respect for and recognition of this norm in both philosophical and legal materials. John Rawls, for example, has long maintained that among those “guidelines intended to preserve the integrity of the judicial process” are the requirements that courts undertake conscientiously

426. See *supra* Sections II.B-C.

to determine whether an infraction has taken place Thus a legal system must . . . *contain rules of evidence that guarantee rational procedures of inquiry*. While there are variations in these procedures, *the rule of law requires some form of due process: that is, a process reasonably designed to ascertain the truth, in ways consistent with the other ends of the legal system*, as to whether a violation has taken place and under what circumstances.⁴²⁷

Rawls's point applies no less to the integrity of the judicial process in civil cases than it does to the integrity of that process in criminal cases. A reflection of this same basic rule-of-law value, articulated in the setting of a civil antitrust action, is found in a prominent federal appellate case. In *In re Japanese Electronic Products Antitrust Litigation*,⁴²⁸ several U.S. electronics manufacturers brought an antitrust action against several Japanese manufacturers. When the U.S. plaintiffs made a motion for jury trial, the defendant Japanese companies countered, claiming among other things that the economic and technical issues were *too conceptually complex* for the jury to understand, even with the help of expert testimony. The case was on appeal from a federal district court on the sole question whether the plaintiffs had a right to a jury trial even when the issues and evidence involved would be acutely complex.⁴²⁹ In effect, the court considered whether there was (what has come to be referred to as) a "complexity exception" to the Seventh Amendment right to jury trial under the U.S. Constitution.⁴³⁰ The district judge had held that there was no such "complexity exception."⁴³¹ In what appears to be an unprecedented decision in the federal courts, the appellate court overturned the district court judgment. The appellate court agreed with the defendant, vacated the district court's pretrial order, and held that, despite the normative force of the Seventh Amendment right to jury trial, the Fifth Amendment *due process* right to have a rational and fair adjudication outweighed the Seventh Amendment right. The court concluded that the Fifth Amendment narrows the scope of the Seventh Amendment by means of a complexity exception.

In its cogently articulated opinion, the appellate court specified the kind of *complexity* that might trump the right to jury trial as follows:

A suit is too complex for a jury when circumstances render the jury unable to decide in a proper manner. The law presumes that a jury will find facts and reach a verdict by rational means. It does not contemplate scientific precision but does contemplate a resolution of

427. JOHN RAWLS, A THEORY OF JUSTICE 238-39 (1971) (emphasis added).

428. 631 F.2d 1069 (3d Cir. 1980).

429. See *id.* at 1071.

430. See *id.* at 1079-80.

431. See *id.* at 1073 (discussing *Zenith Radio Corp. v. Matsushita Elec. Indus. Corp.*, 478 F. Supp. 889 (E.D. Pa. 1979)).

each issue *on the basis of a fair and reasonable assessment of the evidence and a fair and reasonable application of the relevant legal rules*. A suit might be excessively complex as a result of any set of circumstances which singly or in combination render a jury *unable to decide in the foregoing rational manner*. Examples of such circumstances are an exceptionally long trial period *and conceptually difficult factual issues*.⁴³²

The court concludes that “due process precludes trial by jury when a jury is unable to perform this task with a reasonable understanding of the evidence and the legal rules.”⁴³³ The court went on to elucidate the connection between this right to rational comprehension by the legal decisionmaker and rule-of-law values like predictability and notice:

The due process objections to jury trial of a complex case implicate values of fundamental importance. If judicial decisions are not based on factual determinations bearing some reliable degree of accuracy, legal remedies will not be applied consistently with the purposes of the laws. *There is a danger that jury verdicts will be erratic and completely unpredictable, which would be inconsistent with evenhanded justice. Finally, unless the jury can understand the evidence and the legal rules sufficiently to rest its decision on them, the objective of most rules of evidence and procedure in promoting a fair trial will be lost entirely*. We believe that when a jury is unable to perform its decisionmaking task with a reasonable understanding of the evidence and legal rules, it undermines the ability of a district court to render basic justice.⁴³⁴

The court also addressed the question of what values the legal system might injure in cases to which the complexity exception applied by choosing not to allow the kind of community input that the constitutional jury trial right was designed to secure. The central values often mentioned in connection with the jury trial right—values powerful enough, in the district court’s judgment, to lead it to reject the idea of a complexity exception—are the jury’s function as a check on judicial power, and the jury’s ability to modify and conform the law to, and suffuse the law with, community values (so-called jury equity), thereby lending the law a communitarian legitimacy it might not otherwise have. Assessing these countervailing values reflected in the Seventh Amendment, the court of appeals delivered something of a *coup de grace* debater’s point:

432. *Id.* at 1079 (emphasis added) (citations omitted).

433. *Id.* at 1084.

434. *Id.* (emphasis added).

In the context of a lawsuit of the complexity that we have posited, however, these features [of the jury system] do not produce real benefits of substantial value. The function of "jury equity" may be legitimate when the jury actually modifies the law to conform to community values. However, when the jury is unable to determine the normal application of the law to the facts of a case and reaches a verdict on the basis of nothing more than its own determination of community wisdom and values, *its operation is indistinguishable from arbitrary and unprincipled decisionmaking*. Similarly, the "line-drawing" function is difficult to justify *when the jury cannot understand the evidence or legal rules relevant to the issue of where to draw a line*.

. . . A jury unable to understand the evidence and legal rules is hardly a reliable and effective check on judicial power. Our liberties are more secure when judicial decisionmakers proceed rationally, consistently with the law, and on the basis of evidence produced at trial. If the jury is unable to function in this manner, it has the capacity of becoming itself a tool of arbitrary and erratic judicial power.⁴³⁵

In *In re Japanese Electronic Products Antitrust Litigation*, one thus finds a powerful articulation of the legal system's commitment to *practical* norms in the family of rule-of-law values that are specifically addressed to the epistemic cogency of juridical factfinding. In various ways, one finds a similar commitment to these *epistemically* oriented rule of law values in many other judicial opinions, state and federal. Thus, one state supreme court declared:

One cogent reason for overturning the verdict of a jury is that the verdict is based on conclusions that are physically impossible. "[A] verdict should be set aside '[w]here testimony is thus in conflict with indisputable physical facts, the facts demonstrate that the testimony is either intentionally or unintentionally untrue, and leave no real question of conflict of evidence for the jury concerning which reasonable minds could reasonably differ.' . . ."

Scientific evidence is relevant to a determination of what is physically impossible. In *Roma v. Thames River Specialties Co.*, this court held that the trial judge "would have failed in his duty" if he had not set aside the verdict when "the laws of mechanics, as testified to and uncontradicted, tended to prove [the claimant's] story impossible." In *Jump v. Ensign-Bickford Co.* the trial court properly set aside the verdict when expert scientific testimony indicated that it was physically impossible for a fuse to burn as fast as the claimant had alleged, and this court could "find in the evidence no reasonable ground which would have justified the jury in disregarding that evidence."⁴³⁶

435. *Id.* at 1085 (emphasis added) (citations omitted).

436. *State v. Hammond*, 604 A.2d 793, 795 (Conn. 1992) (citations omitted).

Similarly, in an opinion perhaps signaling that the U.S. Supreme Court may be amenable to something like a complexity exception, Justice Souter declared that, when a case requires the legal decisionmaker to interpret and comprehend complex technical patents, the decision is to be made by the judge, not the jury. He reasoned:

In the main, we expect, any credibility determinations will be subsumed within the necessarily sophisticated analysis of the whole document, required by the standard construction rule that a term can be defined only in a way that comports with the instrument as a whole. Thus, in these cases a jury's capabilities to evaluate demeanor, to sense the "mainsprings of human conduct," or to reflect community standards . . . are much less significant than a trained ability to evaluate the testimony in relation to the overall structure of the patent. The decisionmaker vested with the task of construing the patent is in the better position to ascertain whether an expert's proposed definition fully comports with the specification and claims and so will preserve the patent's internal coherence.⁴³⁷

These cases suggest a strong commitment among leading jurists to the idea that factfinding, including factfinding regarding matters that are the special epistemic province of expert scientists, must be conducted in a coherent and rational manner in order that this epistemic process meet the normative requirements of a legal system that operates to grant or deprive people of life, liberty, and property. Reflecting on these and other such statements by judges and other jurists, we may sense a commitment, immanent in the broad materials that constitute authoritative law (U.S. law, at least), to what we may call the practical norm of *intellectual due process*. In *re Japanese Electronic Products Antitrust Litigation* is especially fertile here, with its suggestion that the *epistemic* process of comprehension of theoretical complexities is a mandate of the decidedly practical norm of the Due Process Clause. Though there are, to be sure, many features of due process that do not specifically "sound" epistemic, that case reveals that some distinctively practical norms do have meaningful epistemic consequences. Much philosophical work remains to be done to explicate this emerging rule-of-law norm. Recognition of intellectual due process as a practical norm in the family of rule-of-law norms has only just begun—partly because the startling advances in scientific methods—coupled with the striking increases in the technological complexity of society and the laws that arise to govern and guide it, is also a relatively recent socio-epistemic phenomenon.

437. *Markman v. Westview Instruments, Inc.*, 116 S. Ct. 1384, 1396 (1996) (citations omitted). From an epistemic point of view, *Markman's* solution suffers from the same problem that afflicts *In Re Japanese Products Antitrust Litigation*: A technically nonexpert judge is not in a decisively better position than a technically nonexpert jury.

A great deal of work remains in explicating the scope and criteria of “intellectual due process,” but this much seems clear even now: A reasoning process that is *epistemically* arbitrary is incapable of producing a *legitimate* decision, for such a reasoning process is “indistinguishable from arbitrary and unprincipled decisionmaking.” If I am right that practical epistemic deference to expert scientists is doomed, on average, to generate in nonexpert judges and jurors beliefs that are only accidentally and arbitrarily true at best and thus are not epistemically *justified* beliefs, then this process *perforce* does not produce *legally* legitimate decisions.

B. *Consequences for Doctrinal and Institutional Design:*
“Two-Hat” Solutions and Intellectual Due Process

What is to be done? Detailed analysis of the consequences of this analysis for institutional and doctrinal revision and transformation are beyond the scope of my current project. A few conclusions do emerge, however. If legal systems are to endorse and aspire to satisfy the intellectual due process norms (and other related rule-of-law norms), they would be well advised to move toward a “two-hat” model of legal decisionmaking in areas to which scientific results are rationally pertinent. On this model, the system seeks to ensure that one and the same decisionmaker has both legal legitimacy (by being duly elected or appointed by a legitimate elective or appointing authority) *and* epistemic competence with the basic formal tools of scientific analysis. A useful heuristic analogy might be that of a mathematician or physicist who has practical decisionmaking authority as a voting member of his department (wearing one hat), and epistemic competence that informs the practical judgment (wearing the other), or similarly, a physicist voting on who should receive a physics prize for the most important contribution to his field. Many jurists have already begun to consider different paths on this broad avenue of reform, and various proposals consistent with the “two-hat solution” satisfy it. These include turning over many decisions currently made by private litigation to public administrative agencies staffed with trained scientists, relying on blue ribbon scientifically trained juries, scientific expert magistrate judges, or even special science courts staffed by scientifically trained judges. Already in the wake of *Daubert*’s increased demands on federal trial court judges, special workshops on scientific theory and method have become available to train them.

A further word about *Daubert*’s gatekeeping solution is in order. Both *Daubert* and *In re Japanese Electronic Products Antitrust Litigation* rely on the underlying assumption that a judge is in a decisively better epistemic position than a jury to assess rationally the merits of competing scientific testimony, even when the underdetermination condition is satisfied.⁴³⁸ My

438. See *supra* Subsection V.C.4.c (describing the “underdetermination condition”).

analysis of the legitimacy of epistemic deference gives reason to be skeptical about that assumption, for the analysis applies no less to a nonexpert judge than it does to a nonexpert jury. It is for this reason that the distinction between the threshold question of the *admissibility* of evidence, on the one hand, and the question of the *weight* of the evidence, on the other, is not particularly important in my analysis. *Daubert* and (implicitly) *In re Japanese Electronic Products Antitrust Litigation* treat this distinction as very important, for they both assume that a judge is in a significantly better epistemic position to decide whether proffered scientific evidence is sufficiently reliable to be admissible in a trial before a nonexpert jury, which could then weigh the suitably screened evidence. I have argued that we have good reason to doubt that assumption and, indeed, to be quite skeptical about the idea of solving problems of selection, competition, and underdetermination by taking decisions about expert testimony away from nonexpert juries and giving them to nonexpert judges.

It is important not to overstate my argument here. Early in the Article, I noted that epistemic competence is a matter of degree—that not all experts are equally epistemically competent and not all nonexperts are equally epistemically incompetent.⁴³⁹ This means that it is certainly conceptually possible that a trial judge is significantly more epistemically competent than a jury in assessing the scientific merits of expert scientific testimony, even when the underdetermination condition is satisfied. That is, it is conceptually possible that the underlying assumption of *Daubert*, *In re Japanese Electronic Products Antitrust Litigation*, *Markman*, and many other state and federal cases, is accurate as to *some* judges. Nor is this a bare conceptual possibility. It is not unreasonable to suppose that some judges, who are repeatedly and predictably faced with proffers of scientific evidence, may find and take the time and energy required to become decently competent in manipulating the aims, methods, and results of some of the specific sciences that are likely to come into their courts. Perhaps some autodidactic judges even become sufficiently competent to satisfy the demands of intellectual due process. The plausible possibility that this is true of some judges raises the largely *empirical* question about what percentage of judges in state or federal systems are in fact in this happy—from the point of view of intellectual due process—state.⁴⁴⁰

Still, though I have not done the kind of empirical work required cogently to answer that question, *the norm of intellectual due process itself places the burden of empirical proof* on those who would maintain that a large enough percentage of judges are or will in the near future be in that state. That is, the burden is on the person who claims, along with the *Daubert* Court, that, by and large, trial judges already wear, or soon will wear, the required “two hats.”

439. See *supra* Section IV.A.

440. Thanks to Justice Charles Fried for very helpful discussion of this point.

The burden is on the person who claims that the requirements of intellectual due process can be satisfied on a large scale by taking the decisions out of the hands of nonexpert juries and leaving them in the hands of judges. Carrying that burden of proof would of course call for a procedure significantly different from that of *Daubert* itself, for *Daubert* is still willing to turn over many ultimate decisions, even in cases in which the underdetermination condition is satisfied, to nonexperts whom we have no reason to believe are sufficiently competent in the expert discipline to meet the requirements of intellectual due process.

I have spoken of remaining empirical questions and of burdens of empirical proof. There are also important *conceptual* details that remain to be worked out for the two-hat solution. What kind of training should the experts—or expertly trained judges—get? One can get a clear sense of the training required to have basic competence in biology, genetics, statistics, economics, or epidemiology, but how scientifically specialized is it feasible to allow the two-hat-wearing legal decisionmaker to be? Even the heuristic analogy of the mathematician may break down, since that field, like virtually all fields in the empirical and demonstrative sciences, is becoming intensely specialized. Will scientific discipline become so specialized that it ceases to make sense to talk about general epistemic competence even *within* a discipline? And if that problem looms for singular disciplines, what hope is there for resolving problems of *extra*-disciplinary competition in a manner consistent with the suasions of intellectual due process? Still another question is, how much training is enough? To the level of a Ph.D? An M.A.? Are formal degrees good signals at all? Still another question involves the democratic legitimacy of the two-hat solution. Rule by technocrat-kings has its dangers, just as does rule by epistemically unruly mobs. Is there a feasible and meaningful way in which a responsible polity can deliberate and endorse the training programs and institutional schemes that would implement the “two-hat” solution and achieve a reasonable degree of intellectual due process?

These are deep and difficult questions. But few topics, I hazard to say, will be more important to the health of the polity and its citizens than the close investigation of how the law *ought*—from legal, moral, and other closely related practical *points of view*—to keep up with science.

VIII. CONCLUSION

Though its steps have been long, the argument presented in this Article is not too difficult to summarize. I have argued that there is a structured reasoning process that a nonexpert judge or jury must use in an effort to take account of scientific expert testimony in the course of reaching a legal decision about liability (in the civil setting) or guilt (in the criminal setting). When one attends carefully to the precise steps of the reasoning process, one sees that

there are crucial steps that a nonexpert judge or jury is, in a great many instances, not capable of performing in an epistemically nonarbitrary manner. Specifically, when competing scientific experts are, for all the nonexpert knows, fairly evenly matched in credentials, reputation, and demeanor, and when no generally accessible rational criteria (such as self-contradiction by an expert witness) break the "tie" (i.e., when what I have called the "underdetermination condition" is satisfied), then a nonexpert is not capable of choosing among the competing experts in an epistemically nonarbitrary way. I have also sought to show that epistemic nonarbitrariness is a necessary condition of *legitimacy*, as expressed in the norm of *intellectual due process*. This norm, an emerging rule-of-law norm, immanent in both decided cases and various analyses of jurists and philosophers, will be increasingly important as scientific expert testimony comes to be used in a greater and greater percentage of cases.⁴⁴¹ When the conditions of this norm are not satisfied, decisions by nonexperts, even in light of relevant scientific expert testimony, lack *epistemic* legitimacy, and *therefore* lack the kind of *practical-cum-moral* legitimacy that legal systems do and ought to demand.

What is to be done if the relevance of scientific information to legal decisions continues to grow, while nonexperts are so often incapable of legitimately incorporating that information into their decisions? Nothing in this Article suggests that a nonexpert judge cannot become sufficiently epistemically competent, even without the formal training of a scientist. Perhaps some judges, by virtue of background or repeat "on the bench" experience with scientific evidence, will become sufficiently epistemically competent to render decisions about scientific expert testimony that are epistemically legitimate and that meet the demands of intellectual due process. *Daubert* itself calls upon judges to be more active as "gatekeepers" in screening out unreliable science. But *Daubert's* solution to the problem of legitimately assessing expert scientific testimony seems a poor one. First, given the press of other judicial business, it seems unlikely that a significant percentage of judges either already have, or will find the time to acquire, the kind of scientific competence that legitimate, intellectually "duly processed" decisionmaking requires. That is, unless judges are routinely and *systematically* trained in scientific theories and methods, *Daubert* does not offer a promising overall solution to the problem. Also, under *Daubert*, even when a judge is sufficiently competent, that competence could yield a duly processed, legitimate decision only when the judge decides *not* to admit some proffered scientific testimony. But in a great many other cases, the judge will admit competing scientific evidence, and allow the nonexpert, noncompetent jury to

441. See JUDICIAL CONFERENCE OF THE U.S., REPORT OF THE FEDERAL COURTS STUDY COMMITTEE 97 (1990) ("Economic, statistical, technological, and natural and social scientific data are becoming increasingly important in both routine and complex litigation."), *quoted in* General Elec. v. Joiner, 118 S. Ct. 512, 520 (1997) (Breyer, J., concurring).

make the decision—the quintessential circumstance, as this Article has argued, in which failures of intellectual due process occur.

Nor can the expedient emphasized by Justice Breyer in the *Joiner* decision—the Supreme Court’s next major treatment of an issue concerning scientific evidence after *Daubert*—resolve the problem. Justice Breyer rightly highlighted the epistemic problem judges have in attempting to fulfill *Daubert*’s requirements:

This requirement will sometimes ask judges to make subtle and sophisticated determinations about scientific methodology and its relation to the conclusions an expert witness seeks to offer—particularly when a case arises in an area where the science itself is tentative or uncertain, or where testimony about general risk levels in human beings or animals is offered to prove individual causation. Yet . . . judges are not scientists and do not have the scientific training that can facilitate the making of such decisions.⁴⁴²

In Justice Breyer’s view, given this challenge, judges should more actively solicit scientific information in order to perform their *Daubert*-mandated role of “gatekeepers” vigilant against junk science, for example by using court appointed experts,⁴⁴³ appointing special masters or specially trained law clerks, or using pretrial conferences to narrow the scientific issues.⁴⁴⁴ But, for reasons suggested above, this solution also fails to meet the needs of intellectual due process for any judge who is himself not epistemically competent in scientific methods and theories.⁴⁴⁵ For the judge is not capable of making an epistemically legitimate decision about *which special master, law clerk, or court-appointed expert* to consult.

The only solution (actually, it is a family of solutions) I see requires that one and the *same* legal decisionmaker wear two hats, the hat of epistemic competence and the hat of practical legitimacy. That is, whether it is a scientifically trained judge or juror or agency administrator, the same person who has legal authority must also have epistemic competence in relevant scientific disciplines. In an age in which culture will increasingly take advantage of the massive intellectual power of science, this is not too high a price for the legal system to pay to satisfy its own just intellectual aspirations.

442. *Id.* *Joiner* held that, even under *Daubert*, the proper standard of review for decisions about the admissibility of scientific evidence was “abuse of discretion,” regardless of whether the district judge’s decision was to admit or exclude the evidence, and regardless of whether that decision was “outcome determinative.” See *id.* at 515 (majority opinion).

443. See FED. R. EVID. 706.

444. See *Joiner*, 118 S. Ct. at 520-21 (Breyer, J., concurring).

445. Like the philosopher Anthony Kenny, Justice Breyer offers an “extra-cameral” approach to the problem. I discuss this approach and its problems above. See *supra* notes 286-293 and accompanying text.