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LISTENING TO TRIBAL LEGENDS: AN ESSAY ON LAW AND THE SCIENTIFIC METHOD

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INTRODUCTION

MUCH of jurisprudence is storytelling. Jurisprudence recounts tales of what has gone before; it improvises and crafts new stories of legal theory from old ones. Useful kernels are passed from one generation of legal thinkers to the next. Like tribal legends, the messages in many stories of jurisprudence can be understood only by a select audience. Legends often come with morals; theories of jurisprudence often impart prescriptions for living within the law.¹ Jurisprudence, like legends, concerns fundamental issues, confronts cosmic questions and weaves in magic.² Sometimes both possess humor as well.³

Unfortunately, some modern versions of jurisprudential theories have become anecdotal—capturing partial essences, caricaturing details and

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1. See, e.g., Matsuda, Affirmative Action and Legal Knowledge: Planting Seeds in Plowed-Up Ground, 11 Harv. Women’s L.J. 1, 16-17 (1988) (“Left alone to reseed, the phlox will soon revert to the old muddy-purple, disappointing the gardener who first planted a rainbow of lemon, white, garnet, lavender, and apricot. We must tend our garden lovingly, lest we revert to the boring world of one color, one idea.”); Williams, Alchemical Notes: Reconstructing Ideals from Deconstructed Rights, 22 Harv. C.R.-C.L. L. Rev. 401, 431 (1987) (“In many mythologies, the mask of the sorcerer is also the source of power. To unmask the sorcerer is to depower. So CLS’ unmasking rights mythology in liberal America is to reveal the source of much powerlessness masquerading as strength.”).

2. See R. Erdoes & A. Ortiz, American Indian Myths and Legends xi-xv (1984); B. Malinowski, Myth in Primitive Psychology, in Magic, Science and Religion 93 (1954). This point is also illustrated by the debate regarding the merits of ingenious sparks and grand theory-building as opposed to conventional jurisprudence. Compare Farber, Brilliance Revisited, 72 Minn. L. Rev. 367, 377-78 (1987) (arguing for presumption in favor of conventional wisdom) and Farber, The Case Against Brilliance, 70 Minn. L. Rev. 917 (1986) (arguing that “brilliant” academic work that tends to challenge conventional wisdom should be abandoned) with Schlag, The Brilliant, the Curious and the Wrong, 39 Stan. L. Rev. 917, 919-24 (1987) (responding to Farber—questioning supposition that merely because brilliant theories can be developed only by a few people, they are unlikely to be correct, and suggesting that brilliance is less a matter of consent or majority comprehension and more a matter of conjuring up novel avenues for exploration).

losing salient messages in the telling. Theorists narrate selective parables, but lessons from the full history of the tribe have been lost. The legal storytellers engage in revisionist tales of history and the listeners selectively perceive. In many ways, we are not listening to our tribal legends.

One of the stories of jurisprudence is the account of law and science. In essence, it is the tale of two tribes, each with its own legends, prescriptions and imagery. Different schools of jurisprudence have treated science in legal theory in varied ways. The history of jurisprudence has seen principles of science relied on as a model for legal theory, used to support social action theories of law, dismissed as unhelpful to normative questions faced by law, and decried as a construct that masks choices that are ultimately political.

There have been scattered attempts to apply particular scientific or social science frameworks to law to explain or predict case outcomes, analyze data or empirically support propositions relating to substantive issues. Scholarly attention has recently returned to the possibilities of

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Schlag, supra note 2, at 917 n.1.


4. Of course, this practice is not limited to jurisprudential theorizing. The selection of supportive accounts, passages and arguments is endemic in law.


6. See, e.g., Channels, The Methods of Social Science and Their Use in Legal Proceedings, 16 Conn. L. Rev. 853 (1984) (acknowledging increasing use of social science research in law and attempting to familiarize legal profession with methods and problems in social science research); Finch, The Role of Social Sciences in the Study of Law, 12 Stetson L. Rev. 641 (1983) (traditional law school education that relies almost exclusively on purely legal sources is flawed to the extent it ignores contributions social sciences can make to law); Handler, The Judicial Pursuit of Knowledge: Truth and/or Justice, 41 Rutgers L. Rev. 1, 1-4 (1988) (identifying how scientific information, including that derived from the social sciences, can help resolve difficult legal issues associated with battered women's syndrome, child sexual abuse and surrogate parenting); Jensen & Horvitz, A Theoretical Framework for Quantifying Legal Decisions, 20 Jurimetrics J. 121 (1979) (arguing for quantitative rather than qualitative approach to legal analysis).
ferred by science to shape legal theory. Some commentary discusses the ways in which the scientific model can operate on the decisional level. There has been no systematic attempt, however, to define the modern scientific method in the context of law or to analyze its application to jurisprudence. Recent jurisprudential theories contrast science with practical reason. Consequently, a significant controversy is emerging over the use of the scientific method in jurisprudence.

Part I of this Article defines the criteria of theory-building that comprise the modern scientific method. It observes that the use of science in law has been limited by the prevailing assumption that principles of scientific inquiry must be abandoned when law faces value choices. This Article posits that the scientific method's criteria of validation can apply to decisions about values as well as facts. This Article makes the stronger claim that certain values, such as openness, humility and nonchauvinism inhere in the criteria of theory validation—simplicity, depth, fertility and falsifiability. The principles of scientific inquiry are essentially criteria of rationality. To the extent that the goal of law is


8. See, e.g., Walker & Monahan, Social Frameworks: A New Use of Social Science in Law, 73 Va. L. Rev. 559 (1987) (suggesting that social frameworks may assist decisionmakers in determining factual issues such as the validity of eyewitness identification and the battered woman's syndrome); Note, The Scientific Model in Law, 75 Geo. L.J. 1967, 1981 (1987) ("[t]he explanatory usefulness of the scientific model of legal analysis is probably most important to legal theorists").

9. See generally Fuller, supra note 7, at 552 (scientific realism being ignored in contemporary legal theory debates); Merges, The Nature and Necessity of Law and Science, 38 J. Legal Educ. 315 (1988) (assessing the impact of law and science on legal education and theory); Miller, The Science of Law: The Maturing of Jurisprudence into Fundamental Principles in Fairness, 13 W. St. U.L. Rev. 367, 399-404 (1986) (science of law is defined by certain fundamental principles); Walker & Monahan, Social Facts: Scientific Methodology as Legal Precedent, 76 Calif. L. Rev. 877 (1988) (methodologies used by social scientists should be accorded precentual value; specific applications of methodology should not); Ziegler, A General Theory of Law as a Paradigm for Legal Research, 51 Mod. L. Rev. 569, 584-91 (1988) (attempting to develop a legal paradigm so law can advance like science); Note, supra note 8, at 2001 (law benefits from science and can be studied scientifically).


11. The criteria of validation are used in both theory-building and theory validation.
rationality, legal theory should follow the criteria contained in and adopt the values implied by the scientific method.

Part II describes how various schools of jurisprudence have treated scientific method. Parts III and IV question science's role in law and suggest that the scientific method can assist scholars and judges on both the theoretical and decisional levels. As metatheory, the criteria of validation afford universal standards for good theory-building. They can help evaluate the rationality and utility of theories of jurisprudence. As part of a decisional methodology, the criteria can lead to empowered inquiry—to greater openness in decisionmaking, better reasoned analysis and, perhaps, more just results.

This Article does not attempt to articulate a comprehensive theory of science, law or the intersection of the two; nor does it offer a positive program of "scientific" adjudications for decisionmakers. Its goal is to entice both jurists and theorists into thinking more systematically and self-analytically about their theories, reasoning, conclusions and areas of ignorance. This Article suggests that attention to the principles of scientific inquiry is one method of improving the rationality of legal decisions and theories.

I. AN ACCOUNT OF THE SCIENTIFIC METHOD

To those who assert that Scientific Method is inconceivable in the Law, we ask the blunt question of Alice in Wonderland: 'Have you ever tried it?' And if not how do you know?12

Legal theory contains no inherent set of methodological assumptions.13 Instead, law scavenges other disciplines for its methodology.14 Indeed, most contemporary theories of jurisprudence—law and economics, law and society, and critical legal studies—rely to some degree on empiricism in theory formation and verification.15 While discourse on the "scientific" nature of jurisprudential theories abounds,16 surprisingly little attention is given to what it means for a theory to be "scientific." Definitions of science vary even among commentators who discuss the meaning of science as applied to theory-building.17 It is important,
therefore, to discuss the meaning of the scientific method.

A. Criteria for Theory-Building

Some philosophers of science dispute the existence of a single scientific method. This dispute may mean only that the scientific method itself is adaptive and, therefore, has changed and evolved historically. The term "scientific method" encompasses two separate ideas. The first is a method of inquiry or experimentation—the accepted principles of the means of obtaining knowledge about things. The second is a set of standards for sound theory—criteria for theory validation. This Article is concerned with the procedures for improving legal theory by using the criteria of validation. While categorization differs, there is a generally accepted set of principles for scientific theory-building. It must be emphasized, though, that while these criteria are interrelated—and exclusive reliance on a single criterion can lead to poor theory-building—the principles are not fully compatible. The theory that offers the greatest explanatory power, for example, may not be the theory that is the most simple.

Ventures, 13 J.C.U.L. 109, 120 (1986) (science is “the process by which knowledge is systematized or classified through the use of observation, experimentation or reasoning”); Miller, supra note 9, at 367 (science may be viewed “as an objective system with demonstrably recurrent principles”); Note, supra note 8, at 1967 n.2 (“science can be thought of as an approach to understanding characterized by (1) empirical testing and (2) rational inquiry”).

Martin Golding charges that realist legal theory smacks of scientism. See Golding, Jurisprudence and Legal Philosophy in Twentieth-Century America—Major Themes and Developments, 36 J. Legal Educ. 441, 453 (1986). But what Golding means by the appellation is little more than the negative effects of using empirical results to dictate value choices. In Note, Dworkin and Subjectivity in Legal Interpretation, 40 Stan. L. Rev. 1517, 1535 (1988), the author refers to Gadamer’s view of scientism in theory construction, which he defined simply as “the existence of objectively valid meaning.” Philosopher of science Abraham Kaplan defines “scientism” as “the pernicious exaggeration of both the status and function of science in relation to our values.” A. Kaplan, The Conduct of Inquiry 405 (1964).

The meaning of science is more than a semantic struggle. Until the objectives of science are clearly and consistently referenced, the utility to law of the principles of scientific inquiry will be limited. Professor Ernest Nagel suggests that “[t]he practice of scientific method is the persistent critique of arguments, in the light of tried canons for judging the reliability of the procedures by which evidential data are obtained, and for assessing the probative force of the evidence on which conclusions are based.” E. Nagel, The Structure of Science 13 (1961).

19. See Levi, Common Sense, Scientific Method, and Educational Research, 7 Stud. Phil. & Educ. 130, 135 (1970) (“the general principles of scientific inquiry are themselves reconstructed historically as their clarity, comprehensiveness, and other characteristics are tested by inquiries in specific and varied domains”).
20. See generally J. Feibleman, Scientific Method: The Hypothetico-Experimental Laboratory Procedure of the Physical Sciences 26 (1972) (attempting to catalog principles of scientific method for uniformity of application). This is the process of hypothesis creation and testing. This Article is not concerned with the collection of data, derivation of hypotheses or process of manipulative experimentation.
21. It should also be recognized that there is no hierarchy of criteria. The “most
1. Simplicity

The first criterion of theory confirmation is simplicity, which is also often referred to as economy or elegance. Simplicity refers to a theory's ability to explain all of the relevant phenomena in a single set of ideas. Popularly known as Ockham's Razor, it posits that the least complicated theory or explanation is preferred. Simplicity is perhaps the most pervasive criterion for theory-building because it concerns the integrity of a system of theory. Simplicity refers to the neatness of the conceptual package and the lack of exceptions or ad hoc explanations of phenomena inconsistent with the main precepts of the theory. The absence of autohypotheses and autoexplanations requires a uniformity of laws and principles. Simplicity, ironically, encompasses a complex body of principles including syntactical simplicity (economy of the structure of the theory), semantic simplicity (limitation on the number of presuppositions), epistemological simplicity (economy of concepts with transcendent or generalized components) and pragmatic simplicity (ease of testability).

The purpose of simplicity, and of the other characteristics of scientific theory, is to achieve greater and more accurate knowledge and explanations. The quest for simplicity also serves as a stimulus for integrating and unifying knowledge and as a warning against protecting favored theories by ad hoc explanations. Simplicity subsumes fertility, extensibility and depth because it indicates that these explanatory concepts are not scientific theory would be the one that comports most closely with the greatest number of these criteria.

22. Originally, Greek philosophers of science assumed that the shortest and most direct theory was preferable for aesthetic reasons. See generally On Aesthetics in Science 1-3 (J. Wechsler ed. 1978) (collection of essays discussing the role of aesthetics in science and scientific methodology). This notion was developed from an instinct that "the beauty of a theory implies its truth" to a recognition that energy efficiency in theory construction and testing had scientific merit. G. Gale, Theory of Science: An Introduction to the History, Logic, and Philosophy of Science 217 (1979).

23. See, e.g., I M. Adams, William Ockham 156 (1987) (Ockham's principle of parsimony was that "[i]t is futile to do with more what can be done with fewer"); see also P. Frank, Philosophy of Science: The Link Between Science and Philosophy 350-51 (1957) ("among all theories that can account for the same observed facts the 'simplest' theories are chosen").

24. For example, the Ptolemaic or geocentric view of the universe suggested that all celestial bodies orbited the earth, which remained immovable in the center of the cosmos. Johannes Kepler adopted the simpler Copernican heliocentric cosmology, explaining that earth orbited elliptically as well. See Rosen, Cosmology from Antiquity to 1850, in 1 Dictionary of the History of Ideas 535, 545-46 (1973).

25. For a detailed discussion of this issue, see Bunge, The Complexity of Simplicity, 59 J. Phil. 113 (1962).


27. See id. at 125-26 ("Logical neatness and conceptual connectedness are then not luxuries but means for ensuring testability, which in turn is a necessary—but, of course, not a sufficient—prerequisite for attaining approximate truth." (emphasis in original)).
reducible to observations in a limited area. Thus, simplicity is an essential and cumulative criterion.

2. Explanatory Power

A theory must possess sufficient explanatory force: it must accurately explain the phenomena under study. A theory's power is measured by its ability to advance understanding. An explanatory theory answers a study's initial questions and spins out implications and connections. The explanatory power of a theory of jurisprudence, for example, depends on its ability to explain or influence judicial decisionmaking.

One type of explanatory power is predictive ability: how well a theory can forecast new facts and relations. In a sense, predictive power may be distinct from explanatory power because it adds the future dimension to theorizing. This ability is not necessary to sound theory-building, because many theories are not intended to be predictive and explanations can occur on other levels.

3. Depth or Constructivity

Closely aligned with explanatory power is the concept of depth. A deep thesis goes beyond merely stating or describing phenomena. It explains possible causal relationships among observable phenomena, arranges isolated events into general patterns and seeks underlying explanations. Such hypotheses postulate some relations that are not always obvious to the senses and draw together interdisciplinary phenomena.

29. See Bunge, supra note 26, at 133.
30. Predictive ability is not a sufficient (let alone necessary) condition for accepting scientific theories. Indeed, primary reliance on predictiveness amounts to the logical fallacy of affirming the consequent, for it posits that if a theory is true, we can expect specific observations; and it concludes that because we found the specific observations, the theory must be true.
31. See Martin, How to Be a Good Philosopher of Science: A Plea for Empiricism in Matters Methodological, in Methodology, Metaphysics and the History of Science 39 (R. Cohen & M. Wartofsky eds. 1984) (deep theories "go beyond the appearance of things to their innermost structure"). But see Feyerabend, How to Be a Good Empiricist—A Plea for Tolerance in Matters Epistemological, in Readings in the Philosophy of Science 319, 320-21 (B.A. Brody ed. 1970) (advocating the advancement of scientific knowledge through a profusion of theories).
32. "For example, the hypothesis that syphilis is only a skin disease is literally skin-deep." 5 M. Bunge, Treatise on Basic Philosophy 300 (1983).
33. See M. Levit, Theoretical Justification of the Proposed Interdisciplinary Doctoral Program in Social Science 4 (1978) (unpublished manuscript) (on file at Fordham Law Review) ("in the stronger sciences, 'deep' knowledge has been acquired by studies of historically selected and expanding networks of relations among phenomena, and not by digging deeper holes in the same place with the same equipment"). To this extent, Marxism, which comprehends significant relations among social, economic and legal phenomena, is a theory possessing depth. See K. Marx, Das Kapital (1867). That, however, is not a scientific endorsement of Marxism. Committed Marxists refuse to specify the conditions under which their belief structure is refutable. See Lakatos, Falsification and the
4. Fertility and Extensibility

A theory should have not only explanatory power, but also "exploratory power." Fertile theories lead to greater precision and corroboration; they suggest new ideas, questions and theories. Like law, science is often a search for questions rather than answers. Closely tied to fertility is extensibility: the ability of a theory to expand and apply to related fields. The Darwinian theory of evolution, for example, has proven to be unusually fertile and extensible—it has suggested applications, research designs and flaws in current approaches in fields ranging from psychology to law. Similarly, Rawls' theory of justice provoked not only commentary, but also modification of jurisprudential theories.

5. External Validity

A theory must be consistent with the generally accepted body of knowledge, both within its own discipline and in other areas. This facet of the scientific method leads to a restrained approach to new ideas and, in some instances, excessive hostility to novel theories. It is this healthy skepticism, however, which promotes theory-testing and validation. External validation ensures that theories are compatible with conclusions in other areas of inquiry. Theories that rely on and relate to comprehensive and converging evidence from other disciplines are more likely to be valid.

6. Internal Consistency and Logic

A basic requirement of theory-building that is often taken for granted is internal consistency and logic. The postulates of a hypothesis must not conflict with one another. Furthermore, the premises of a theory,
along with observations and data, must lead to conclusions through logically valid reasoning. A hypothesis must be free of logical fallacies and paradoxes—it cannot simultaneously support contrary propositions.\(^4\)

7. Falsifiability

Theories must be testable and refutable.\(^4\) If theories are non-falsifiable, they are unscientific. Hypotheses that avoid testability—for example, those concerning the existence of supernatural beings—are not scientific. Likewise, theories that purport to explain everything, theories that are unconditional and admit no negative evidence and theories that are vague or otherwise self-protected are not falsifiable. A non-refutable theory has no explanatory value:

It is easy to construct deceptively powerful looking but empty explanations of case law. For example, suppose we hypothesize that all judging is a matter of cost benefit analysis with the society's priorities measured, say, in utiles; the judge is the representative of society charged with doing the analysis, including the assignment of utile values. This will always work—the hypothesis will never be falsified.\(^4\)

Refutability of a theory's final state must be distinguished from the process of theory development and refinement. Theories are constructed by a process of "conjecture, refutation, reconjecture and so on . . . [that] emphasises the dynamic nature of theory creation."\(^4\)

8. Other Criteria

Many other desiderata of good theory-building are umbilical to those mentioned. I note just a few here without exploring them in depth. The predicates, assumptions and methodologies of a theory must be publicly verifiable and open.\(^4\) In addition, originality in theory-building is desir-

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\(^4\) In the realm of legal theorizing, there is a tremendous body of literature discussing the relative usefulness of types of reasoning: deductive, inductive and analogical. See, e.g., Broiles, The Principles of Legal Reasoning, 17 Mercer L. Rev. 389 (1966); Landau, Logic for Lawyers, 13 Pac. L.J. 59, 67-89 (1981); Murray, The Role of Analogy in Legal Reasoning, 29 UCLA L. Rev. 833 (1982). However, different types of reasoning reflect not the validity of the form of a theory, but the kinds of reasons given for the theory's claims.

\(^4\) See K. Popper, The Logic of Scientific Discovery ch. iv (1959); see also Potter, Testability, Flexibility: Kuhnian Values in Scientists' Discourse Concerning Theory Choice, 14 Phil. Soc. Sci. 303, 309 (1984) ("testability is not merely important but is a central and necessary feature of science. It is only by testing explanations, and rejecting those that fail such tests, that scientific activity will progress").


\(^4\) Scientific openness has its analog in constitutional notions of procedural due process. See Bazelon, Coping with Technology Through the Legal Process, 62 Cornell L. Rev. 817, 825 (1977) ("[O]penness is in everyone's best interests . . . [w]hen the issues are controversial, any decision may fail to satisfy large portions of the community. But those who are dissatisfied with a particular decision will be more likely to acquiesce in it if they perceive that their views and interests were given a fair hearing.").
able. "The most influential theories are . . . those which are the more thought-provoking and, particularly, those which inaugurate new ways of thinking . . . such as Newtonian mechanics, field theory, quantum theory, and evolutionism." Fertility, comprehensiveness, depth and other criteria are intertwined with creativity.

All of the criteria offer ways to improve the conceptual and operational clarity of theories. These criteria should be thought of not simply as rules in the game of scientific method, but as means of improving the cogency and objectivity of theories—as criteria of rationality.

B. The Scientific Method and Values: Is and Ought

The principal challenge to the application of the scientific method to legal thinking is the asserted inability of science to assist in the choice among competing values. Our culture believes that science and values are strangers. Many philosophers of science, however, believe that the principles of scientific inquiry need not be abandoned at the threshold of moral judgments. In fact, the thesis that values can be rationally grounded is fairly widespread in philosophical literature. One form of this thesis involves reliance on general principles of logic and science, arguing that the principles of the scientific method imply certain moral postures and value choices.

The criteria of scientific inquiry also mandate a different approach to values. Values must not be viewed as isolated events separate from their social contingencies. Moreover, the scientific method compels an approach to value judgments that requires critical inquiry into the foundations of moral choices.

46. Bunge, supra note 26, at 135; see also Dyson, Innovation in Physics, 199 Sci. Am. (no. 3) 74, 76 (1958) ("The reason why new concepts in any branch of science are hard to grasp is always the same; contemporary scientists try to picture the new concept in terms of ideas which existed before. The discoverer himself suffers especially from this difficulty; he arrived at the new concept by struggling with the old ideas, and the old ideas remain the language of his thinking for a long time afterward.").

47. See, e.g., Funk, Legal History as Empirical Social Science in Theory and Practice, 21 Hous. L. Rev. 311, 320 n.23 (1984) ("Most scholars believe that ultimate values by which individual events are critically evaluated cannot be verified by scientific methods."); Mearns, Scientific Legal Theory and Arnold Brecht, 47 Va. L. Rev. 264, 265 (1961) ("real crisis in scientific legal theory is the rise of the theoretical opinion that no scientific choice between values can be made").

48. See Levit, Noncognitivist Ethics, Scientific Method, and Education, 2 Stud. Phil. & Educ. 304, 305-06 (1963); Scheffer, Science, Morals and Educational Policy, 26 Harv. Educ. Rev. 1, 15-16 (1956); see also Note, supra note 8, at 1969 ("The analogy [of the scientific model to law] suggests an attitude as much as a systematic approach to problem solving. Its core is a spirit of empirically based skepticism . . . that transcends any specific methodology." (emphasis in original)). Compare Funk, Religion, Ethical Natural Consequentialism, and the Science of Justice, 8 Cap. U.L. Rev. 371, 371-72 (1979) (positing that if certain religious premises are accepted, empirical verification of value propositions is possible).

The criteria of scientific inquiry require a hypothetical or experimental approach to theory and practice. This attitude encompasses provisional acceptance of theories, healthy skepticism and anti-dogmatism. Carried a step further, the scientific method necessitates humility on the part of theorists. Pretensions to knowledge are as unscientific as ignorance, and more dangerous.

Further, the criteria of validation demand openness in process and results. The process of hypothesis-testing and falsification calls for methods that have the greatest explanatory value. Explanation requires exposition: it is "the deliberate policy of science to expose its cognitive claims to the repeated challenge of critically probative observational data.

Scientific methods also foster non-chauvinism. The essence of the scientific method—the initial premise of objectivity and the process of theory creation, testing, falsification and reconjecture—prohibits prejudgment. There can be no a priori exclusions on the basis of class characteristics.

A final example of how the criteria of scientific inquiry translate into moral judgments comes from the general objective of scientific explanation. Science attempts to provide increasingly comprehensive explanations of events and relations. Thus, the scientific method is inimical to barriers to thought, whether educational, economic or social. Similarly, the principles of scientific inquiry lead to communalist rather than individualist resolutions of disputes, because they favor more complex and contextual explanations of causation rather than anachronistic individualist views of self-sufficient agents. These illustrations are not exhaus-

50. See, e.g., G. Gale, Theory of Science 204 (1979) ("The soul of scientific epistemology will die if it becomes committed to the view that knowledge is confined only to the established notions.").

51. The need for humility in endeavors of inquiry is illustrated by the Indian doctrine of syadvada (that all propositions are true only in certain respects) and the accompanying Jain legend of the blind men who are exploring different parts of the same elephant. See A. Kaplan, The Conduct of Inquiry 310 (1964).

52. See Loewinger, Jurimetrics: Science in Law, in Scientists in the Legal System 7, 11 (W. Thomas ed. 1974) ("Science recognizes no meaning that is not empirically definable and accepts no significance that is not empirically demonstrable.").

53. E. Nagel, supra note 17, at 12.

54. See M. Bunge, supra note 32, at 187.

55. Tort and contract law, for example, were shaped around individualist notions of
They are simply examples of value choices and value decision methodology impelled by the criteria of scientific inquiry.

These examples should not lead to the conclusion that the scientific method alone can resolve value questions. No open system can. Abstract concepts alone cannot generate a concrete series of results because general categories do not decide specific instances. However, the criteria of the scientific method can contribute to theory selection in jurisprudence and to the crafting of decisions in individual cases.57

II. THE TALE OF JURISPRUDENCE

Various schools of jurisprudence—classical legal theory, realism, law and society, law and economics, critical legal studies and practical reason—have treated the intersection of law and science differently. To the extent that jurisprudence is the process of building explanatory theories about law, the scientific method offers a means of assessing their usefulness.

First, some caveats and disclaimers. Scientific method cannot achieve certainty about jurisprudence, or anything else, because science does not erase the contingencies of the world. No scientific law determines anything.58 Scientific conclusions are preliminary and tentative; they call for elaboration and falsification. Scientific inquiry simply offers methods for responsibility and unicausal premises; only recently have they contemplated rules to juggle the effects of multiple causes. See generally Holt, Recovery by the Worker Who Quits: A Comparison of the Mainstream, Legal Realist, and Critical Legal Studies Approaches to a Problem of Nineteenth Century Contract Law, 1986 Wis. L. Rev. 677 (reassessing contract principle that denied pay to workers who did not complete performance in light of more capacious view of multiple causes); Horwitz, The Doctrine of Objective Causation, in The Politics of Law 201 (D. Kairys ed. 1982) (describing challenge to objective view of causation in tort law); Rosenberg, The Causal Connection in Mass Exposure Cases: A "Public Law" Vision of the Tort System, 97 Harv. L. Rev. 849, 905-24 (1984) (proposing that current system of case-by-case adjudication in mass exposure cases be replaced by public law system where exposed parties would be compensated according to probability of disease risk in exposed population); Wright, Causation in Tort Law, 73 Calif. L. Rev. 1735, 1788-1803 (1985) (advocating new test for tort causation). Standing law reflects a parallel course of development. See Winter, The Metaphor of Standing and the Problem of Self-Governance, 40 Stan. L. Rev. 1371, 1478 (1988). Both bodies of law evolved at the expense of communal considerations of multiple parts, sources, paths and effects.

56. Many versions of basic democratic principles are social applications of general scientific criteria. For instance, the legislative process recognizes the absence of universal, external truths, the need to question and change basic assumptions, contextual conditioning of principles (majority rule, but recognition of minority rights) and a process of decisionmaking based on public, verifiable information. They never cause an object to turn right or left, or to move up or down. See, e.g., A. Kaplan, supra note 51, at 402 ("A scientific approach does not suddenly come into being at the magical moment when we know 'enough'; such moments never arrive."); see also Note, supra note 8, at 1967 ("We have received so many gifts from the wizard science that we have come to associate science with truth and experiments with answers.").
gaining greater probabilistic knowledge, which itself may become obsolete.

Similarly, no scientific analysis of jurisprudential theories can illuminate the single best ideology. Theoretical elixirs are not in the repertoire of science. The danger of viewing a critique of jurisprudence as no less and no more than a scientific inquiry is the hazard of legitimating areas of uncertainty. The scientific method, however, can test assumptions, provide a powerful critique for ideologies, suggest new avenues of exploration and lead to empowered theory-building.

A. Classical Legal Theory and the Science of Law

Nineteenth-century legal theorists advocated the scientific study of law. Their model of the science of law was mechanistic: they viewed the process of lawmaking as a deductive science. Lawmaking consisted of judges syllogistically reaching solutions using existing legal principles as major premises and the “facts” of particular cases as minor premises. Law was considered a determinate collection of rules derived from natural law, not an instrument for social change.

In the 1870s, Christopher Columbus Langdell, Dean of the Harvard Law School, pioneered an empirical case-method approach to the study of law. The case-study method treated judicial decisions as raw data subject to scientific investigation by jurists and scholars. Langdell believed that enduring principles of law existed that could guide decisions in future cases, and that the jurist’s task was to select the appropriate legal rules for a given case.

Langdell’s conception of law as science assumed that once a legal truth was established, it endured. He viewed law as an objective system with

59. See, e.g., R.F. Clark, The Science of Law and Lawmaking 3 (1898) (law “as one of the family of sciences, [is] subject like the rest to certain fundamental principles”); see also W. Hastie, Outlines of the Science of Jurisprudence 118-219 (1887) (jurisprudence as science concerned with principles of right); Mayes, Whether Law Is a Science?, 9 Am. Jurist 349, 354 (1833) (“The science of law . . . is that knowledge whereby we distinguish between the just and the unjust, reduced into a system, and arranged so as to be conveniently taught, easily remembered and readily applied.”).

60. If one could reveal the nature of the elemental building blocks (people or atoms, for example), and the organizing principles that held them together (e.g., human relations or chemical bonds), [classical theorists] believed that the structure of the whole system would become apparent and expressible, as in the form of restatements or treatises, or periodic charts.


63. See, e.g., C. Langdell, A Selection of Cases on the Law of Contracts viii (2d ed. 1879) (“Law, considered as a science, consists of certain principles or doctrines. To have such a mastery of these as to be able to apply them with constant facility and certainty to the ever-tangled skein of human affairs, is what constitutes a true lawyer.”).

Langdell's scientific approach to legal theory relied on formal logic. Scientific inquiry consisted simply of inductively extracting rules from a series of cases and deductively reasoning decisions in new cases from those fixed legal rules. Law progressed only when a jurist or scholar discovered a previously undivined principle that explained prior decisions. The Langdellian model was closed, complete and largely static. Moreover, this model used an inductive conception of science, in which thought moves from the particular and concrete to the general and abstract by finding recurrent, essential identifying traits. Such a model is now rejected by most theoreticians and philosophers of science.

A number of Langdell's peers disagreed with the immutable nature of his law-as-science theories. According to Samuel Williston, Langdell's system "[did not] sufficiently take account of changes in law as a constant and necessary process, however gradual and slow." Oliver Wendell Holmes, Jr. and John Chapman Gray quarreled with the Langdellian process of separating cases from their historical and social context and rendering decisions by analyzing whether the cases fit existing legal doctrine.

Langdell's scientific technique "is criticized today as insufficiently rigorous," and his objective of discerning transcendent principles of law is viewed as an "absurd task." His unwavering emphasis on empirical

65. [T]he number of fundamental legal doctrines is much less than is commonly supposed; the many different guises in which the same doctrine is constantly making its appearance, and the great extent to which legal treatises are a repetition of each other, being the cause of much misapprehension. . . . It seemed to me, therefore, to be possible . . . to select, classify, and arrange all the cases which had contributed in any important [sic] degree to the growth, development, or establishment of any of its essential doctrines . . . .

C. Langdell, supra note 63, at viii-ix.

66. See Grey, Langdell's Orthodoxy, 45 U. Pitt. L. Rev. 1, 31 (1983). Several years later Wesley Hohfeld engaged in a parallel endeavor to Langdell's attempt to enumerate these scientific principles of law when he tried to produce analytic studies of the meaning of rights discourse. See Hohfeld, Some Fundamental Legal Conceptions as Applied in Judicial Reasonings, 23 Yale L.J. 16 (1913).


68. S. Williston, Life and Law 200 (1941).

69. See White, The Impact of Legal Science on Tort Law, 1880-1910, 78 Colum. L. Rev. 213, 222 (1978); see also Book Review, 14 Am. L. Rev. 233, 234 (1880) ("the effort to reduce . . . concrete details . . . to the merely logical consequence of simple postulates is always in danger of becoming unscientific"). The current scientific method would disapprove of a system that called for the rejection of data inconsistent with the theory.

70. Note, supra note 8, at 1976.

71. Miller, supra note 9, at 388.

72. See G. Gilmore, supra note 64, at 42 ("Langdell seems to have been an essentially stupid man who, early in his life, hit on one great idea to which, thereafter, he clung with all the tenacity of genius").
analysis, however, was advanced for his time\(^7\) and his case method fostered precision and brought fresh analytical inquiry to legal concepts.\(^7\)

**B. Realism and Empiricism**

The legal realist movement was a reaction to the formalism of classical legal theory. The realists were not a cohesive group. They drew on different branches of the social sciences—psychology, economics, statistics—and had different assumptions about the ability of science to answer normative questions in law.\(^7\) Most realists did unite, however, on common points of departure from the Langdellian tradition;\(^7\) collectively, they condemned the formalists' rigid and unadaptive interpretation of legal rules.

Classical analysis, according to the realists, failed to account for the indeterminacy of legal rules and the manipulability of legal reasoning.\(^7\) As a theory of science, classical analysis did not adequately account for changes in law.\(^7\) Finally, the realists argued that deductive logic was of

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\(^7\) Note, supra note 8, at 1976.

\(^7\) The case method forced students of law to approach original sources or cases without relying on the collected wisdom of earlier scholars. See generally Speziale, Langdell's Concept of Law as Science: The Beginning of Anti-Formalism in American Legal Theory, 5 Vt. L. Rev. 1, 3 (1980) (defending Langdell's realist tenets of legal theory).

\(^7\) See Golding, Jurisprudence and Legal Philosophy in Twentieth-Century America—Major Themes and Developments, 36 J. Legal Educ. 441, 453 (1986); see also Comment, supra note 61, at 122-23 (delineating three sub-schools of the legal realist movement: the social-science group, the political-reformist group and the judicial-reasoning group). There is even some internal ambivalence in individual realists about the utility of science to assist in the choice among value judgments. Compare Holmes, Law in Science and Science in Law, 12 Harv. L. Rev. 443, 462 (1899) ("I have had in mind an ultimate dependence upon science because it is finally for science to determine, so far as it can, the relative worth of our different social ends.") with Holmes, Natural Law, 32 Harv. L. Rev. 40, 41 (1918) ("you can not argue a man into liking a glass of beer").

\(^7\) See Llewellyn, Some Realism About Realism—Responding to Dean Pound, 44 Harv. L. Rev. 1222, 1235-36 (1931); see also Pound, The Call for a Realist Jurisprudence, 44 Harv. L. Rev. 697, 700-09 (1931) (listing points of departure from formative school of thought). For a rich examination of the socio-historical backdrop of the era and the effect of developments in other disciplines on the realists' jurisprudence, see E. Purcell, Jr., The Crisis of Democratic Theory: Scientific Naturalism & The Problem of Value 47-94 (1973).

\(^7\) See Tushnet, Post-Realist Legal Scholarship, 1980 Wis. L. Rev. 1383, 1384; see also K. Llewellyn, The Bramble Bush 4 (1960) ("men talk about contracts, and trusts, and corporations, as if these things existed in themselves, instead of being the shadows cast across the front stage by the movements of the courts unheeded in the rear").

\(^7\) The reason which gave rise to the rule has been forgotten, and ingenious minds set themselves to inquire how it is to be accounted for. Some ground of policy is thought of, which seems to explain it and to reconcile it with the present state of things; and then the rule adapts itself to the new reasons which have been found for it, and enters on a new career.

O.W. Holmes, The Common Law 8 (1963); cf. D. Shapere, Reason and the Search for Knowledge 200 (1984) ("It is a condition of the adequacy of any philosophy of science that it show how rational change in science is possible." (emphasis in original)).
limited use in deciding most controversies. Indeed, some realists suggested that intuitive methods were not only more representative of how judges decided cases, but could be a preferable method of problem solving.

Values were missing from classical legal theory's scientific universe. The realists acknowledged the role of values in judicial decisionmaking as well as the roles of social history and the consequences of decisions. While the realists remained committed to the scientific study of legal concepts, they shifted the emphasis to analyzing the practical effects of legal rules. These scholars focused on the judicial process and attempted to apply scientific methods to the study of decisionmaking; by so doing, they hoped to improve the caliber of decisions.

The empiricists, unlike their classicist predecessors, viewed law as an observable and, in some measure, a calculable phenomenon. For realists, the study of law comprised the examination of judicial behavior and prediction of future court action. Some realists stressed the necessity for objective and external observation of law, so that the study would be "uncontaminated by the desires of the observer." Others called for judges to improve the manner and quality of decisionmaking by acknowledging their own biases. Still others believed that a greater use of em-


80. See B. Cardozo, The Nature of the Judicial Process 14-23 (1921); see also Frank, What Courts Do in Fact, 26 Ill. L. Rev. 645, 653-55 (1932) (describing how hunches enter and control the process of judicial decisionmaking).


82. See, e.g., Holmes, The Path of the Law, 10 Harv. L. Rev. 457, 460-61 (1897) (associating law less with formal logic and more with the behavior of judges); Llewellyn, The Theory of Legal "Science", 20 N.C.L. Rev. 1, 7-8 (1941) (recognizing that law of a given era is, in part, a function of its social context); Pound, Law and the Science of Law in Recent Theories, 43 Yale L.J. 525, 533-34 (1934) (proposing integration of law with other disciplines to help develop criteria for valuing legal interests).

83. See, e.g., Miller, supra note 9, at 388-90 (realists changed focus of study from finding the science of law to articulating practical, functional and malleable rules).

84. See White, From Sociological Jurisprudence to Realism: Jurisprudence and Social Change in Early Twentieth-Century America, 58 Va. L. Rev. 999, 1006-07 (1972). Even when certain realists paid little attention to the scientific method, they drew upon scientific concepts as metaphors to illustrate arguments. See Note, supra note 8, at 1978; see also B. Cardozo, Selected Writings of Benjamin Nathan Cardozo 259 (1947) (suggesting that Einstein's theory of relativity of measurements is paralleled by a "principle of relativity in the adaptation of the law to conduct.").

85. See, e.g., Holmes, supra note 82, at 457 ("The object of our study, then, is prediction, the prediction of the incidence of the public force through the instrumentality of the courts.").

86. See, e.g., Bingham, supra note 79, at 9 ("The lawyer, as does the scientist, studies sequences of external phenomena and he studies them with a similar purpose—to determine their causes and effects and to acquire an ability to forecast sequences of the same sort.").

87. Llewellyn, supra note 76, at 1236.

88. See J. Frank, Law and the Modern Mind 147 (1930).
pirical data could assist in solving legal controversies and that the methods of scientific inquiry could aid in choosing among competing value judgments. Realism moved from the classical concept of law as a pure science to the idea that law was an interdisciplinary venture in which scientific techniques, such as experiments and measurement, were useful analytical tools, rather than elements of a decisional methodology. In this sense, realism gave law a contextual footing. It recognized that law was a vehicle for social change.

The realists’ empiricism differed sharply from the classical law-as-science approach. Classical theorists viewed law as a set of axioms that, if applied correctly, would lead to a scientifically valid outcome. Realism, in contrast, stressed the futility of examining law as a set of rules. In diametric opposition to the classical view that decisions were the product of application of general principles in a given case, the realists emphasized that the validity of generalizations about laws should be tested against actual rulings. Although the exclusive importance the realists gave to predictive success is overly simple and misleading as an empirical guide, they moved the scientific approach to law incrementally forward by emphasizing the need for the testability of hypotheses about law.

Realism did not fall from intellectual grace in the same manner as did classical thought. However, it generated its share of skeptics and detractors, and failed to achieve many of its theoretical goals. Critics faulted the behavioral focus of realism as a limited method of understanding a complex system. The realists’ separation of positive law and normative issues (“is” and “ought”), even for purposes of study, was challenged as unrealistic and impractical. For example, Morris Cohen,


90. See O.W. Holmes, *Law in Science and Science in Law*, in Collected Legal Papers 210, 225-26 (1920) (“The true science of law...[lies in] the establishment of its postulates...upon accurately measured social desires.”).

91. See, e.g., J. Frank, *supra* note 88, at 100-11 (suggesting that analysis of personal judicial biases and sympathies significantly explained case outcomes); Haines, *General Observations on the Effects of Personal, Political and Economic Influences in the Decisions of Judges*, 17 Ill. L. Rev. 96, 115-16 (1922) (applying principles of behavioral science to interpret the influences of various sociocultural factors on judges' decisions); Pound, *Mechanical Jurisprudence*, 8 Colum. L. Rev. 605, 620-23 (1908) (proposing use of the scientific method to create a sociological jurisprudence).

92. See *Cook, Williston on Contracts*, 33 Ill. L. Rev. 497, 505 (1938) (“The 'realists' will of course at once inquire whether... broad generalizations will 'account for' the 'law' as it is found in the decisions. From their point of view that is the acid test of the validity of any generalization.”); Rumble, *The Legal Positivism of John Austin and the Realist Movement in American Jurisprudence*, 66 Cornell L. Rev. 986, 992 (1981).

93. See *supra* note 29-30 and accompanying text.


96. See L. Fuller, The Law in Quest of Itsel 64 (1940).
himself a realist, insisted that any empirical approach to law should be normative and that the nature of law as a social institution necessitated standards for judgment apart from the results of empirical research.\(^{97}\)

More seriously, empirical social science research failed to provide answers to some theoretical and practical legal problems. In many respects, the social science tools of the time were not equal to the theoretical tasks set out for them by the realists.\(^{98}\) Moreover, the role envisioned for empirical research in solving pressing legal issues far surpassed the boundaries of empirically verifiable phenomena. These frailties in means and goals resulted in a misuse of empiricism\(^{99}\) and disillusionment with the goals of the realist movement.\(^{100}\) Whether legal realism ever ceased as an intellectual movement is the subject of some debate.\(^{101}\) Many would agree that legal realism survives, either as an ideology that has not lost all of its followers, or as the progenitor of later theories of law, such as the law and society or critical legal studies movements.\(^{102}\)

C. Law and Society: Social Science and Public Policy

The law and society movement developed slowly from the sociological branch of legal realism and continues today as a jurisprudential theory.\(^{103}\) Law and society adherents advocate using social science research to shape solutions to legal problems. Thus, much law and society re-

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98. See Schlegel, supra note 94, at 460.
99. Realists even chided their own for sloppy scientism:
[I]t was at Yale that the nadir of idiocy was achieved when Underhill Moore 'tested out' whether law has mystical operation by an elaborate observation, metering and statiskicking of the noneffect on the parking practices of New Haveners of a change in the official traffic regulations which he had arranged to keep carefully from coming to the knowledge of any trafficer.
101. Compare L. Kalman, Legal Realism at Yale: 1927-1960, at 230 (1986) ("[i]ntellectually realism had not proved significant"), with Singer, Legal Realism Now (Book Review), 76 Calif. L. Rev. 465, 467 (1988) ("To some extent, we are all realists now"); see also Nowak, Resurrecting Realist Jurisprudence: The Political Bias of Burger Court Justices, 17 Suffolk U.L. Rev. 549, 550 (1983) ("It appears to me that it has become quite trendy for constitutional law professors to claim to be legal realists but that only a very small group of academics accept the [nihilistic] tenets of that jurisprudential school.").
103. See Lopucki, Bringing Realism to the Classroom (Book Review), 1987 Wis. L. Rev. 641, 641-43. The parentage of the movement can be traced back even further, to the
search examines the effect of law on social phenomena.\textsuperscript{104} Theorists in the movement hope for reciprocal social reform through institutional legal change.\textsuperscript{105} Law and society scholars also try to broaden the definition of law—beyond law as authoritarian principles to law as a creation of prevailing cultural norms.\textsuperscript{106}

For law and society scholars, empiricism is more than verification; it is a catalyst for legal problem solving. At the heart of law and society theory lies the conviction that an understanding of the law is possible only within the context of the surrounding social environment. This contextualism requires law and society adherents to explain a vast range of social complexities.\textsuperscript{107}

Law and society researchers employ methods and borrow theories from the social sciences, particularly the behavioral sciences.\textsuperscript{108} Their inquiry focuses on the social effects of legal rules.\textsuperscript{109} Law and society not only draws upon the results of social science research, but constructs its jurisprudence on methodologically scientific grounds. Initially, law and

law-as-a-social-construct theories of Henry Sumner Maine and Max Weber. See Friedman, supra note 102, at 764.

\textsuperscript{104} See, e.g., Silbey & Sarat, Critical Traditions in Law and Society Research, 21 Law & Soc'y Rev. 165, 165 (1987) ("Its focus has been decentering, concerned not with what the law is but with what the law does." (emphasis in original) (citation omitted)).


\textsuperscript{107} Theorists in the movement thus have undertaken broad, explanatory activities. See, e.g., Galanter, Why the "Haves" Come Out Ahead: Speculations on the Limits of Legal Change, 9 Law & Soc'y Rev. 95, 149-51 (1974) (discussing way in which basic structure of legal system both creates and limits the possibilities of using the system as a means of redistributive change); Silbey & Bittner, The Availability of Law, 4 Law & Policy Q. 399, 400 (1982) (study of Massachusetts Attorney General's Office of Consumer Protection that concludes that laws are not fully enforced, thus leaving great amounts of discretion to law enforcement officers).


society theorists acknowledge that social science experimentation does not produce conclusive answers. This recognition of the tentative and probabilistic nature of their conclusions comports with the scientific requirement of falsifiability. Law and society endeavors are also fertile or extensible; research conclusions not only prompt specific recommendations, but also inspire new research.

The scientific shortcomings of the law and society movement arise from the subjective nature of its inquiries. The questions asked by law and society scholars necessarily require interpretive answers. Furthermore, advocates of this approach must often draw subjective conclusions from empirical results to construct positive programs.

D. Law and Economics: Scientific Utilitarianism

In the 1950s several theorists, working independently, began to analyze antitrust, corporation and securities law according to economic principles. This approach soon spread to other areas of law, such as tort, criminal, constitutional and family law. Economic analysts of law seek to make law more efficient by importing economic tools and principles.

110. See Teitelbaum, An Overview of Law and Social Research, 35 J. Legal Educ. 465, 477 (1985). Theories that are tentative or falsifiable must be distinguished from theories that are vague or lacking in criteria.

111. For a discussion of the meaning of scientific falsifiability, see supra notes 42-44 and accompanying text.

112. See supra notes 34-38 and accompanying text.


115. See Teitelbaum, supra note 110, at 477.

116. This label is a self-description by Richard Posner, one of the principal theorists in the law and economics school. See Posner, The Present Situation in Legal Scholarship, 90 Yale L.J. 1113, 1115 (1981).

117. See, e.g., Manne, Accounting for Share Issues Under Modern Corporation Laws, 54 Nw. U.L. Rev. 285 (1959) (examining stated capital requirements on share issues from the point of view of both accountant and lawyer); Turner, The Validity of Tying Arrangements Under the Antitrust Laws, 72 Harv. L. Rev. 50 (1958) (analyzing conflicting interests in tying arrangements and setting forth criteria to determine when to apply a per se rule). See generally Posner, The Chicago School of Antitrust Analysis, 127 U. Pa. L. Rev. 925 (1979) (the maturing of economics as a social science has greatly diminished the distinctions between schools of antitrust policy).

ples into the study of law. The law and economics school confines its inquiry to the study of allocative efficiency. The law and economics approach presumes that actors in the judicial system operate to maximize wealth or utility; that they achieve maximization or efficiency through cost-benefit analysis; and that general societal good is achieved when all participants maximize concurrently. The goal of law and economics is to explain how certain legal rules obstruct efficiency and to advance rules that promote efficient resource allocation.

One aspect of the law and economics movement prescribes normative solutions to specific legislative, regulatory and decisional controversies. The positive branch of the law and economics movement tests its efficiency hypotheses with reference to existing decisions. Excluded from the law and economics framework are interdisciplinary methods, designs and epistemologies. However, some efficiency theorists favor the use of social science methods to evaluate the effect of legal rules and to study legal theory.

Law and economics analysis satisfies several criteria of scientific inquiry. It is somewhat successful in proposing a falsifiable hypothesis: testing the concrete working of allocative efficiency has produced a series of tort and criminal law); Priest, *A Theory of the Consumer Product Warranty*, 90 Yale L.J. 1297, 1347-52 (1981) (applying economic analysis to law of warranties).


121. See, e.g., Posner, *A Theory of Negligence*, 1 J. Legal Stud. 29 (1972) (formulating and testing theory to explain the social function of negligence concept by analyzing samples of leading cases).

122. See, e.g., Coase, *The Problem of Social Cost*, 3 J. Law & Econ. 1, 43 (1960) (proposing the construction of economic models that would "start our analysis with a situation approximating that which actually exists, . . . examine the effects of a proposed policy change and . . . attempt to decide whether the new situation would be, in total, better or worse than the original one"); Posner, supra note 14, at 779 (suggesting that legal theory should be analyzed "from the outside," using the methods of scientific and humanistic inquiry to enlarge our knowledge of the legal system").
Law and economics has also proved to be unusually fertile; its supporters have proposed the application of economic theory to family law, constitutional theory and criminal law. Maximization principles provide the backdrop for public choice theory.

While law and economics permits puzzle-solving within the context of a structured paradigm, the framework is unscientific. Initially, it must be recognized that the positive branch of the law and economics movement uses a utilitarian type of policy analysis, rather than attempting to apply certain natural science techniques to the study of law. A serious difficulty with this approach is that it provides a closed model that reduces most conceptual considerations to the issue of efficiency.


Economic analysis "seeks to 'import' into the law a unified body of thought." Merges, supra note 9, at 326.
distribution. Commentators question, in terms ranging from polite dissent to incredulity, a view of the legal system that promotes allocative efficiency to the exclusion of other economic and social goals. While positive economic analysis introduces quantitative reasoning to legal decisions, it suffers from deficiencies as a scientific method that limit its explanatory force.

Many assumptions of normative law and economics are either untested or called into doubt by empirical testing. For example, economists assume that individuals make choices that maximize self-interest. Explanations for this basic assumption, however, are sadly lacking. Some scholars refute this hypothesis by suggesting that consumers often make undesirable personal choices. Second, normative law and economics' derivation of legal solutions through cost-benefit analysis is far from an objective mathematical process. As James Boyle points out, "cost-benefit analysts can smuggle in their preferences and thus give their tinkering with the existing distribution of wealth the sham rigor of scientific rationality." Third, when legal facts or rules fail to comport with economic theory, efficiency theorists suggest that the rules should be changed to conform with the theory. This seriously limits the opportunity to disprove efficiency theory. Thus, law and economics theory fails to comport with the criterion of falsifiability.

128. See generally Kennedy, Cost-Benefit Analysis of Entitlement Problems: A Critique, 33 Stan. L. Rev. 387, 388 (1981) (liberal law and economics scholars concede that other factors such as distributational equity may rival efficiency as a guiding choice in particular cases); cf. Calabresi, supra note 118, at 505 (formulating theory on economically efficient distribution of risk of loss). For the proposition that any such assignment of values gerryrigs the results, see Binder, Beyond Criticism, 55 U. Chi. L. Rev. 888, 900 (1988) ("[R]esources cannot be distributed on the basis of calculations of allocative efficiency because such calculations always depend on prior assumptions about the distribution of resources.").


130. See, e.g., Gintis, Consumer Behavior and the Concept of Sovereignty: Explanations of Social Decay, 62 Am. Econ. Rev. 267, 270 (1972) (advertising and other forms of psychic manipulation impel consumers to choose what is not in their own interest); Kelman, Choice and Utility, 1979 Wis. L. Rev. 769, 778 (examining the neo-classicist tautology that "[o]ne is best off . . . when one gets what one chooses because one chooses what makes one best off").


132. See, e.g., Tushnet, Post-Realist Legal Scholarship, 1980 Wis. L. Rev. 1383, 1389 ("[w]hen faced with rules that depart from what their analysis shows would promote allocative efficiency, these scholars find it hard to resist the temptation to urge that the rules be altered"). Comparatively, truly scientific theories are modifiable. "The scientist is ready to abandon a theory when the data collected demand that he does so . . . . When generalizations conflict with the phenomena, he 'saves the phenomena.'" J. Feibleman, supra note 20, at 55.
Subsidiary difficulties include the failure of the model's assumptions to correspond with social or judicial reality, to account for non-economic preferences and to guide moral choices. While an economic model might offer tremendous predictive power, its flaws undermine the usefulness of the result. Fundamentally, law and economics is a technology, not a science. Its object is to increase efficiency, while the general aim of science is to unfold increasingly more general and comprehensive theories about its subjects.

E. Critical Legal Studies: Analytic Empiricism and Demythology

The critical legal studies (CLS) movement was founded in 1977 by a group of scholars who were disappointed by the strict "empirico-behaviorist" approach of the Law and Society Association. These scholars initially relied on philosophers and social theorists, such as Jurgen Habermas, Georg Hegel, Martin Heidegger, Gyorgy Lukacs and Karl Mannheim, to argue that law is a construct of its social surroundings and that legal doctrines reflect, solidify and legitimate existing political and social hierarchies. The CLS critique is deeper than an attack on the power of rules to resolve disputes; it also suggests that patterns and accompanying text.

133. See generally Balkin, supra note 127 (law and economics theory assailed because its underlying assumptions are unrealistic); see also Tushnet, supra note 132, at 1393 ("the real world is not Pareto-optimal").


135. Indeed, law and economics adherents share the realists' single criterion of predictiveness for evaluating the worth of their model. See, e.g., R. Posner, Economic Analysis of Law 13 (2d ed. 1977) ("The true test of a theory is its utility in predicting or explaining reality."). Regarding the scientific value of predictive power, see supra notes 29-30 and accompanying text.

136. See S. Toulmin, supra note 18, at 14-15; see also Kaufmann, supra note 40, at 469 ("all scientific activity is meant to result directly or indirectly in changes of the body of knowledge").

137. Adherents to critical theory are far from a unified band of thinkers. See, e.g., Dalton, Book Review, 6 Harv. Women's L.J. 229, 231-39 (1983) (delineating distinctions between CLS reformists and irrationalists); Stick, Charting the Development of Critical Legal Studies (Book Review), 88 Colum. L. Rev. 407, 407-08 (1988) (referring to a dominant tradition of emphasis on indeterminacy and legitimation and a less cohesive counter-tradition that focuses on other aspects of the politics of law); Williams, Critical Legal Studies: The Death of Transcendence and the Rise of the New Langdells, 62 N.Y.U. L. Rev. 429, 472-91 (1987) (distinguishing between classical CLS' application of structuralist theory to law and more recent irrationalist claims that law is illegitimate because it is not neutral).


140. See generally R. Unger, The Critical Legal Studies Movement (1986) (criticizing current legal theories); Gordon, New Developments in Legal Theory, in The Politics of Law 281, 288 (D. Kairys ed. 1982) (legal concepts "have been built by elites who have thought they had some stake in rationalizing their dominant power positions, so they have tended to define rights in such a way as to reinforce existing hierarchies of wealth
methods of legal reasoning are inherently indeterminate and reified.\textsuperscript{141}

Some CLS theorists advance a more modest version of the indeterminacy claim—that the explanatory force of legal reasoning is limited and incomplete.\textsuperscript{142} Thus, CLS challenges established deterministic views of the universe and formulates a social vision of choice. CLS jurisprudence argues that individuals can shape social institutions.\textsuperscript{143}

CLS scholars are divided about the role of empiricism in legal theory. The rejection of determinism has led some to dismiss empiricism as well, because social science appears targeted toward the discovery of causal laws.\textsuperscript{144} They insist that focusing on empirical inquiry will mystify law in the same way that religion or literature clouds fundamental political choices. Science can provide only textual interpretation, which itself ultimately becomes hypostatized.\textsuperscript{145} In this view, science's promise of objectivity is an illusion—it masks underlying political choices about the selection of hypotheses, methods of observations, the interpretation of data and even the very subjects of scientific study.\textsuperscript{146}

Some critical scholars lament that empirical work fails to answer fundamental policy questions,\textsuperscript{147} is unable to deliver any vision of social
transformation and can never hope to do so. Other CLS theorists are hopeful that empirical research will substantiate CLS claims. Still others use the results of empirical studies to bolster their conclusions, but fear a generalized and uncritical acceptance of science.

Critics of CLS attack the high level of abstraction in critical theory. The methods used by a number of CLS scholars, however, are strikingly organized and analytic. They endeavor to arrive at concept specificity, to analyze the constituent elements of ideas and to test theories against historical realities. For example, one technique employed by critical theorists is deconstruction, which breaks arguments underlying a rule of law into their constituent elements to show how those elements actually support the opposite rule. As an analytic tool, deconstructive practice can illuminate the nature and meaning of legal rules. As a method of epistemological inquiry, deconstruction can expose the ideologies that shape those rules.

Several CLS scholars have engaged in systematic empirical analyses of the legitimating effect of certain legal doctrines. William Whitford

148. See id. at 341-42.
149. See Stick, supra note 137, at 420-21.
150. See Trubek, supra note 145, at 584-615; see also Klare, Labor Law as Ideology: Toward a New Historiography of Collective Bargaining Law, 4 Indus. Rel. L.J. 450, 452 n.6 (1981) (critical labor law has neglected empirical approach); Tushnet, Introduction, 52 Geo. Wash. L. Rev. 239, 241 (1984) ("because CLS seeks to critique all versions of formalism ... its task can never be concluded").
151. See, e.g., Gabel & Harris, Building Power & Breaking Images: Critical Legal Theory and the Practice of Law, 11 N.Y.U. Rev. L. & Soc. Change 369, 375-76, 381-84 (1982-83). Peter Gabel and Paul Harris call for the application of critical strategies to the practice of law and employ case studies to supply proof that this practical application of theory is viable. See id.
152. See, e.g., Kelman, supra note 147, at 302 (describing quantitative accounts of particular CLS reform packages); id. at 303-04 (yet denying the existence of objectively knowable "facts"); id. at 336 (and exhibiting apprehension about the determinist program of scientific endeavors such as sociobiology). As a practical matter, once critical scholars have empirical data to support their theoretical propositions, it would be unwise not to use it.
155. See id. at 755.
156. By "empirical" I mean evaluative of the impact of rules on behavior.
157. See Freeman, Legitimizing Racial Discrimination Through Antidiscrimination Law: A Critical Review of Supreme Court Doctrine, 62 Minn. L. Rev. 1049 (1978); Klare, Judicial Deradicalization of the Wagner Act and the Origins of Modern Legal Consciousness, 1937-1941, 62 Minn. L. Rev. 265 (1978). Freeman and Klare document how Supreme Court interpretations of the fourteenth amendment and the Wagner Act, respectively, created a repressively tolerant legal atmosphere that limited the transformative impact of the civil rights and labor movements. Klare demonstrated that benevolent Court decisions during the labor movement, while appearing to confer benefits on labor, actually created a structure in which "unions were treated as guarantors of productivity and enforcers of work-discipline, and the chasm separating union leadership from the rank and file was widened." Klare, supra, at 336. Similarly, Freeman establishes that the
has offered one of the more thoughtful approaches to the compatibility of empirical research with critical theory. Whitford endorses research into changes in social behavior caused by legal constructs.\textsuperscript{158} Further, Whitford explains that implementation research can steer past the Scylla of indeterminacy and the Charybdis of determinism, if such research is undertaken with an awareness of its contingent and probabilistic nature.\textsuperscript{159}

Finally, critical scholars have taken an unprecedented role in criticizing the application of the scientific model to law. In a distinctly scientific fashion, CLS’ predecessors questioned the explanatory power of a social sciences model of law. According to philosophers such as Jacques Derrida and anthropologists such as Clifford Gertz, science offered yet another narrative—a story of law—rather than a key to objective truths about law.\textsuperscript{160} Some CLS theorists thus have emphasized textual or literary analysis as a superior method of analyzing the meanings of legal writings.\textsuperscript{161} In the face of accusations of mushy technique, certain critical legal scholars have demanded rigor in theory-building.\textsuperscript{162} Critical legal studies, more than other theories of jurisprudence, is intensely and critically self-evaluative. CLS theory is truly multidisciplinary in its origins,\textsuperscript{163} drawing upon philosophy, art, literature, anthropology and sociology. Moreover, critical legal studies is extensible; the focus of critical theory is to embrace more phenomena by putting law into explanatory relations with other aspects of social behavior.

\textsuperscript{158} See Whitford, \textit{supra} note 144, at 759.

\textsuperscript{159} "I am prepared to accept the critique [of determinism] to the extent that it rejects a timeless, natural law of the social order. It is quite another matter, however, to assert that there are no time-bounded, momentary consistencies in human social behavior that can be anticipated with considerable reliability." \textit{Id.}

\textsuperscript{160} See Williams, \textit{supra} note 137, at 455.


Instead of guiding inquiry, we have found theory used in \textit{critical legal studies} research, as in liberal legal research, to justify the continued reliance on exegesis of doctrine as a research method without seriously challenging or testing the premises of such a method. Too often, Marxist theory is cited as if it made basic research on political economy unnecessary rather than central, and too often it is cited to explain the significance of doctrinal developments which by themselves do not support the theory.

\textit{Id.}

F. The Jurisprudence of Skepticism: Practical Reason and Ineffability

What began centuries ago as a theory of moral reasoning has been regentrified recently as a philosophy of jurisprudence. Various labels—"practical reasoning," "practical legal studies," and "the jurisprudence of skepticism"—this school of thought focuses on decisional methodology—"how judges decide cases and how judges should decide cases"—and the ethics of legal practice, rather than on the nature of law or the structure of the legal system. Not surprisingly, those who espouse practical reason disagree on its definition. One of the initial theorists in the area, Vincent Wellman, distinguishes practical reason from deductive and analogical reasoning and defines it as "the reasoning of ends to means." Richard Posner views practical reason as "the methods that people who are not credulous—who have inquiring minds—use to form beliefs about matters that cannot be verified by logic or exact observation." According to its adherents, practical reason supplies the decisional methodology when formal logic and scientific observation alone cannot provide legal solutions.

 Supporters of practical reason are quick to recognize that they must explain its method and offer criteria for evaluating its success. However, in relation to the volume of impassioned arguments about the need for practical reason, explanations of its techniques are largely unvoiced or


166. Feinman, supra note 10, at 724.

167. See Posner, supra note 10, at 827. Richard Posner was an early champion of the law and economics movement. Nowhere in his article does Posner attempt explicitly to reconcile the fundamental assumptions of efficiency analysis with the methodology of practical reason. Perhaps this is because Posner views the "skeptical mood" engendered by practical reason as "[p]erspective—not theory." Id. at 829. Implicit in Posner's practical reason paradigm is the choice, at the outset, of a judging model. "A popular candidate for such a concept today is the economic concept of wealth maximization, but it is, needless to say, a contestable choice." Id. at 863.

168. Feinman, supra note 10, at 724.


170. Wellman, supra note 165, at 46.


172. See id. at 830-37. Practical reason comprises "the methods . . . that people use to make a practical or ethical choice." Id. at 837.

173. Most recently, Justice William Brennan added his powerful voice in support of a particular brand of practical reason. See Brennan, Reason, Passion, and "The Progress of the Law", 10 Cardozo L. Rev. 3 (1988). Lest Justice Brennan's call for more humane judging be mistaken simply as a plea for visceral jurisprudence, Professors Martha Minow and Elizabeth Spelman have attempted to clarify that reason and passion—wearing various definitional garb—do not present an uncompromising dichotomy. See Minow & Spelman, Passion for Justice, 10 Cardozo L. Rev. 37 (1988). They also delineate tentative criteria for judging that employs passion yet does not abandon reason. See id. at 50-60.
fuzzy. Posner, for example, has sketched the process used by a judge employing practical reason: first, the judge develops an overall concept or framework to guide her decision; second, she examines relevant precedents; third, she makes a policy determination guided by the chosen paradigm; finally, the judge reviews the decision to ensure that it does not conflict with precedent. Since the first step of the method involves the unconstrained choice of a judging paradigm and because all policy choices follow from this paradigm, the process prescribed only choreographs how a judge implements whatever social vision she already possesses. Unfortunately, the analysis pretends to be more than descriptive. Posner, Wellman, Kronman and others firmly advocate the use of practical reason as a prescriptive methodology.

Posner's brand of practical reason, for example, "includes anecdote, introspection, imagination, common sense, intuition . . ., empathy, imitation of motives, speaker's authority, metaphor, analogy, precedent, custom, memory, 'induction' . . . [and] 'experience.' " Most of these forms of reasoning rely on subjective methods of perception that are not measurable, let alone testable or falsifiable. All suffer from subjectivity and unassailable self-sufficiency and cannot be publicly verified. Certain criteria, such as memory and common sense, encourage reliance on accumulated lore of a specifically nonscientific nature. Others, such as imagination and analogy, may provide the beginnings of scientific evidence, but also may include elements that escape criteria of verification.

Importantly, the "methods" proposed to shape a decision based on practical reason emphasize sources of knowledge, rather than process, methods or results. Such a focus—on sources of knowledge, as opposed to process—historically has been associated with unassailable decrees, religion and dogmatic writings. Theories that are more scientific stress
procedure; theories that are less so encourage reliance on the locus of knowledge as a definitive measure of the theory's worth.¹⁸⁰ In short, the methods of practical reason lie in a domain from which science, by definition, is largely excluded.

Wellman offers a somewhat different account of the operation of practical reason. For him, assessment of the validity of any problem-solving by way of practical reason involves the measure of "satisfactoriness"—whether the decision serves a set of predetermined wants or purposes—and "satisfaction"—whether the decision has accomplished its purpose.¹⁸¹ One troublesome aspect of Wellman's methodology is the vaporous nature of his "criteria," which themselves specify no standards for evaluating the worth of a decision and no public criteria for the selection of purposes.¹⁸² More troubling is the illogic of the two measures. Satisfactoriness is defined solely as a measure of effectiveness. Satisfaction, a purportedly independent gauge of a decision's worth, is actually subsumed in the initial criterion of satisfactoriness, and refers to no external barometer for validation.

Scholars of practical reason engage in a curious dance with science. Its advocates generally side-step the logical and deductive methods of science. Some recognize that empirical methods are hostile to the notion of reliance on "seasoned know-how."¹⁸³ Others reject scientific models, tests and methods as too cumbersome for the realities of legal practice and decisionmaking and conclude that science cannot be depended on to answer value questions.¹⁸⁴

Ironically, one challenge to practical reason is that it smacks of scientism.¹⁸⁵ However, the accusation that practical reason suffers from an

¹⁸⁰. Science eschews resting beliefs on transcendental sources, hallowed figures, great minds or customs—in other words, on any source of beliefs. Scientific possibilities are always candidates to be tested. See generally P. Achinstein, The Concept of Evidence (1983) (essays discussing (or presupposing) that scientific methods and trials, not origins or sources of belief, provide authority and credibility); H. Redner, The Ends of Science: An Essay in Scientific Authority 105-06 (1987) (changes in scientific thinking can occur only through process of rational experimentation and cannot be dictated solely by any authority or power).

¹⁸¹. See Wellman, supra note 165, at 90-92.

¹⁸². Regarding the scientific value of openness as a measure of a theory's worth, see supra note 44 and accompanying text.


¹⁸⁵. Posner's skepticisms, like those expressed in some Critical Legal Studies, depend on the scientific criteria of objectivity and determinacy. The undefended premise is that these orthodox scientific standards are among the necessary criteria for the existence and identification of the law. Posner's arguments for legal skepticism fail if scientific criteria do not govern law and judicial practice at all.

Burton, Judge Posner's Jurisprudence of Skepticism, 87 Mich. L. Rev. 710, 713 (1988) (footnote omitted). This Article makes the claim that practical reason fails as a decisional methodology if scientific criteria, properly applied, do govern law and judicial practice. See supra text accompanying notes 177-182. In fairness, Professor Burton does recognize that by advocating a jurisprudence grounded on practical reasoning Posner is
attempt to arrive at objectivity is misplaced. The charge that practical reason is deterministic does not necessarily mean that it is either unscientific or scientific-but-helpful.\(^{186}\)

Practical reason is not without normative content. Its advocates make assumptions about the nature of law and use practical reason to suggest adoption of certain principles or doctrines. Fundamentally, practical reason betrays a disappointment in logical reasoning and at the extreme, a distrust of rationality.\(^{187}\) In part because it lacks any forward-thinking social vision, practical reason also fosters an inherently conservative approach to change: "The premise of prudentialism is that gradual reform within the framework of existing institutions is almost always preferable to more dramatic and discontinuous modes of change that seek to replace one entire framework with another."\(^{188}\)

The conservative bent of practical reason does not end with its approach to conceptual innovation. Practical reason calls for reliance on intuition, visceral reactions and gut-level common sense. It also necessarily involves political choices by legal decisionmakers.\(^{189}\) The federal bench is stocked with "conservative" judges,\(^{190}\) whose judgment calls and policy selections are influenced by their political visions.\(^{191}\) The ac-

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186. Determinism simply describes the notion that natural events have causes. See E. Cassirer, Determinism and Indeterminism in Modern Physics xi (1956). Indeed determinacy promotes continued examination to unearth the existence of causal relations.

187. See, e.g., Posner, supra note 10, at 828 ("Many—though certainly not most, and perhaps only a tiny fraction—of the legal questions in our system . . . are not merely difficult, but impossible, to answer by the methods of legal reasoning."); Wellman, supra note 165, at 65 (referring to deduction as "mechanical jurisprudence" that is "inadequate to explain the myriad ways in which judges use legal rules to rationalize their decisions"); id. at 84 (referring to analogical reasoning as lacking in criteria, and failing to provide "any useful normative insights").

188. See, e.g., Kronman, supra note 169, at 876 ("the rationalization of the law is likely to turn us all, those who teach the law as well as those who make and practice it, into bureaucratic functionaries, characterless experts whose work requires knowledge, precision, and fairness, but never judgment in the sense that I have used that term here"). Apparently Kronman fears the link of rationality with rationalization, the transformation of rationalization into bureaucratization, and a consequent loss of some ineffable human qualities, which he loosely collects under the heading of judgment.

189. Kronman, supra note 176, at 1609.

190. "[T]here is an open area in judging that judges can fill only by bringing in policy preferences, ethical values, and the like . . . ." Posner, supra note 10, at 864.

191. See, e.g., Goldman, Reagan's Judicial Legacy: Completing the Puzzle and Summing Up, 72 Judicature 318, 318-19 (1989) ("when Ronald Reagan left office in 1989, his judicial legacy literally was 346, or 47 per cent, of the judges in active service on Article III courts of general jurisdiction"). Regarding the conservative agenda promoted by these judges, see Coyle, The Judiciary: A Great Right Hope, 10 Nat'l L.J. 22 (April 18, 1988) (the Reagan appointees are "predominately white, male and wealthy").

192. See Estreicher, Conserving the Federal Judiciary for a Conservative Agenda? (Book Review), 84 Mich. L. Rev. 569, 569-70 (1986). Stephen Griffin suggests that institutional constraints apart from partisan politics keep constitutional theory "fundamentally conservative. Scholars tend to avoid areas of inquiry where the Court does not or cannot go.
ceptance of practical reason would exacerbate the extent to which legal decisions would conform to the prevailing political mood. By emphasizing conventional wisdom based on common experience and values, practical reason relies on majoritarian definitions of "practical wisdom" or "sound judgment." At best, practical reason is ill-defined. As a tool to assess the validity of any particular decision, it is reminiscent of Justice Potter Stewart's test for the recognition of pornographic material. Any decisional methodology that depends upon intuition cannot describe how to resolve conflicts among competing values. As an apparatus to guide decision-making, it is an illusion.

This section has offered examples of how the criteria of validation can be employed to critique theories of jurisprudence. Occasionally, scholars use isolated principles of the scientific method to shape or criticize theories or decisions. Theorists have failed, however, to make comprehen-


193. See, e.g., Farber & Frickey, supra note 10, at 1653 (practical reason in the context of judicial review is circumscribed by, among other things, “our traditions of constitutional exegesis . . . [and] the expectations of the society in general and the legal community in particular”); Kromnan, supra note 10, at 205-07 (practicing lawyers concern themselves with the particulars of their cases, rather than with more general theoretical approaches to law); Posner, supra note 10, at 854-55 (“[the test of time] is a refinement of the idea that whatever most people think is probably true”).

194. Mark Tushnet makes the stronger claim that practical reason is not centrist, but elitist because “[t]hose who, in our society’s terms, are better educated, more independent, and so on, are likely to have the faculty of practical reason better developed.” Tushnet, Anti-Formalism in Recent Constitutional Theory, 83 Mich. L. Rev. 1502, 1536 (1985).


196. See Tushnet, supra note 194, at 1532.

197. See supra notes 177-182 and accompanying text (discussion of the absence of external criteria to guide decisionmaking).

sive and consistent use of these criteria to evaluate the logic, utility, explanatory and exploratory power of jurisprudential theories.

III. THE SCIENTIFIC METHOD AND JURISPRUDENTIAL METATHEORY: LESSONS FROM THE HISTORY OF LAW AND SCIENCE

Any theory of jurisprudence may be evaluated according to the criteria of scientific inquiry. These criteria provide a common analytical framework that can be applied to all theories. Equally important, the history of the treatment of science by different schools of jurisprudence offers certain collective messages: about the utility of interdisciplinary thought, about formalism and about grand theory-building.

Initially and perhaps most importantly, the historical sweep of law and science attests to the necessity of interdisciplinary thinking. The interaction of the two disciplines has offered new and substantially different ways of viewing perennial legal problems, both in terms of specific conceptual transplants and broader theoretical approaches. For example, the Heisenberg uncertainty principle—which postulates that it is impossible to determine simultaneously the velocity and the location of a subatomic particle because the act of determining one characteristic makes uncertain the determination of the other—has been applied to the process of constitutional adjudication and the allocation of contract risks.

More broadly, the advance of scientific theorizing has led to greater refinement in the development of jurisprudential theories. Classical thought was flawed by the formalism of its method, which relied on the proposition that legal rules are an unchanging and transcendent body of doctrine. Later theories, such as realism, law and society and critical legal studies, exhibit increasing depth—a recognition that legal rules are not reducible solely to observable phenomena, but are a product of underlying forces, such as creativity, politics, or empathy.

Another message from the history of science in law concerns how jurisprudential theorists search for knowledge, understanding and greater explanatory power, and why those searches fail. Classical thought, and to some extent law and society scholarship, offer examples of how science can be used as mystique rather than reason. While both schools exhibit faith in science’s ability to deliver objective and systemic solutions to legal issues, neither recognizes that it is mistaking the prestige of science for the benefits that scientific inquiry has to offer in evaluating arguments, objectives or conclusions. Critical legal studies, on the other hand, manifests a healthy, skeptical attitude toward existing legal rules.

199. See W. Heisenberg, Physics and Beyond 81 (1971).
200. See Bradley, The Uncertainty Principle in the Supreme Court, 1986 Duke L.J. 1, 2 n.5.
As a theoretical venture, however, CLS does not build upon its own conclusions. Most critical theorists offer no positive program for better decisionmaking; some suggest that such a goal is inherently unattainable. Thus, CLS theorists do not put the criteria of scientific inquiry to their greatest possible use. The utility of scientific inquiry should neither be exalted beyond its bounds, nor should its possible contributions be underestimated.

Unlike theories of science, in which knowledge is necessarily cumulative (although marked at times by leaps and lapses), legal theories appear to change in paradigm shifts. Many theories of jurisprudence are defined by a rejection of what has gone before. Some theorists pride themselves on the fact that their theories do not resemble or converge with prior legal thinking. The collective history of legal philosophy is one of fragmentation and atomism, not of comprehensiveness or depth. The progression of jurisprudence has been distinctly unscientific.

Perhaps the lesson to be drawn from this view of the history of science in law is that the dichotomy between incrementalism and grand theory-building is a false one. Incrementalism—the gradual refinement of legal theories guided by historical successes and failures—may result in more enlightened grand theory-building. Critical legal studies, for example, adopted and distilled realist principles of indeterminacy. Similarly, a number of modern theories of scientific realism are crafted

202. See, e.g., Letter from Sir Isaac Newton to Robert Hooke (February 5, 1675), reprinted in 1 The Correspondence of Isaac Newton 416 (H. Turnbull ed. 1959) ("If I have seen further it is by standing on . . . sho[u]lders of Giants."); see also Cohen, History and the Philosopher of Science, in The Structure of Scientific Theories 308, 321 (F. Suppe ed. 1977) ("The development of an 'interial' [sic] physics demonstrates how a scientist, in 'creating' a 'new theory' of 'his own', is apt to borrow or use or adapt a definition or a law or an axiom or a principle, or even a whole theory, from one of his predecessors."). One test of the viability of any novel scientific theory is convergence—how it fits with what we already know. See P. Frank, Philosophy of Science: The Link Between Science and Philosophy 350 (1957).

203. See Boyle, Legal Fiction, 38 Hastings L.J. 1013, 1018 (1987); see also Schlag, Cannibal Moves: An Essay on the Metamorphoses of the Legal Distinction, 40 Stan. L. Rev. 929, 931-34 (1988) (suggesting that legal distinctions have become less dichotomous and less paradigmatic over time, but still operate in a schisming sort of way that is cannibalistic toward legal reasoning). Thomas Kuhn initiated the concept that thought changes in paradigm shifts. See T. Kuhn, The Structure of Scientific Revolutions 92-110 (2d ed. 1970).


205. The explanations provided by the history of science offer "a more and more unified perspective on a larger and larger body of detailed beliefs." D. Shapere, supra note 78, at 205.

206. See, e.g., Farber, Legal Pragmatism and the Constitution, 72 Minn. L. Rev. 1331, 1376-77 (1988) (criticizing grand theory approach to constitutional law and suggesting a pragmatic analysis).

207. See supra text accompanying notes 139-141.

208. See Fuller, supra note 7, at 552 (presenting a "particular brand of scientific realism that . . . goes beyond simply postulating a distinction between the world and how we think about it. It also recognizes a difference between our own social constructions and
from components of realism and critical legal studies. One reason scientific theories have successfully built on their predecessors is the consensus on "a standard of testability for evaluating theories."\(^{209}\)

It may be argued that reliance on the scientific method to analyze the value of legal theories, or to guide decisions, heralds a return to formalism.\(^{210}\) This conclusion mistakes the nature and function of the principles of scientific inquiry. The criteria of confirmation offer no fixed prescription for theory development; instead, they provide one method of evaluating a theory. Moreover, the criteria themselves are not rigid, but have historically been subject to modification and improvement.\(^{211}\)

IV. PRINCIPLES OF SCIENTIFIC INQUIRY AND DECISIONAL METHODOLOGY

To what extent is the scientific method capable of shaping decisions? The criteria of scientific inquiry cannot guide all judicial decisions; abstract concepts cannot prescribe tangible results in varied factual contexts.\(^{212}\) There can be no "scientific" program for decisionmaking; indeed it would be most unscientific to suggest such a map. The principles of scientific inquiry, however, can lead to greater understanding of how arguments and justifications are actually being used. They can reveal the use of legal fictions and hypostatizations and can promote greater rationality in decisionmaking.

A. How Unscientific Decisions Make Bad Law

In the tradition of critique coming more easily than a positive program, this section will offer examples of how "unscientific" decisions—decisions that do not comport with the criteria of confirmation—lead to unwise and unjust outcomes. These examples lead to some affirmative suggestions on how judges can make better reasoned and more self ana-


\(^{210}\) Formalism is variously defined simply as deductive reasoning, see Posner, Legal Formalism, Legal Realism, and the Interpretation of Statutes and the Constitution, 37 Case W. Res. L. Rev. 179, 180-82 (1986), as false constraints on interpretive choices in theory, see Tushnet, supra note 194, at 1505-07, and as "the way in which rules achieve their 'ruleness' . . . by . . . screening off from a decisionmaker factors that a sensitive decisionmaker would otherwise take into account." Schauer, Formalism, 97 Yale L.J. 509, 510 (1988).

\(^{211}\) See supra note 19 and accompanying text.

\(^{212}\) Indeed, the experimental and tentative nature of science seems to be at its core antidecisional in the sense of requiring continued and particularized studies and amassment of data.
lytical decisions.213

Last term, in Michael H. v. Gerald D.,214 the Supreme Court handed down what may be the quintessential unscientific decision. While married to Gerald D., Carole D. conceived a child, Victoria, during an affair with Michael H. Blood tests established a 98.07 percent probability of Michael’s paternity, and the parties stipulated that Michael was Victoria’s natural father. During her first three years, Victoria was raised by Carole, but they lived in varied family settings. At times, they lived with Michael who developed a parental relationship with Victoria and held her out as his daughter. Eventually, Carole reconciled with her husband, Gerald, with whom she and Victoria now live. When Carole later refused Michael visitation, he filed a filiation action to establish paternity and obtain visitation rights.

Michael and Victoria’s guardian ad litem sought visitation rights for Michael. On the recommendation of a court-appointed psychologist, the Superior Court granted Michael visitation privileges. Gerald moved for summary judgment, arguing that a California evidentiary statute conclusively presumed “the issue of a wife cohabitating with her husband, who is not impotent or sterile . . . to be a child of the marriage.”215 The Superior Court granted Gerald’s motion, after finding that Carole and Gerald cohabited at conception and birth. The principal issue before the Supreme Court was whether application of the conclusive evidentiary presumption violated Michael’s substantive due process rights.216 The Supreme Court held that Michael lacked a protectible liberty interest, because the due process guarantee applied only to “fundamental” interests “traditionally protected by our society.”217 The Court completed the syllogism by finding the unitary family represented by Carole, Gerald and Victoria deserving of protection,218 while the parental relationship asserted by Michael H.—“the natural father of a child conceived within and born into an extant marital union that wishes to embrace the child”—as undeserving of due process protection.

The Court’s reasoning in Michael H. is incompatible with the criteria of scientific inquiry. The critical problem with the decision is that the Court, in determining the meaning of “fundamental” interests, favored a hypothetical ideal—the unitary family—over the reality of the facts—a

213. Regarding the difficulties of diagramming procedures for critical thinking, see Gutteridge, "First Sit Down and Play the Piano Beautifully . . .": Reading Carefully for Critical Thinking, 9 Informal Logic 81 (Spring & Fall 1987).
216. See Michael H., 109 S. Ct. at 2341.
217. Id.
218. See id. at 2342.
219. Id. at 2344. The dissent notes, “no fewer than six times, the plurality refers to Michael as the ‘adulterous natural father.’” Id. at 2353 (Brennan, J., dissenting) (emphasis in original).
multiple family. This flaw is more serious than the Court's dismissal of the empirical evidence: the 98.07 percent probability and the parties' stipulation that Michael was Victoria's father; the evidence in the record that Michael and Victoria had an established parent-child relationship; and the psychologist's recommendation to preserve that relationship.

More fundamentally, the deficiency is one of method. Imposing ideal norms and values on situations that do not resemble the abstraction is more than unscientific, it is unjust.

*Michael H.* fails to comport with the criteria of validation and also fails as a matter of social vision. The decision bases rights in a changing society on static historical tradition. Such inflexibility leads to a closed system. Unyielding reliance on historical tradition and a lack of inquiry into contextual changes is distinctly unscientific. Moreover, the plurality engages in definitional gaming. According to the plurality, its focus on whether an "adulterous natural father" has rights protected by traditional notions of liberty interests is supportable because it "refer[s] to the most specific level at which a relevant tradition protecting, or denying protection to, the asserted right can be identified." The plurality's justification for its conclusion that adulterous natural fathers who have an established parental relationship are undeserving of parental rights is wholly dependent on its framing of the issue. Considering tradition with respect to the most specific possible application permits only conservative changes in law. New applications and extensions of liberty interests will not be adopted precisely because they have not previously been encountered. The Court's definitional gambit is selective and persuasive rather than explanatory. It is circular and is clearly aimed at reaching a certain result, rather than promoting inquiry. The criteria of the scientific method, on the other hand, suggest that data be defined so as to open the possibilities of new knowledge, rather than to constrain exploration.

*Michael H.* is an instructive example of how the principles of scientific inquiry can be used to critique a decision. More generally, the principles can help shape approaches to law, especially in cases where values clash

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220. In the battle between theory and phenomena, the scientist must be willing to discard the former, not the latter. See supra note 132.

221. Any scientific decision must be in accord with and supported by the empirical data. See J. Ravetz, Scientific Knowledge and its Social Problems 78 (1971). For another example of the conceptual (pardon the expression) mishandling of empirical evidence, see Michael M. v. Sonoma County Superior Court, 450 U.S. 464, 473 (1981) (upholding a statutory rape law directed only at males on the wholly unsupported assertion that "the risk of pregnancy itself constitutes a substantial deterrence [to intercourse] to young females" and the correlative, and equally unsupported, assumption that the presence of statutory rape laws will deter male teenagers from having sex).

222. See *Michael H.*, 109 S. Ct. at 2344 n.6 (discussing the lack of "historical traditions" conferring rights on "an adulterous natural father").

223. Id. at 2344 n.6.

224. See supra note 44 and accompanying text.
and the consequences of a given value choice are unknown or disputed. The debate over the regulation of pornography is one example.

Early decisions permitted the suppression of obscene books and films based, in part, on the belief that viewing pornographic material caused violent behavior. Subsequent research on the link between pornography and violence proved inconclusive. The 1970 Presidential Commission on Obscenity and Pornography reported that some researchers determined that pornography has a cathartic effect that actually reduces crime by affording an outlet for sexual urges. The 1986 Attorney General's Commission on Pornography ("Meese Commission") reached the opposite conclusion.

The Meese Commission has been ridiculed for its unobjective composition, its limited survey of the social science data and its selective use of existing research. Some cross-cultural research suggests that violent crime against women is attributable to many factors other than pornography. Laboratory studies suggest that repeated exposure to violent pornography induces not violence, but boredom. In short,


227. See Attorney General's Commission on Pornography, Final Report 324 (1986) [hereinafter Meese Comm'n Report]. The Commission concluded that "exposure to sexually violent materials," id. at 325, leads to "an increase in aggressive behavior directed towards women." Id. at 325-26. However, two of the twelve Commission members dissented from the Commission's finding of a causal link between pornography and violence. See id. at 203-07.


230. See Hunter & Law, Brief Amici Curiae of Feminist Anti-Censorship Taskforce, et al., in American Booksellers Association v. Hudnut, 21 U. Mich. J.L. Ref. 69, 72 (Fall 1987-Winter 1988). To establish the connection between pornography and violence, the Meese Commission's most frequent reference was to the work of Dr. Edward Donnerstein. While Donnerstein's research shows that in a laboratory setting, repeated exposure to violent pornography decreases males' sensitivity to violence toward women, Donnerstein himself has cautioned that his research is limited to the effect of pornography on attitudes, not behavior. See Note, Violent Pornography and the Obscenity Doctrine: The Road Not Taken, 75 Geo. L.J. 1475, 1491 (1987).


there is a dearth of sound empirical evidence causally linking pornography and violent crimes against women.

In light of the absence of a conclusive empirical link between sexually explicit material and violence, the arguments in favor of suppression have changed. Some feminists, such as Andrea Dworkin and Catherine MacKinnon, have joined the conservative call for regulation of pornography, contending that pornography disempowers women by reinforcing sexist attitudes. For purposes of this inquiry, the conflict focuses on the clash of free speech values and the values of preventing female subordination.

The application of the criteria of rationality would resolve the dispute in favor of preserving first amendment values. First, the openness required by the scientific method supports the free flow of ideas, including—perhaps emphasizing—ideas that are not mainstream and thoughts that are unpopular or even deviant.

Second, the criterion of simplicity favors the absence of regulation. Leaving sexually explicit materials unregulated offers the best chance for a unified and integrated approach to first amendment law, especially considering the variety of modern obscenity and the immense difficulties


235. In fact, a theorist applying scientific principles to the debate would not stop with defeat of the MacKinnon-Dworkin position. For similar reasons, the criteria of inquiry would find too restrictive even the current test for determining when sexually related material is obscene:

(a) whether "the average person, applying contemporary community standards" would find that the work, taken as a whole, appeals to the prurient interest . . . ;

(b) whether the work depicts or describes, in a patently offensive way, sexual conduct specifically defined by the applicable state law; and (c) whether the work, taken as a whole, lacks serious literary, artistic, political, or scientific value.


236. While science is cumulative, see supra note 202 and accompanying text, this does not mean that conformity to majority ideas is a requisite of scientific theory. If Planck and Einstein, for example, had tracked the path of classical physics, they would not have founded quantum physics. See Kaufmann, supra note 40, at 469; see also Post, Cultural Heterogeneity and Law: Pornography, Blasphemy, and the First Amendment, 76 Calif. L. Rev. 297 (1988).

237. With technological advances and commercial innovations, a wide variety of communications in different media are argued to be pornographic. See, e.g., Carlin Communications, Inc. v. FCC, 787 F.2d 846, 855 (2d Cir. 1986) (considering standards for analyzing federal dial-a-porn regulations); M.S. News Co. v. Casado, 721 F.2d 1281 (10th Cir. 1983) (upholding district court dismissal of action for injunction against enforcement of city ordinance banning promotion of sexually oriented material to minors); Community Television of Utah, Inc. v. Wilkinson, 611 F. Supp. 1099, 1108-09 (D. Utah 1985) (holding the Utah Cable Television Programming Decency Act unconstitutionally overbroad and vague), aff'd sub nom. Jones v. Wilkinson, 800 F.2d 989 (10th Cir. 1986),
of distinguishing violence-inciting pornography (if it exists) from erotica. Moreover, the criteria of rationality do not support the creation of ad hoc rules regulating that which is only theoretically harmful.

Third, a scientific theoretician should examine the unspoken assumption of the MacKinnon-Dworkin subordination theory: that women are a class in need of protection from sexually explicit material. This chauvinism depends on unwarranted suppositions about class characteristics of both men and women. Furthermore, regulations premised on paternalism may perpetuate and reinforce those stereotypes. The scientific method of contextualizing is inconsistent with a hypothetical assumption that pornography is always subjugating.

Fourth, the criterion of falsifiability requires an explicit, unambiguous definition of pornography. One difficulty with the Indiana anti-pornography ordinance, for example, was the vague and self-protected nature of its terms, such as "who enjoy ... humiliation; ... presented in scenarios of degradation; ... shown ... as inferior; ... presented ... for ... conquest ... through postures or positions of servility or submission or display."  


238. See, e.g., Lynn, “Civil Rights” Ordinances and the Attorney General’s Commission: New Developments in Pornography Regulation, 21 Harv. C.R.-C.L. L. Rev. 27, 85 (1986) (“The highly personal character of a viewer’s response to pornography ... renders spurious the claim that it is analytically and legislatively possible to draw ‘objective’ distinctions between pornography and erotica.”). Even feminists who advocate suppression of pornography confess the difficulties of distinguishing between pornography and erotica. Andrea Dworkin contends that “in the male sexual lexicon, which is the vocabulary of power, erotica is simply high-class pornography: better produced, better conceived, better executed, better packaged, designed for a better class of consumer.” Bryden, Between Two Constitutions: Feminism and Pornography, 2 Const. Commentary 147, 166 (1985). The solution these feminists advance, however, is the regulation of all material that could be either pornographic or erotic that subordinates women.

239. See supra note 24 and accompanying text (discussion of how ad hoc hypotheses violate the precept of simplicity).

240. See, e.g., Hunter & Law, supra note 230, at 126 (“The [Indianapolis] ordinance assumes that in sexuality, degradation is a condition that attaches to women ... [T]he ordinance assumes that women as a class are subordinated and hurt by depictions of sex, and men are not. The ordinance reinforces yet another sexist stereotype of men as aggressive beasts.”). For a discussion of why chauvinism is unscientific, see supra text accompanying note 54.


242. The Meese Commission’s conclusion that pornography is degrading and humiliating relies in large part on testimony from individual women. See Meese Comm’n Report, supra note 227, at 773-835.

Finally, assuming that first amendment law should seek to reduce sexual stereotyping and subjugation of women, the criteria of scientific inquiry would still favor free expression over censorship to attain that objective. The MacKinnon-Dworkin argument is that a system purged of pornography will become a clean canvas on which to create an empowered image of women. 244 This argument is flatly contradicted by histories of other types of forbidden fruit, 245 depends on a unicausal vision of female subordination, 246 and offers the least extensible or fertile solution to the problem of female degradation. Permitting pornography may lead to presently unknown solutions to this problem 247 without the evils of censorship. Indeed, the "marketplace of ideas" theory at the core of the first amendment—that deleterious speech is best combated with more speech—is far more compatible with the criteria of scientific inquiry than is censorship. 248

The pornography debate provides one example of the analytic utility of scientific principles in legal decisionmaking. Some criteria of inquiry have already been used to analyze issues such as the teaching of creationism in public school science classes 249 and the availability of strict liability theory for a tort action against a manufacturer of defective goods. 250

244. See, e.g., Dworkin, Against the Male Flood: Censorship, Pornography and Equality, 8 Harv. Women's L.J. 1, 23-24 (1985) (by challenging pornography women gain equality).


246. If subjugation of women has other antecedents—such as differential acculturation within the family or a history of educational or employment disadvantages—eradication of sexually explicit pictures and stories will not eliminate the subordination; censorship will not create educational opportunities or cure wage differentials.


248. The values promoted by free expression are one with the criteria of inquiry: advancement of inquiry and knowledge and open exchange of thoughts and ideas. See Emerson, Pornography and the First Amendment: A Reply to Professor MacKinnon, 3 Yale L. & Pol'y Rev. 130, 133 (1984); see also State v. Han, 63 Haw. 418, 421 n.3, 629 P.2d 1130, 1133 n.3 (1981) ("Some commentators emphasize the value of sexually explicit material for sex education in general. Studies have found that in a practical sense, commercial erotics is the only graphic information about sex that many adolescents ever receive.").


The ultimate utility of the criteria of rationality in decision-making awaits further application and testing.

B. The Unscientific Use of Empirical Evidence

Use of scientific or social science evidence in a decision does not mean that a court is employing the scientific method. While failure to conform a decision to empirical data is generally unscientific, the converse proposition is not necessarily true: reliance on empirical evidence does not make a decision scientifically sound.

Perhaps the best illustration of this point is *Muller v. Oregon*, the first decision using social science evidence. In *Muller*, defendants presented the Supreme Court with the original Brandeis Brief, a collection of social science data urging the Court to regulate working hours for women, even though substantial precedent prohibited such regulation for men. The Court complied, giving the following reasons for reducing working hours for women: 

"(a) the physical organization of women, (b) her maternal functions, (c) the rearing and education of the children, (d) the maintenance of the home ..."  

Thus, the first use of empirical evidence to shape a decision produced a protectionist and chauvinist rule. As this Article has explained, chauvinism is an unscientific value because it relies on a priori assumptions about class characteristics. The use of class-based data in *Muller* also violated the principle of simplicity; if the argument was that long hours endanger the health of workers, the simplest form of proof would link health consequences to workers in general, not to women. While the contextual approach of Brandeis briefing is consistent with the requirement that theories possess external validity, empirical evidence is often easy to manipulate. Use of empirical evidence is not tantamount to use of the principles of scientific inquiry; the entire argument must still be evalu-

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251. *See supra* note 221.
252. 208 U.S. 412 (1908).
253. The brief included government statistics, surveys and factory inspection reports. *See id.* at 420 n.1.
255. *Muller*, 208 U.S. at 420 n.1 (citation omitted).
256. *See* Hovenkamp, *Social Science and Segregation Before Brown*, 1985 Duke L.J. 624, 633 n.54 ("the social science data in the famous Brandeis Brief were designed in part to show that women were inferior to men and thus incapable of entering into their own employment contracts without state regulation").
257. *See supra* text accompanying note 54. I feel obliged to point out the obvious counterpart to the use of social science evidence in *Muller*: in *Brown v. Board of Education*, 347 U.S. 483 (1954), plaintiffs introduced, and the Court gave limited recognition to social science data that indicated the deleterious effects of segregation on school children. *See id.* at 494 n.11. This use of empirical evidence—which was intended to question the assumptions in and effect of a rule of law that was based on uninformed conclusions about class characteristics—would promote the scientific goals of inquiry, openness and simplicity (a lack of autoexplanations regarding members of the same species).
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ated. Thus, one must examine the ends or objectives to which empirical evidence is being put.

The contention that the criteria of validation can improve judicial decisionmaking is a far cry from the suggestion that adjudication can be reduced to laboratory acrobatics. The claim is more modest: that the principles of scientific inquiry offer one means of assessing the rationality of alternative decisional possibilities.

C. Implications for Stare Decisis

It may be argued that use of a more scientific model would produce dangerous upheavals in established bodies of legal doctrine. Indeed, commentators have already catalogued the horrors of rapid judicial responses to “state of the art” empirical findings. Their criticism is either partly misplaced or trivial.

The principles of scientific inquiry do not encourage a rapid reaction to each new empirical study. Indeed, the requirement that theories be supported by a wealth of cumulative and converging evidence suggests a cautious attitude toward novel ideas. While the requirement of falsifiability does not mandate the actual physical testing of theories, it does call for their careful conceptual refinement. In practice, modern courts have hesitated to accept novel social science theories in legal proceedings.

The possibility that a more scientific approach to law would disrupt longstanding precedent may not be all bad. If precedent is considered a suggestion that a decisionmaker examine prior cases for guidance on the relevant legal rules and policy considerations, the principles of scientific inquiry would call for the same course of action—the gathering of relevant data. On the other hand, the principles of scientific inquiry are inconsistent with the meaning given to stare decisis by Professor Frederick Schauer. He defines stare decisis as a “naked argument from precedent” that “urges that a decisionmaker give weight to a particular result regardless of whether that decisionmaker believes it to be correct and regardless of whether that decisionmaker believes it valuable in any way to

259. Philosopher of science Imre Lakatos has emphasized that “scientific theories are rarely abandoned upon the first observation that purports to refute them.” Wonnell, Truth and the Marketplace of Ideas, 19 U.C. Davis L. Rev. 669, 712 (1986); see also D. Hollinger, Morris R. Cohen and the Scientific Ideal 150 (1975) (“one does not ‘throw out’ an old theory because of a few instances of disconfirmation”).
260. See C. Hempel, Philosophy of Natural Science 40 (1966) (discussing the quantum of proof necessary to dislodge established theories).
261. For example, courts have been slow to accept, and in many instances have rejected the use of scientific evidence such as rape trauma syndrome, polygraph results and rapist profiles, because those constructs lacked general acceptance or reliability. See Handler, supra note 6, at 7.
The principles of critical inquiry would encourage instead an evaluation of the reasons behind the rule. This is not a radical proposal. The idea that the role of precedent be limited by its ability to explain and persuade, as well as by the factual similarity between the cases, is probably the prevailing view of stare decisis.

Finally, the values promoted by stare decisis—certainty and predictability, as well as rationality and self-awareness, can be achieved through use of more scientific principles of inquiry. Reliance on precedent should mean more than unthinking dependence on the rule enunciated in a prior similar case; the factual applicability, context and breadth of the rule as well as policy considerations should enter the decisional calculus. The criteria of validation offer some guidance for evaluating policy choices and provide tools intended to promote rational inquiry.

V. THE MORAL OF THE STORY

The history of how theories of jurisprudence treat scientific inquiry reveals significant gaps. In the tradition of babies and bathwater, when science got a bad name during the realist era because techniques of empirical verification did not keep pace with theory development, jurisprudence silently dispensed with the scientific method. Although there has been an increasing recognition (from realism to law and society to critical legal studies) that law does not operate in a vacuum, the methods of inquiry pursued by certain schools of jurisprudence are unscientific. The jurisprudence of practical reason, for example, encourages decisionmaking that is not open, not verifiable and not meaningful. While certain theories, such as legal realism or law and economics, claim to be more "scientific" than others, they actually appear to be more interested in co-opting the mystique of objectivity that surrounds things scientific than in carefully analyzing theories according to the criteria of scientific inquiry.

This Article has delineated the criteria of inquiry that comprise the modern scientific method. It suggests that these requirements of good theory-crafting can be applied to analyze and critique the rationality and fruitfulness of jurisprudential theories. The criteria of validation can also assist judges in deciding individual cases if applied to the objectives sought by litigants. Finally, the Article posits that the criteria of scien-

263. See Douglas, Stare Decisis, 49 Colum. L. Rev. 735, 737 (1949) ("stare decisis must give way before the dynamic component of history"); Salmond, The Theory of Judicial Precedents, 16 Law Q. Rev. 376, 381 (1900) (previous decisions that do not follow principles of sound reasoning should have no binding force); see also H.L.A. Hart, The Concept of Law 127 (1961) (rigid adherence to precedent can lead judges to totally ignore social goals in deciding cases); H. Kelsen, General Theory of Law and State 148-49 (1946) (because legislature cannot foresee all possible outcomes when it creates general legal norms, judge is authorized to create new norms to fill in gaps when applying general norms would lead to inequitable outcome).
265. See supra notes 47-56 and accompanying text.
tific inquiry do not become impotent when value questions are posed. In fact, the criteria themselves suggest certain values.

The intent of this Article is not to scientize jurisprudence. It calls instead for legal philosophy to become more self-analytical, more self-aware and more precise in its use of the concepts of science. Applying scientific criteria to law requires that legal theorists more sensitively and widely employ concepts and findings from economics, psychology, sociology and other areas of study. Application of these criteria to law promises to lead to more rational theory-building and to greater inquiry in decisionmaking. As the criteria of inquiry suggest, the ultimate value of science to law depends on further testing of the scientific method in jurisprudence and decision-making.

This attempt to integrate the worlds of law and science does not pretend to be a steady bridge between the two. Instead, the journey has been an effort to assimilate some of the ways of scientific inquiry into the traditions of jurisprudence—to inform legal thinkers of another way of viewing their world. I have suggested that some theories of jurisprudence have not been precedent-setting, at least in part because the theme of science has been missing or mistold. As jurisprudential thinkers “continue to create narratives . . . to instruct and amuse their audiences,” perhaps they will weave in the story of science to craft more powerful legends—legends without myths, legends with renewed vision, legends with enduring power.

266. Law itself is fundamentally a technology, not a science. Its aims—order, retribution, equality, fairness and so on—are something other than the advancement of knowledge. But then why do we want to make law, the technology, more “scientific”? The argument has been that the criteria of the scientific method provide a means of increasing not the experimental sophistication of law, but its rationality.

