# LAW AS SCIENCE: REVISITING LANGDELL'S PARADIGM IN THE 21ST CENTURY

NANCY COOK*

## ABSTRACT

This Article examines the idea that law is science, a notion that was long ago introduced into the law school curriculum in the guise of the "casebook method" and Socratic teaching by Dean Christopher Columbus Langdell at Harvard Law School. This Article posits that radical shifts in the philosophy of science merit a return to the idea of law as science, even as law schools flounder in search of a pedagogical ideology that is consistent with modern law practice. Two scientific philosophers, in particular, are the focus: Karl Popper, whose work repudiated the longstanding observationalist-inductivist account of scientific method; and Thomas Kuhn, whose seminal book, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS, describes the work of scientists as operating with a series of paradigms. Derivative theories demonstrating the efficacy of scientific methods that elevate the significance of invention and creative reconceptualization have application to law in a time of rapid technological innovation and globalization.

* Vaughan G. Papke Professor of Clinical Law, University of Minnesota School of Law. I had the opportunity to workshop a version of this piece at the NYU and Clinical Law Review Writers Workshop. Thanks especially to Gemma Smyth, Bob Seibel, Karen Tokarz, Michael Pinard, David Koelsch, and Margaret Barry for comments.

## I. INTRODUCTION

This short Article revisits an old notion: the idea that law is science. In addressing this topic, this Article briefly examines the origins of the idea of law as science in the context of the late nineteenth century when Christopher Columbus Langdell first introduced the concept at Harvard Law School. As a general matter, science is "[t]he observation, identification, description, experimental investigation, and theoretical explanation of phenomena," or a methodological approach to knowledge acquisition.[1] The science paradigm advocated by Langdell was rooted in the accepted wisdom of the time that the work of science was to uncover – to *dis*cover – immutable laws of nature.[2] More than a century later, even after considerable and persistent critiques of the methods adopted to lead law students "scientifically" to the "discovery" of law's basic principles, legal academics continue to follow the Langdellian approach to law and legal education, if for reasons other than those expressed by Langdell

1. THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE 1560 (4th ed. 2006).
2. Thomas C. Grey, *Langdell's Orthodoxy*, 45 U. PITT. L. REV. 1, 17 (1983).

himself.[3] In light of this history, both the persistence of Langdell-inspired teaching methods and the persistent critiques of the same, this Article posits that law may indeed be like science, although not science as it was generally understood in the late nineteenth and early twentieth centuries. Rather, law may be understood to be, as a growing number of scientific philosophers maintain, a process of invention or creative reconceptualization. Accordingly, viewed from a modern perspective, science may well be a still useful – and needed – paradigm for today's lawyers and legal educators.

In Langdell's time, one of the attractions of science as an analogy to law was its purported certainty and predictability. In science, as in law, however, these characteristics have been demonstrated to be no more than wishful thinking. Yet science still has its attractions. Traditional scientific methods are useful as a means of testing knowledge and creating opportunities for the expansion of knowledge through a process of perception or discovery.[4] Additionally, science – the science of Bacon[5] and Newton,[6] and even Aristotle[7] – is the foundation of technology or invention, and invention is transformative in daily human life, a value that is hard to overstate. The critical rationalists,[8] who followed Karl Popper,[9] and the science studies sociologists, adherents to Thomas Kuhn's philosophy,[10] have offered theories allowing for the tentative acceptance, deconstruction, and reconstruction of conceptual paradigms.[11] The new science recognizes the benefits of received beliefs, designated as principles or rules, but is also keenly aware of the limitations of those beliefs. Today, the scientific method is understood to consist of more than the piling of newly discovered "truths" onto existing ones through discovery, testing, hypothesizing, and retesting; it involves an active reconceptualization of what is true and the generation of whole new conceptual paradigms.

---

3. While not often legitimated by reference to Langdell principles, law schools still largely adhere to the methodology. *See* WILLIAM M. SULLIVAN ET AL., EDUCATING LAWYERS: PREPARATION FOR THE PROFESSION OF LAW 2-3, 5 (2007) (noting, inter alia, that Langdellian case-dialogue method, which "socializes" law students very quickly and inculcates an ability to "think like a lawyer," remains the predominant teaching mode for American law schools as of the time of the writing of the report).

4. *See infra* pp. 25-27.

5. *See infra* pp. 26-27.

6. *See infra* pp. 27-29.

7. *See infra* pp. 25-27.

8. *See infra* p. 38.

9. *See infra* pp. 38-41.

10. *See infra* pp. 39-42.

11. *See infra* pp. 41-42.

In approaching law in this way, this Article does not intend to spark debates about the relative values of Langdell's science paradigm so much as to point out the void that has been left by the nearly complete erosion of the original paradigm, and to postulate that it might be filled by a fully updated science paradigm. Although some have displayed a surprisingly fierce loyalty to the underlying theories on which the Langdell approach to "thinking like a lawyer" was based, it can hardly be denied that scientific theory has come a long way since Langdell hitched Harvard Law School's star to "the scientific method."[12] But it also bears noting that, as a general matter, one great strength of science is that it is self-correcting. The nature of scientific inquiry demands that scientists abandon theories when they are shown to be irrational or unsupportable. The scientific method is not an inalterable recipe; it requires intellect, imagination, and creativity. In recent times, in fact, it has been emphasized that science is an ongoing cycle, constantly developing more useful, accurate and comprehensive models and methods.[13] If law is viewed this way, the Langdell notion that its core principles can be "discovered" loses efficacy. At the same time, however, in keeping with modern characterizations of science, law could be viewed as an ongoing dynamic, dependent on past models, developments, and understandings. The legal academy, in keeping with this evolved perspective, could preserve the "law as science" paradigm by expanding pedagogical methods in the first year to include a focus on understanding law as a creative and inventive process that is distinctly different from – or certainly more complex than – a process of discovery.

The Article is broken down into five Parts. Following this brief introduction in Part I, Part II, The Old Paradigm, provides the historical background and context for understanding the proposed paradigmatic shift. Part III, An Imperfect Evolution, explores the continuing utilization of the original scientific method paradigm, as well as the changing forms and rationalizations that have accompanied its use. In Part IV, The New Scientific Paradigm, twentieth century developments in science are used to revisit the Langdellian premise and redefine the parameters of a scientific-

12. *See infra* pp. 24-26; 29-32.

13. This can be understood by a simple example: When Einstein developed his SPECIAL AND GENERAL THEORIES OF RELATIVITY, he did not wholly discount Newton's PRINCIPIA (PHILOSOPHIAE NATURALIS PRINCIPIA MATHEMATICA 1687). In fact, if phenomena that Newton could not have observed, given the technological constraints of the time, are removed from Einstein's theories, Newton's equations remain. Einstein's theories are expansions and refinements of Newton's theories based on increased data and shifts in perspective. They validate, rather than undermine, Newton's accomplishments. *See* Stephen W. Hawking, *Newton's Principia*, *in* THREE HUNDRED YEARS OF GRAVITATION 1, 4 (Stephen W. Hawking & Werner Israel eds., 1989).

method analogy for law school pedagogy. Finally, Part V consists of applications of the revised paradigm in the context of doctrinal law courses. Using the legal principles and paradigms relating to defenses to negligence, the prohibition against cruel and unusual punishment, and statutory construction of sexual harassment, the applicability of scientific method is demonstrated. The Article notes in conclusion that the science paradigm of the twenty-first century provides a shift in perspective that allows for a reordering of knowledge, one which is not only more inclusive of multiple existing realities, but opens the gates for creativity and new understandings of law in context and in operation.

## II. THE OLD PARADIGM

At Harvard Law School in the late nineteenth century, Langdell sought to modernize professional education by incorporating the best known scientific methods into the classroom laboratory. His basic pedagogical approach to the teaching of contracts, generally referred to as "Socratic method," is still widely in use in American law schools.

### A. SCIENCE AS A CHOSEN CONCEPTUAL FRAME OF THE LATE NINETEENTH CENTURY

Since the years of Langdell's reign at Harvard,[14] the first-year curriculum of the vast majority of the nation's law schools has been primarily about the teaching of doctrine and, more specifically, common law doctrine.[15] The origins of this agenda, the Harvard method, came about in the latter half of the nineteenth century, when science was the rage in intellectual circles, and law, as a profession and an academic discipline, was anxious to be admitted to the university academy.[16] Then, as today, people wanted law to be predictable and neutral.[17] Professionals were loathe to admit to uncertainty about the principles governing judicial decision-making and sought a conceptual frame that would both bring order to chaos and render the teaching of the subject rigorous enough to merit university admission. Science provided that conceptual framework.[18] In this

14. Langdell served as dean from 1870 to 1895. BRUCE A. KIMBALL, THE INCEPTION OF MODERN PROFESSIONAL EDUCATION: C.C. LANGDELL, 1826–1906, at 2 (Daniel Ernst & Thomas A. Green eds., 2009). His teaching career spanned another five years. *Id.* at 8.

15. Edward Rubin, *What's Wrong with Langdell's Method, and What to Do About it*, 60 VAND. L. REV. 609, 649 (2007).

16. *See* KIMBALL, *supra* note 14, at 345.

17. *See* Grey, *supra* note 2, at 45.

18. *See id.* at 17.

environment, a relative upstart at Harvard Law School, Langdell, introduced the notion that law is science and should be taught as such.[19]

In the late nineteenth century, the scientific system of acquiring knowledge was viewed as completely objective, rational, and empirical. Scientific theories and laws were believed to be conclusively confirmed or conclusively falsified on the basis of objective data.[20] This provided the kind of certainty that many craved, especially in the wake of an Enlightenment that had exposed as irrational many belief systems anchored in irrefutable religious or mythological tenets.[21]

Certainty could be achieved through "the scientific method," which had roots in classical philosophy. One of Aristotle's contentions was that universal truths can be known from observation of particular things; he thereby provided one of the primary ingredients of scientific tradition: empiricism. Aristotle used induction as a way of reconciling abstract thought with observation.[22] Although he did not claim that knowledge acquired by induction constitutes scientific knowledge, he saw induction as a necessary prelude to scientific inquiry, in that measured and detailed observations could provide the premises required to engage in scientific experimentation.[23] Induction became the foundation of modern science, later advocated and popularized by Francis Bacon.[24]

Baconian inductivism was the apex of scientific method in the early seventeenth century.[25] The basic technique was the collection of copious observations, theoretically uninfluenced by any prior prejudice or intellectual preconceptions, followed by an inductive discovery of operational laws or theories gained by generalizing from the data.[26] But the weaknesses of induction as an overarching approach to science were soon exposed. The method is problematical not least because one initial condition – freedom from theoretical preconceptions – is an impossibility.[27]

---

19. *Id.* at 5.

20. *See id.* at 17.

21. Rubin, *supra* note 15, at 624.

22. Christof Rapp, *The Nature and Goals of Rhetoric*, *in* A COMPANION TO ARISTOTLE 579, 580 (Georgios Anagnostopoulos ed., 2009).

23. Aristotle attributes the idea of induction to Socrates. ARISTOTLE, METAPHYSICS, bk. VIII, at 220 (John H. McMahon trans., George Bell & Sons 1904).

24. KARL POPPER, THE MYTH OF THE FRAMEWORK: IN DEFENCE OF SCIENCE AND RATIONALITY 84 (M.A. Notturno ed., 1994) [hereinafter POPPER, MYTH OF THE FRAMEWORK].

25. Grey, *supra* note 2, at 12-13; Rubin, *supra* note 15, at 632-33.

26. Francis Bacon, *Thoughts and Conclusions on the Interpretation of Nature or a Science Productive of Works*, *in* THE PHILOSOPHY OF FRANCIS BACON 73, 89 (Benjamin Farrington trans., Liverpool Univ. Press 1964) (1653).

27. *See* COLIN HOWSON, HUME'S PROBLEM: INDUCTION AND THE JUSTIFICATION OF BELIEF 10-11 (2000); KARL POPPER, THE LOGIC OF SCIENTIFIC DISCOVERY 7-10 (Routledge Classics 2002) (1935) [hereinafter POPPER, LOGIC OF SCIENTIFIC DISCOVERY].

In fact, when using inductivism to arrive at natural laws, certain theoretical preconceptions are vital. To generalize from the data, the individual must assume uniform operation of nature, that is, that the laws apply equally to physical processes *not* observed.[28]

An answer to this dilemma was found in another form of Aristotelian logic: deductive reasoning.[29] Using syllogisms, scientists could infer new universal truths from those already established. Deductive reasoning was particularly suitable in a world in which change, or evolution, was deemed to be part of the nature of things. The deductive method imposed continuing responsibilities on scientists to collect increasingly more data to measure the consistency of the applicability of existing known laws. This process, with its heavy reliance on empirical observation, was followed by modification or rejection of existing laws as necessitated by conflicting comparative results.[30]

But this approach had limited utility as well. One problem is that not all data is sensory. Science deals with objects that cannot be directly observed, such as subatomic particles and the force of gravity. Even the application of mathematics to natural phenomena was severely limited by this method, since most of nature (*i.e.*, the empirical world) is in a constant state of nonlinear change, and the mathematics of the time was only able to deal with phenomena that remained more or less static. With the invention of calculus, generally attributed to Isaac Newton and Gottfried Wilhelm Leibnez, mathematics was able to describe change.[31] Where previously, mathematics – geometry and early number theory, in particular – were, through inductivism, identified as part of the ideal, unchanging world, empiricism became the method of choice to learn about the ever-changing environment.

Newtonian theory, eventually termed hypothetico-deductivism, was the paradigm shift needed to make mathematics applicable to both the static and dynamic aspects of the empirical world.[32] The process is basically one in which human irrationality is quarantined: the beginning point, or hypothesis, is followed by deductive predictions, which can then be tested, through repeated experimentation, against empirical data. The sources of theory are irrelevant in hypothetico-deductivism since, regardless of origin,

28. *See* HOWSON, *supra* note 27, at 10-11.

29. Rapp, *supra* note 22, at 580.

30. *See* POPPER, LOGIC OF SCIENTIFIC DISCOVERY, *supra* note 27, at 17-20.

31. STEVEN JOHNSON, WHERE GOOD IDEAS COME FROM: THE NATURAL HISTORY OF INNOVATION 261 (2010).

32. Peter Achinstein, *Introduction: Hypotheti-Deductivism, the Mill-Whewell Debate and the Wave Theory of Light*, *in* SCIENCE RULES 127, 127 (Peter Achinstein ed., 2004).

theories can be tested against empirical findings and confirmed or refuted. A theory is validated not by reference to its historical source, but within a defined, temporal universe, through a laborious method of verification.

Newton's work became a model that other sciences sought to emulate, and his approach was foundational to much of natural philosophy throughout the eighteenth and early nineteenth centuries.[33] The basic method used for scientific inquiry, still in general application today,[34] consists of a methodological paradigm combining these concepts: operations, observations, models, and a utility function for evaluating models. "Operations" in this context implies that some action is being done to the system being investigated; "observation" is activity undertaken as and after the operation is done to the system.[35] A model may be a hypothesis, theory, or the phenomenon under study; utility function is the means by which the usefulness of the model is measured.[36] The method has been broken down into operational components, generally consisting of:

1. Defining the question;
2. Gathering data (observing, measuring);
3. Forming a hypothesis;
4. Experimenting and recording observed data;
5. Analyzing data;
6. Interpreting data and drawing conclusions that serve as a starting point for a new hypothesis;
7. Publishing results; and
8. Retesting.[37]

---

33. Some of his methods were later systematized by John Stuart Mill. Among the efforts made to classify fields of study outside physical sciences as science were those by WILLIAM STANLEY JEVONS in his THE PRINCIPLES OF SCIENCE: A TREATISE ON LOGIC AND SCIENTIFIC METHOD (1887). Jevons argued for the centrality of the hypothetico-deductive method in the logic of science and framed the methodology in terms of probability, which he then applied to economic laws. Similarly, the idea that law was, like any physical science, a coherent system built on fixed principles, was the standard view of the time. *See* Carrie Menkel-Meadow, *Taking Law and ____ Really Seriously: Before, During and after "The Law*," 60 VAND. L. REV. 555, 556-67 (2007).

34. Although these methodological elements and this organization of procedures tend to be more characteristic of natural sciences than social sciences, the cycle of formulating hypotheses, testing and analyzing the results, and formulating new hypotheses in social science research fields resembles the cycle described.

35. *See generally* RICHARD P. FEYNMAN ET AL., SIX EASY PIECES: ESSENTIALS OF PHYSICS EXPLAINED BY ITS MOST BRILLIANT TEACHER 24 (1965); JEVONS, *supra* note 33, at 265-66.

36. *See generally* PETER GEOFFREY-SMITH, THEORY AND REALITY: AN INTRODUCTION TO THE PHILOSOPHY OF SCIENCE 6-17 (2003); LUDWICK FLECK, GENESIS AND DEVELOPMENT OF A SCIENTIFIC FACT 66-71 (Thaddeus J. Trenn ed., 1981).

37. There are many ways the components of scientific methods have been described. While the language varies somewhat and the specific characterization of the actions may differ, in general these eight steps capture the range of these descriptions. *See infra* notes 44, 45, 135, & 137 (containing different variations on which this list is based).

All of these ideas influenced Langdell's thinking.[38] In accordance with his understanding that law is a scientific discipline and his belief that it should be treated as such in the university setting, Langdell introduced into the United States in the late nineteenth century a model of legal education that survives, and even thrives, today.[39]

### B. CONFLATION OF SCIENTIFIC METHOD WITH CASE BOOK/SOCRATIC METHOD

Langdell's oft-quoted theory of law as science is succinctly laid out in his Contracts text book:

> Law, considered as a science, consists of certain principles or doctrines. To have such 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 . . . . [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. If these doctrines could be so classified and arranged that each should be found in its proper place, and nowhere else, they would cease to be formidable in their number.[40]

The basic principles underlying Langdell's pedagogy have been simply stated:

> 1. Law involves a scientific analysis able to reveal the life-giving principles of the common law.
>
> 2. This science of law could be advanced only by specially trained researchers – not practitioners – who were committed to disciplined analysis.
>
> 3. The subject most appropriate for such scientific analysis is the body of written appellate opinions.

---

38. To the extent that science served as the paradigm for Langdell's pedagogy, it would have to be said that it consisted of an oleo of scientific philosophies then extant. *See* KIMBALL, *supra* note 14, app. II, at 349-51 (making the point that Langdell's purported reliance on natural science in devising his teaching methods has been overstated).

39. Rubin, *supra* note 15, at 610-11; WILLIAM C. CHASE, THE AMERICAN LAW SCHOOL AND THE RISE OF ADMINISTRATIVE GOVERNMENT 27-31 (1982).

40. C.C. LANGDELL, A SELECTION OF CASES ON THE LAW OF CONTRACTS, at viii-ix (2d ed. 1879).

> 4. Legal education means instilling techniques for scientific probing into these opinions.
>
> 5. Like other sciences, law should be pursued under circumstances most conducive to scientific thought, viz., in a university rather than in the hurly-burly world of law offices and courts where law is learned, at best, unscientifically.[41]

These principles have been thoroughly explained and analyzed;[42] thus, a brief overview will suffice here. With regard to the initial premise, Carrie Menkel-Meadow points out that Langdell was noted for "[t]reating law (as a field) as a science of principles learned by induction through reading cases and systematically arranging their holdings into a coherent body of limited, general principles."[43] He publicly asserted that "the approach to law embodied in the Harvard curriculum was a form of natural science;" in fact, he maintained that this approach was natural science itself.[44] Classroom exploration was, essentially, a search for the already known. Langdell believed that by examining cases, students "would come to perceive the enduring principles of Anglo-American law that lay behind them."[45]

Similarly, Thomas Grey describes Langdell's vision as one in which "[t]he legal system was to be so arranged that it resolved hard disputes by indubitable (even if complex) reasoning . . . . The system would be predictable; people could know in which circumstances they would get the aid and in which they would face the opposition of state power."[46] Legal principles were to be discerned by inductive reasoning, and empirical evidence was to be found in judicial decisions that had been published in

---

41. Nancy L. Schultz, *How Do Lawyers Really Think?*, 42 J. LEGAL EDUC. 57, 58 (1992); *see also* Rudolph J. Gerber, *Legal Education and Combat Preparedness*, 34 AM. J. JURIS. 61, 67 (1989).

42. *See generally* James Barr Ames, *Christopher Columbus Langdell, 1826-1906*, *in* 8 GREAT AMERICAN LAWYERS 465, 483-85 (William D. Lewis ed., 1909); HARV. LAW SCH. ASS'N, THE CENTENNIAL HISTORY OF THE HARVARD LAW SCHOOL, 1817–1917 (1918); MORTON J. HORWITZ, THE TRANSFORMATION OF AMERICAN LAW 1870-1960: THE CRISIS OF LEGAL ORTHODOXY (1992); KIMBALL, *supra* note 14; ROBERT STEVENS, LAW SCHOOL: LEGAL EDUCATION IN AMERICA FROM THE 1850S TO THE 1980S (1987); CHARLES WARREN, HISTORY OF THE HARVARD LAW SCHOOL AND OF EARLY LEGAL CONDITIONS IN AMERICA, vol. 2 (1908).

43. Menkel-Meadow, *supra* note 33, at 561.

44. Rubin, *supra* note 15, at 632.

45. *Id.* at 634. Rubin contends that Langdell was influenced by Louis Agassiz. Agassiz insisted the biological world was composed of fixed, unchanging forms that had been specially created, and he believed that empirical examination of particular plants and animals would reveal the essential features of those forms. *Id.*

46. Grey, *supra* note 2, at 32. In Grey's analysis, "[t]he core notion of classical legal science can be grasped through the analogy to geometry, as that subject was understood in the late nineteenth century." *Id.* at 16; *see also* OLIVER WENDELL HOLMES, JR., THE COMMON LAW 35 (1881) ("The official theory is that a new decision follows syllogistically from existing precedents.").

court reporters.[47] The Socratic method was the means by which "scientific" principles or principles of knowledge would be "discovered" by students.[48]

What was radical about Langdell's ideas was not the notion that law is science, but the attendant proposal to overhaul legal education to adapt to scientific inquiry. What Langdell and Harvard President Charles William Eliot added was the application of scientific discovery to legal education, that is, the idea that Socratic inquiry would disclose the principles that were the source of law's coherence.[49] In a relatively short period of time, those charged with educating students in the law "cast out the textbooks, and [in their place] used . . . cases, carefully selected and arranged to illustrate the meaning and development of principles of law."[50]

This case book method became the "single most prominent feature of twentieth-century American legal education."[51] The methodology has been noted to incorporate dual strands: "first, the study of law through the medium of judicial opinions, mainly appellate opinions, that have been rendered in actual disputes; and second, the examination of these opinions in a spirit that has often, and aptly, been described as 'Socratic.'"[52] The change in textbooks was accompanied by a change in the role of law faculty.[53] A professor could no longer stand at the podium and lecture; he was, instead, "a Socratic guide, leading the student to an understanding of concepts and principles hidden as essences among the cases."[54]

The expertise necessary to conduct in-class discovery of essential principles was to be found not in practicing lawyers, but in legal academics, the equivalent of researchers in the scientific community.[55] Langdell and his champion, Harvard President Eliot, were strongly influenced by the German University system, which employed structured, directed

47. Rubin, *supra* note 15, at 632-33; *see* Menkel-Meadow, *supra* note 33, at 561.

48. Rubin, *supra* note 15, at 611-12.

49. *Id.* at 611.

50. David D. Garner, *Socratic Misogyny? — Analyzing Feminist Criticisms of Socratic Teaching in Legal Education*, 2000 BYU L. REV. 1597, 1604 (quoting LAWRENCE M. FRIEDMAN, A HISTORY OF AMERICAN LAW 531 (1973)). "Within fifty years of its introduction, the case method and the accompanying Socratic method were firmly entrenched as the backbone of legal education." *Id.* "By the 1920s, anybody who was anybody in the law school 'industry' used the case method," presumably in tandem with the Socratic dialogue. *Id.* (quoting ROBERT STEVENS, LAW SCHOOL: LEGAL EDUCATION IN AMERICA FROM THE 1850S TO THE 1980S 123 (1983)).

51. Anthony Kronman, *The Socratic Method and the Development of the Moral Imagination*, 31 U. TOL. L. REV. 647, 647 (2000).

52. *Id.*

53. *See* Garner, *supra* note 50, at 1604; WILLIAM M. WIECEK, THE LOST WORLD OF CLASSICAL LEGAL THOUGHT: LAW AND IDEOLOGY IN AMERICA 1886–1937, at 94-95 (1998).

54. Garner, *supra* note 50, at 1604 (quoting LAWRENCE M. FRIEDMAN, A HISTORY OF AMERICAN LAW 531(1973)).

55. *See* Richard J. Wilson, *Western Europe: Last Holdout in the Worldwide Acceptance of Clinical Education*, 10 GERMAN L. J. 823, 837 (2009); WIECEK, *supra* note 53, at 88-89, 94-95.

questioning by full-time academics and relied heavily on library research in legal analysis.[56] According to Langdell, "the library is the proper workshop of professors and students alike; . . . it is to us all that the laboratories of the university are to the chemists and physicists, the museum of natural history to the zoologists, the botanical garden to the botanists."[57] Judicial decisions, published in court reporters, became the primary source of empirical evidence.[58] Thus, the birth of the Socratic method was intimately intertwined with the replacement of textbooks by cases as the sole source of instructional material. The origin of the term "Socratic method" has generally been attributed to Langdell in the law school context,[59] who saw it as "a necessary adjunct to the case method of study."[60]

Although no historical record contains an explicit definition of the Socratic method as Langdell perceived it, his pedagogical methods in the classroom have been described:

> Langdell began his actual teaching by having each of the cases, which the students had to study carefully in preparation for the class, briefly analyzed by one of them with respect to the facts and the law contained in it. He then added a series of questions, which were so arranged as gradually to lay bare the entire law contained in that particular case. This stimulated questions, doubts, and objections on the part of individual students, against whom the teacher had to hold his ground in reply. Teacher and pupils then, according to Langdell's design, work together unremittingly to extract from the single cases and from the combination or contrasting of cases their entire legal content, so that in the end those principles of that particular branch of the law which control the entire mass of related cases are made clear.[61]

This philosophy laid the foundation for law school pedagogy for the next century.

---

56. *See* Wilson, *supra* note 55, at 837.

57. KIMBALL, *supra* note 14, at 350 (quoting Langdell, Address 1886, *reprinted in* 9 L. Q. REV. 9, 49-50 (1887)).

58. Menkel-Meadow, *supra* note 33, at 561; Rubin, *supra* note 15, at 632-33.

59. Garner, *supra* note 50, at 1599 (footnote omitted).

60. Alan A. Stone, *Legal Education on the Couch*, 85 HARV. L. REV. 392, 406 (1971).

61. JOSEF REDLICH, THE COMMON LAW AND THE CASE METHOD IN AMERICAN UNIVERSITY LAW SCHOOL: A REPORT TO THE CARNEGIE FOUNDATION FOR THE ADVANCEMENT OF TEACHING 12 (2009).

## III. AN IMPERFECT EVOLUTION

Although the twentieth century saw a great many changes in the conceptualization of scientific theory and method, the pedagogical shift Langdell inaugurated in its earliest years took root and held fast. Changes in law school pedagogy advanced far more slowly than the justifications for retaining the case book method.

### A. CRITIQUES OF THE SCIENTIFIC METHOD PARADIGM

Even as Langdell struggled to convince colleagues and students of the value of his pedagogy,[62] the world of science was undergoing its own transformation. Certainly inductive science, and to some extent, hypothetico-deductivism, were insufficient to explain the full range of scientific phenomena. Even assuming the general reliability of sensory experience, memory, and testimony, the impossibility of examining all germane data was obvious. Unrevealed data could always contradict the predictions of any known scientific law, and every theory was suspended in proof because of the infinite number of possible empirical outcomes. A theory could be confirmed to some extent by empirical data, but it could never be conclusively confirmed.

These and other critiques found their way into the field of "legal science." Case law is an ever-expanding field of data; thus, in law, as in science, new data would always threaten empirical outcomes and coincidentally the principles resting on them. Specifically with respect to law, data derived from studying cases was admittedly distinguishable from sensory data obtained through observation.[63] Yet Langdell made few concessions to progressive theories, including Darwinism,[64] and with respect to applications to legal education, he remained steadfast in his adherence to earlier conceptions of science and scientific analysis.[65] Despite the fact that, almost since the inception of his methods, the scientific foundations were met with skepticism, Langdell's case book/Socratic pedagogy spread unremittingly across the legal academic landscape during the first twenty years of the twentieth century.[66]

---

62. Langdell's ideas by no means received immediate acceptance. *See, e.g.*, JOEL SELIGMAN, THE HIGH CITADEL: THE INFLUENCE OF HARVARD LAW SCHOOL 47 (1978); Robert Gordon, *The Case for (and Against) Harvard*, 93 MICH. L. REV. 1231, 1235 (1995) (book review). Oliver Wendell Holmes was, at times, a particularly vocal critic. William Epstein, *The Classical Tradition of Dialectics and American Legal Education*, 31 J. LEGAL EDUC. 399, 399-400 (1981).

63. Grey, *supra* note 2, at 20-21.

64. *Id.* at 28-29; Rubin, *supra* note 15, at 634.

65. Rubin, *supra* note 15, at 634.

66. *See id.* at 612-13, 634.

Grey noted that "[o]n first encounter, the very idea of 'legal science' held by Langdell and his followers is baffling."[67] Others have described it as "an incomprehensible jumble of induction with deduction and of norm with fact,"[68] and "[t]ranscendental nonsense."[69] It has been argued that its claims to empiricism and amoralism cannot be justified given the classroom discussions to which it leads lend themselves to both conceptual thinking and normative judgments.[70] Even the notion that this pedagogy is Socratic has had numerous detractors.[71] In a very short time, the scientific theory paradigm attributed to Langdell was "obsolete in entirety."[72]

Today the rhetoric seems to have softened. Anthony Kronman sees in the Socratic method simply a healthy skepticism for all judicial pronouncements.[73] Socratic questioning provides students with opportunities to draw distinctions and analogies, reconcile apparently inconsistent judgments, and make judgments about the soundness of legal reasoning.[74] Such probing analysis places the burden on students to articulate what they understand the judicial authorities to be saying.[75] From this perspective, the classroom is still viewed as a kind of scientific laboratory, in which professors convey knowledge and engage students in the "central activities of the natural or social scientist: hypothesis, experimentation, and refinement of the hypothesis in response to test results."[76] It is a classroom scene that has survived, however, says Paul Carrington, "only because wiser men than Langdell, perceiving a moral subtext where he saw only the surface gloss of 'legal science,' had effected a separation of the method from its author's madness, and so freed posterity

67. Grey, *supra* note 2, at 16 (observing that one view of Langdell's pedagogy is that of "a deductive natural law system based on self-evident moral axioms").

68. *Id.*

69. *See* Felix S. Cohen, *Transcendental Nonsense and the Functional Approach*, 35 COLUM. L. REV. 809, 821 (1935).

70. Grey, *supra* note 2, at 16 ("Langdell's kind of theory . . . claims to be empirical and yet its practice is highly conceptual; it delivers normative judgments, yet proclaims the positivist autonomy of law from morals.").

71. "After all," as Harvard law professor Phillip E. Areeda was wont to point out, "Socrates had never heard of *Lawrence v. Fox*; *Palsgraf* . . . ." Phillip E. Areeda, *The Socratic Method (Sm) (Lecture at Puget Sound, 1/31/90)*, 109 HARV. L. REV. 911, 911 (1996).

72. Rubin, *supra* note 15, at 635.

73. *See* Kronman, *supra* note 51, at 647.

74. Areeda, *supra* note 71, at 915-16.

75. *Id*.

76. Philip M. Genty, *Overcoming Cultural Blindness in International Clinical Collaboration: The Divide Between Civil and Common Law Cultures and Its Implications for Clinical Education*, 15 CLINICAL L. REV. 131, 152 (2008).

from 'transcendental nonsense' to teach the enduring morality of republican politics and law."[77]

### B. SURVIVAL OF LANGDELL'S METHODS

The critics have been persistent and frequently harsh; but Langdell's paradigm has survived, and the methodologies he introduced have persisted, albeit in a modified form. There are those who still see the method as akin to inductive natural science, designed to engender a "true understanding of first principles . . . . [and] ultimate good and truth."[78] Learning law is seen from this perspective solely in terms of discovery. Others are less sanguine about the notion of first principles and see the method as refutational only, with any purported demonstration of truth or proof occurring as "an accidental byproduct."[79] The analogy to science is described as at least quasi-deductive, although still essentially a process of discovery: "understanding the problem, discerning the knowns and the unknowns, applying related theorems or principles, and conducting a trial-and-error process of experimentation."[80] The German system, from which Langdell borrowed, as well as other civil law systems, still approaches law as a set of fundamental norms which, by deduction, govern operative facts.[81] Most agree, however, that the real lasting virtue of Langdell's philosophy is to be found less in the premise of law as science and more in the methodology he adopted, a methodology that recalls earlier glory days of scientific rationalism and possesses other virtues that might call for its preservation.

Despite the criticisms, the case method and the Socratic method have largely been seen not only as compatible with each other,[82] but as having compatibility with scientific method, arising from the "essential duality and definitive ambiguities of the classic method."[83] This compatibility theory, with its associations to a scientific theory of discovery, seems to have stuck, in part perhaps because of a belief that the activity in the Socratic-like

77. Christopher Tomlins, *Bruce A. Kimball, the Inception of Modern Professional Education: C.C. Langdell, 1826-1906*, 59 J. LEGAL EDUC. 657, 658 (2010) (book review).

78. Epstein, *supra* note 62, at 404.

79. Harold Tarrant, *Elenchos and Exetasis: Capturing the Purpose of Socratic Interrogation*, *in* DOES SOCRATES HAVE A METHOD?: RETHINKING THE ELENCHUS IN PLATO'S DIALOGUES AND BEYOND 61, 63 (Gary Alan Scott ed., 2002).

80. Robert J. Rhee, *The Socratic Method and the Mathematical Heuristic of George Polya*, 81 ST. JOHN'S L. REV. 881, 887 (2007); *see generally* Donald G. Marshall, *Socratic Method and Irreducible Core of Legal Education*, 90 MINN. L. REV. 1 (2005) (calling for the revival of the Socratic method, defined as allowing for student discovery of principles).

81. Wilson, *supra* note 55, at 837.

82. *Id*.

83. Amy R. Mashburn, *Can Xenophon Save the Socratic Method?*, 30 T. JEFFERSON L. REV. 597, 613 (2008).

classroom has the appearance of scientific laboratory work. As Menkel-Meadow points out, this claim made the law school classroom unique in graduate studies; it was a place of active experience, not passive attendance at lectures.[84] Although Langdell did not expressly make the connection, others later demonstrated parallels between law and the social sciences, which were developing a methodological affinity to the natural sciences even during Langdell's era.[85] The derivative analogy to science, combined with the persistent myth of scientific discovery, was enough to maintain the security of the pedagogical practices.

Romantic notions about scientific reasoning and hopes for the discovery of unchanging laws of nature have made the analogy of legal analysis to scientific method attractive. But another reason for the longevity of Langdell's pedagogy, as Grey noted more than a quarter century ago, may be the fact that the rejection of Langdell's theory left legal academics with no conceptual scheme with which to revitalize the law school curriculum.[86] Academics have struggled to find a credible functional analogy ever since legal formalism was targeted by the legal realists in the early twentieth century. Conceptual frameworks of policy science and legal process advanced in the mid-twentieth century had limited success;[87] more recently, law and economics has marshaled similarly limited adherence.[88]

In the void, a number of academics have written to defend the watered-down practices of case examination and Socratic-style interrogation, while paying no heed to scientific theory. Whether or not the Socratic/case book methodology is explicitly conceived of as science, generations of law teachers have adopted the methods and extolled their virtues. Langdell, it could be said, is often perceived as having been right for the wrong reasons.

Among the virtues that have been espoused are:

- Learning the analytical process. Students learn to synthesize rules of law.[89] They get a feel for the boundary conflicts that define, at any given moment, the margins of a field in the most economical way possible.[90] The

84. Menkel-Meadow, *supra* note 33, at 582.

85. Rubin, *supra* note 15, at 636, 634-40 (discussing functional data gathering approach); Menkel-Meadow, *supra* note 33, at 567.

86. Grey, *supra* note 2, at 49.

87. *Id.* at 50; Menkel-Meadow, *supra* note 33, at 567.

88. Menkel-Meadow, *supra* note 33, at 568; Grey, *supra* note 2, at 51.

89. Michael Vitiello, *Professor Kingsfield: The Most Misunderstood Character in Literature*, 33 HOFSTRA L. REV. 955, 987 (2005).

90. Kronman, *supra* note 51, at 648.

internalization of that questioning process[91] becomes a concrete analytical tool for the student.[92]

- Exposure to real client dilemmas. Provided with a "steady stream" of "complex, real-life dilemmas of clients,"[93] students use their knowledge of the law to work on particular cases, "the most difficult and most important art."[94]
- Practice for advocacy. Students learn to deal with the pressures they will face in the practice of law.[95] The pedagogy promotes rhetorical abilities needed in law practice[96] by forcing students "to state issues and rules with precision and then to test their understanding of those rules in new factual settings."[97] They "learn the need for mental agility in handling rapid fire questioning"[98] through the process of performing before peers and the instructor.
- Coping with moral ambiguity. Students learn the relationship of rules to their underlying justifications or policies that support those rules.[99] The goal is to "habituat[e] students to the need for reasoned judgment under conditions of maximum moral ambiguity . . . giving them practice at rendering such judgments themselves."[100] This challenges "students' views and forces them to think more deeply than they may have done before attending law school."[101]
- Self discovery. Skillful examination by the professor insures that students will discover legal principles for themselves.[102] Students become confident that they can

91. Burnele V. Powell, *A Defense of the Socratic Method: An Interview with Martin B. Louis (1934-94)*, 73 N.C. L. REV. 957, 957 (1995).
92. Rhee, *supra* note 80, at 882.
93. Kronman, *supra* note 51, at 648.
94. Powell, *supra* note 91, at 987.
95. Vitiello, *supra* note 89, at 987.
96. Kronman, *supra* note 51, at 648.
97. Vitiello, *supra* note 89, at 987.
98. *Id.* at 986-87.
99. *Id.* at 987.
100. Kronman, *supra* note 51, at 652.
101. Michael Vitiello, *Teaching Effective Oral Argument Skills: Forget About the Drama Coach*, 75 MISS. L.J. 869, 902 (2006).
102. Marshall, *supra* note 80, at 13.

> discover answers on their own and can "reason through" what they know to solve a problem.[103]

If these are the goals, however, there are many educational models that would serve better. The attachment to scientific method hardly seems adequate to sustain the current pedagogy.[104] In contrast to the apologists for the Langdell pedagogy, there have been other voices, voices explicitly calling for a new conceptual paradigm or framework for the first year pedagogy. Menkel-Meadow, for example, proposes an interdisciplinary framework,[105] and Robert Rhee advocates the mathematical heuristic of George Polya.[106] Notably, these suggested new paradigms are characterized as creative,[107] and even generative.[108]

## IV. THE NEW PARADIGM

This section identifies a few of the major theories in the philosophy and history of science developed during the last eighty years. These theories define science not as the discovery of fixed principles, but as rhetorical invention and/or creative reconceptualization. When these ideas are parsed, it is possible to see that a scientific paradigm may be the conceptual framework to fill the void.

The ideas of two scientific philosophers have been particularly influential in the last century. In 1934, Popper published THE LOGIC OF SCIENTIFIC DISCOVERY, which repudiated the longstanding observationalist-inductivist account of scientific method and advocated empirical falsifiability as the criterion for distinguishing scientific work from non-science.[109] Popper's main contributions to scientific philosophy were to demonstrate the flaws of inductivism,[110] and to explain why a

---

103. Powell, *supra* note 91, at 957.

104. The critics of the pedagogy abound. *See, e.g.*, Chester Alumbaugh & Scott E. Alumbaugh, *Functionalizing First Year Legal Education: Toward a New Pedagogical Jurisprudence*, 25 U.C. DAVIS L. REV. 21, 21 (1991); Peggy Cooper Davis & Elizabeth Ehrenfest Steinglass, *A Dialogue About Socratic Teaching*, 23 N.Y.U. REV. L. & SOC. CHANGE 249, 249 (1997); Thomas D. Eisele, *The Poverty of Socratic Questioning: Asking and Answering in the Meno*, 63 U. CIN. L. REV. 221, 221 (1994); Jerome Frank, *Why Not a Clinical Lawyer School*, 81 U. PA. L. REV. 907, 907 (1933); Duncan Kennedy, *How the Law School Fails: A Polemic*, 1 YALE REV. L. & SOC. ACTION 71, 71 (1970).

105. Menkel-Meadow, *supra* note 33, at 557. Interestingly, the disciplines identified by Menkel-Meadow seem to exclude traditional sciences.

106. Rhee, *supra* note 80, at 882.

107. Menkel-Meadow, *supra* note 33, at 559; Rhee, *supra* note 80, at 897.

108. Menkel-Meadow, *supra* note 33, at 559.

109. POPPER, LOGIC OF SCIENTIFIC DISCOVERY, *supra* note 27, at 17-20.

110. Inductivism here refers to the idea, often attributed to Francis Bacon, that to develop theories about cause and effect, one needs to make specific observations of phenomenological results from experiments made in controlled conditions, and to generalize therefrom. In general,

theory cannot originate exclusively from empirical data.[111] He also convincingly argued that data is selective and subject to human choice, thereby undermining faith in scientists' ability to objectively observe the world.[112]

Then, in 1962, Kuhn published THE STRUCTURE OF SCIENTIFIC REVOLUTIONS in which he argued there was little evidence of scientists actually following Popper's falsificationist methodology and described the work of scientists as operating with a series of paradigms.[113] Kuhn approaches science from a historical perspective and has determined that the history of science is characterized by revolutions in scientific perspective.[114] Observing the changes in scientific thought and practices, Kuhn concludes that revolutionary changes happen through a process of definition.[115] The ideas that have developed in the wake of these theories have relevance to legal as well as to scientific thought.

Popper's skepticism about the viability of inductive proof to science was not new. As early as the mid-eighteenth century, the empiricist David Hume argued there were serious logical problems with induction.[116] In the mid-twentieth century, Popper joined those who believed science would best progress using deductive reasoning as its primary emphasis. His critique of the prevailing scientific method, which came to be known as critical rationalism, was based in large part on the apparent impossibility of recording everything observed.[117]

At the core of Popper's theory is the notion of a logical asymmetry between verification and falsifiability. His idea is that no scientific principle can be verified by scientific testing, but can only be "falsified" by observation or experiment.[118] Some process of selection is needed, Popper

---

Bacon began with the premise that "what the sciences stand in need of is a form of induction which shall analyze experience and take it to pieces, and by a due process of exclusion and rejection lead to an inevitable conclusion." FRANCIS BACON, THE PLAN OF THE INSTAURATIO MAGNA (1620), *excerpted in* 39 HARVARD CLASSICS 127, 140 (1909).

111. POPPER, MYTH OF THE FRAMEWORK, *supra* note 24, at 84.

112. *Id.* at 86.

113. *Id.*

114. *Id.*

115. *Id.* at 92.

116. HOWSON, *supra* note 27, at 10-12.

117. *See generally* KARL POPPER, ALL LIFE IS PROBLEM SOLVING (1994) [hereinafter POPPER, ALL LIFE IS PROBLEM SOLVING]; KARL POPPER, CONJECTURE AND REFUTATION: THE GROWTH OF SCIENTIFIC KNOWLEDGE (1963) [hereinafter POPPER, CONJECTURE AND REFUTATION]; KARL POPPER, OBJECTIVE KNOWLEDGE: AN EVOLUTIONARY APPROACH (1972)[hereinafter POPPER, OBJECTIVE KNOWLEDGE]; POPPER, LOGIC OF SCIENTIFIC DISCOVERY, *supra* note 27.

118. POPPER, CONJECTURE AND REFUTATION, *supra* note 117, at vii; POPPER, OBJECTIVE KNOWLEDGE, *supra* note 117, at 119; *see also*, THOMAS KUHN, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS 113 (2d. ed. 1970); PAUL FEYERABEND, AGAINST METHOD 111 (1975).

noted, and thus observation is always selective.[119] A precondition to any selection process is a theoretical preconception about what is to be empirically examined.[120] Without a working hypothesis there can be no way to determine which data are germane.[121] That being the case, Popper argued there can be no sound justification for devising a general rule from the observation of particulars.[122] Induction cannot yield certainty.[123]

In Popper's view, scientific theory should make predictions, but empirical methods should be aimed at disproving theories rather than continuously attempting to prove them.[124] The more generally applicable a theory can be shown to be, the greater its value. Outcomes could potentially falsify a theory, but can never definitively prove the positive. Thus, in his view, scientific theory, and human knowledge generally, is irreducibly conjectural or hypothetical, and is generated by the imagination in order to solve problems that have arisen in specific historical/ cultural settings.[125] Accordingly, scientific method can aid in a progression toward truth but can never produce a final, definitive explanation.[126]

Popper's critics concede that data is selective, but contend that although researchers often have a theory to guide data selection, they don't necessarily follow it consciously or prescriptively.[127] Moreover, it has been argued, just as it is impossible to conclusively demonstrate an immutable principle through continuous observation, it is impossible to conclusively falsify theories by empirical data.[128] "Falsification[]," as Martin Gardner indicates, "can be as fuzzy and elusive as confirmations."[129] What critics chiefly take issue with, however, is the idea that a *single* method of analysis applies to all science.[130] Kuhn in particular has been critical of any such overly simplistic picture of science.

---

119. POPPER, MYTH OF THE FRAMEWORK, *supra* note 24, at 89, 104-15.

120. POPPER, LOGIC OF SCIENTIFIC DISCOVERY, *supra* note 27, at 72.

121. *Id.* at 72-73.

122. *Id.* at 75-76.

123. *Id.* at 4, 76; KUHN, *supra* note 118, at 52.

124. *See* POPPER, LOGIC OF SCIENTIFIC DISCOVERY, *supra* note 27, at 4.

125. *See generally id.* at 57-74 (giving a more detailed exploration of falsifiability).

126. *See id.* at 6-8.

127. ANTHONY O'HEAR, AN INTRODUCTION TO THE PHILOSOPHY OF SCIENCE 39-41 (1989); KUHN, *supra* note 118, at 4.

128. MARTIN GARDNER, ARE UNIVERSES THICKER THAN BLACKBERRIES? 13 (2004); CARL GUSTAV HEMPEL, SELECTED PHILOSOPHICAL ESSAYS 203 (Richard Jeffrey ed., 2000); KUHN, *supra* note 118, at 4.

129. GARDNER, *supra* note 128, at 13; KUHN, *supra* note 118, at 4-5.

130. *See generally* LARRY LAUDEN, SCIENCE AND VALUES: THE AIMS OF SCIENCE AND THEIR ROLES IN SCIENTIFIC DEBATE 16 (1986) (discussing, in particular, the work of Paul Feyerabend and Ian Mistroff).

Like Popper, Kuhn maintains all observation is theory laden, driven by a paradigm that is encoded with a particular interpretation of the world.[131] According to Kuhn, the dominant paradigm is accepted as knowledge until anomalies are discovered. Scientists then begin to question the basis of the paradigm itself, new theories emerge which challenge the dominant paradigm, and eventually one of these new theories becomes accepted as the new paradigm.[132] Thus, science does not progress via a linear accumulation of new knowledge, but undergoes periodic revolutions, or paradigm shifts, whereby the nature of scientific inquiry is abruptly transformed.[133]

Science, in Kuhn's view, progresses through three distinct stages: prescience, normal science, and revolutionary science.[134] Normal science is clearly distinguishable from revolutionary science. The former builds on past knowledge using existing paradigms: routine, specific, pre-patterned and accessible methods of problem solving. It actualizes theory by increasing the number of matches between data discovered (often through experimentation) and predictions.[135] Thus the norm is "an attempt to force nature into the preformed and relatively inflexible box that the paradigm supplies."[136] Revolutionary science, on the other hand, generally begins with awareness of an anomaly in the data. The ensuing empirical study explores how far the anomaly extends or how frequently it occurs.[137] In the field, this can lead to crisis, precipitated by a string of anomalous results, which thereby force the creation of a new paradigm. Until scientists actually see nature in a different way, however, the new facts are not seen as scientific facts at all – merely as anomalies. It requires a new paradigm to subsume the old results along with the anomalous results into a new framework.[138] The work of Herbert Simons[139] and Richard Rorty,[140]

131. JAMES A. MARCUM, THOMAS KUHN'S REVOLUTION: AN HISTORICAL PHILOSOPHY OF SCIENCE 60-61 (2008).

132. *Compare* KUHN, *supra* note 118, at 60-65 *with* FEYERABEND, *supra* note 118, at 30-31. Feyerabend argues for a far more skeptical approach to knowledge, asserting that since no one can predict what shape future knowledge will have, one universal method of gaining knowledge should never be assumed. Feyerabend agrees with Kuhn that the history of science is the history of different viewpoints, and for Feyerabend this means that what counts as "knowledge" in the future may have paradigms we cannot yet know. Because we cannot yet know them, we should not attempt to forbid future intellectual enterprise by attempting to define one narrow dominant paradigm of knowledge using any particular model.

133. JOHNSON, *supra* note 31, at 137-38.

134. KUHN, *supra* note 118, at 92-95.

135. *Id*. at 24.

136. *Id.*

137. *Id.* at 53.

138. *Id.*

among others, helped develop the idea that Kuhn's STRUCTURE is rhetorical and, by implication, that science itself is rhetorical in nature.

The science of the post-modern world may not seem to suggest a paradigm for the field of law, which almost by definition demands some measure of constancy and consistency. But in law, as in science, successful analysis depends on the ability to group or associate situations into what Kuhn calls "similarity sets."[141] Moreover, it should be remembered that when relying on theories, scientists use assumptions that are supported by empirical evidence, despite the fact that an infinite number of other theories might explain the exact same set of data. In both fields, a heightened inquiry into similarity groupings – asking the question, "similar to what?" – advances understandings, past the automatic, unreflective, "primitive" stage of categorization, towards a possible transfer of subsets into a separate or new category.[142] This is the practical foundation of critical change.[143] Lawyers who, like scientists, can and do engage in this type of heightened analysis, could be expanding their pedagogy to include the broader view of science of knowledge progressing through conceptual paradigm shifts and invention. Today's world is one of accelerating paradigm shifts and innovations, and begs the introduction of skills to manage rapid changes.[144] A neoglobal perspective also calls for study that integrates macro-analysis of systems with the microanalysis of individual cases.[145]

## V. APPLICATIONS OF THE NEW PARADIGM

A few examples of how a modern scientific model might apply in today's law schools will help clarify matters. Using the legal principles and paradigms relating to defenses to negligence, the prohibition against cruel and unusual punishment, and statutory construction of sexual harassment, the applicability of scientific method can be demonstrated.

---

139. *See* Herbert W. Simons, *Are Scientists Rhetors in Disguise? An Analysis of Discursive Processes within Scientific Communities*, *in* RHETORIC IN TRANSITION 115, 115 (Eugene E. White ed., 1980).

140. *See generally* RICHARD RORTY, PHILOSOPHY AND THE MIRROR OF NATURE (1979); RICHARD RORTY, CONTINGENCY, IRONY, AND SOLIDARITY (1989).

141. KUHN, *supra* note 118, at 200.

142. *Id.*

143. *Id.*

144. *See* JOHNSON, *supra* note 31, at 13.

145. *Id.* at 20 (expounding on the notion that Johnson calls "the long zoom").

### A. DEFENSES TO NEGLIGENCE

At common law, only two defenses to negligence were recognized: contributory negligence and assumption of risk.[146] Either defense successfully asserted operated as a complete bar to recovery by a plaintiff.[147] Contributory negligence has been defined as conduct on the part of the plaintiff which falls below the standard of care to which a reasonable person should conform for self protection, and which is a legally contributing cause in bringing about the harm to the plaintiff.[148] Under a Langdellian approach to law, the rule at common law was clear: contributory negligence on the part of the plaintiff in a torts suit barred recovery absolutely. An empirical study of thousands of cases in the nineteenth century would surely have supported this legal principle.

Over time, of course, anomalies started to appear. In England, in 1842, a court decided to instruct a jury that a plaintiff's contributory negligence was not a complete bar to recovery if the defendant still had an opportunity to avoid harm after the plaintiff's contributory negligence occurred, and negligently failed to avail himself of that opportunity.[149] Similar court rulings followed, and a new paradigm was born: last clear chance.[150]

Last Clear Chance was, indeed, a paradigmatic shift. It has been characterized as a humanitarian doctrine, one meant to soften the harsh results of depriving the plaintiff of all recovery in the situation in which the plaintiff bears little responsibility for the harm done.[151] In other words, contributory negligence, the immutable rule, was not working. Thus, what was demanded was not a tortuous mangling of facts to conform to an inflexible law or an application of an inflexible law that would result in

146. Baltimore & Ohio R. Co. v. Goodman Adm'x, 275 U.S. 66, 66 (1927) (If defendant found himself "in an emergency," it was incumbent on him to take precautions.); Brown v. Kendall, 60 Mass. (6 Cush.) 292, 296 (1850); Smith v. Smith, 19 Mass. (2 Pick.) 621, 665 (1824) ("[T]o entitle the plaintiff to an action to damages resulting from a nuisance he must show that he acted with common and ordinary caution."); Bayly v. Merrel, (1615) 79 Eng. Rep. 331 (K.B.) 331 ("[T]he law gives no remedy for voluntary negligence."); Butterfield v. Forrester, (1809) 103 Eng. Rep. 926 (K.B.) 927; *see also* Francis H. Bohlen, *Assumption of Risk*, 20 HARV. L. REV. 14, 16-18 (1906).

147. *Merrel*, 79 Eng. Rep. at 331; *Forrester*, 103 Eng. Rep. at 926; *Smith*, Mass. (2 Pick.) at 641-65; *Kendall*, 60 Mass. (6 Cush.) at 296; *Goodman*, 275 U.S. at 66 (noting that where standard of care is clear, question of due care is not for jury to decide); *see also* Bohlen, *supra* note 146, at 16-18.

148. *Forrester*, 103 Eng. Rep. at 926; RESTATEMENT (SECOND) OF TORTS § 463 (1977).

149. Davies v. Mann, (1842) 152 Eng. Rep. (K.B.) 588-89.

150. Fuller v. Illinois Cen. R. Co., 56 So. 783, 785 (1911); Kumkumian v. City of New York, 111 N.Y.S. 2d 395, 396 (N.Y. App. Div. 1952).

151. *See generally* Robert E. Cook, *Torts – Last Clear Chance Doctrine as Humanitarian Rule*, 1 WM. & REV. VA. L. 64 (1950).

injustice; what was needed was a creative novel doctrine to take into account new knowledge and to satisfy actual human needs.

Last Clear Chance, as a doctrine, could be viewed as an experiment, an "attempted solution," in Popper's words. Although the doctrine was further refined over time to distinguish between helpless plaintiffs and inattentive plaintiffs,[152] it seems, in operation, to have had limited utility. This is in large part because lawmakers came to recognize the need for a more significant paradigm shift and crafted a solution to deal with the problem of a complete bar on recovery under contributory negligence principles. Most states, either through common or law or by statute, adopted a comparative negligence or comparative fault approach to determining fault and damages, allowing plaintiffs to make partial recoveries based on a concept of proportional responsibility.[153]

In this evolution can be seen a "network of commitments" akin to puzzle solving in the scientific realm.[154] The process follows a pattern of conceptual/theoretical/instrumental/methodological development. For years, lawyers understood the world as it was ordered, in accordance with an accepted notion of negligence (the conceptual). This idea took shape as more precise doctrine, and was applied with far-reaching scope (theoretical). Over time, courts scrutinized more and more carefully the "pockets of disorder" arising in negligence cases and sought to reconcile actual results with predictions indicated by the theory (instrumental). This led to refinements in the law (methodological), and the process was reiterated.[155]

### B. CRUEL AND UNUSUAL PUNISHMENT

In the criminal procedure area, the Eighth Amendment's Cruel and Unusual Punishment clause provides another interesting example. In this instance, the inquiry for student scholars begins with a constitutional provision, the origins of which are not well understood. It is known that the phrase "cruel and unusual punishment" was lifted or borrowed from the 1689 English Bill of Rights, but beyond that, scholars have unearthed no clear indication of the framers' intent as to the meaning and scope of the clause. Contemporaneously, the Crimes Act of 1790, in addition to providing for the imposition of death by hanging in certain cases, granted courts the right to require corpse dissection in cases of treason, and

152. *See* G. EDWARD WHITE, TORT LAW IN AMERICA: AN INTELLECTUAL HISTORY 159 (2003) (discussing Prosser's theories on the subject).

153. *See generally* RESTATEMENT (THIRD) OF TORTS § 7 (2000).

154. KUHN, *supra* note 118, at 42.

155. *See id*. (describing the scientific process).

whipping or standing in pillory for some lesser offenses.[156] One hundred years later, about the time Langdell became Harvard's law school dean, *In re Kemmler*[157] was decided. In that case, the Supreme Court made note of earlier punitive practices, such as burning at the stake, crucifixion, and breaking on a wheel, that would no longer be deemed acceptable. In the same opinion, the Court determined that a relatively new method of execution, electrocution, did not offend constitutional standards relating to "cruel and unusual" punishment.[158] Another hundred years would find some courts outlawing electrocution as cruel and unusual within the definitions of their state constitutions.[159]

Students investigating whether a particular practice constitutes cruel and unusual punishment would be likely to find Popper's observations about scientific method quite apt. In Eighth Amendment cases, students would need a theoretical preconception about what is being examined, and they would likely find that courts in these cases had been working from similar preconceptions. That notion, in fact, now seems to be the explicit basis for courts' analyses.

Since 1958, with the decision in *Trop v. Dulles*,[160] the standard for determining the constitutionality of any punitive method has been whether it is consistent with "evolving standards of decency."[161] In *Trop*, the Court held that denaturalization as punishment for desertion is "obnoxious" in an "enlightened democracy."[162] On similar grounds, the Court held that twelve to twenty years in chains for the offense of making a false statement in a public record,[163] or a prison sentence for a mere status offense,[164] is inconsistent with modern sensibilities and norms.

Empirical "observations" of other court decisions would be confounding to researchers looking for the "fundamental doctrine" guiding principled decision making. They might discover that the Eighth Amendment is implicated when criminal punishments are being carried out,[165] but only if the conduct under scrutiny is actual punishment and not

156. An Act for the Punishment of Certain Crimes Against the United States, ch. 9, §§ 4, 15, 18, 1 Stat. 112, 113, 115-16 (1790).

157. 136 U.S. 436 (1890).

158. *In re Kremmler*, 136 U.S. at 443.

159. Notably one such court is Georgia's Supreme Court. Dawson v. State, 554 S.E. 2d 137, 139 (Ga. 2001); *see also* State v. Mata, 745 N.W. 2d 229, 255-80 (Neb. 2008).

160. 356 U.S. 86, 100 (1958).

161. *Id.*

162. *Id.* at 100-02.

163. Weems v. United States, 217 U.S. 349, 357-82 (1910).

164. Robinson v. California, 370 U.S. 660, 662-68 (1962).

165. Hope v. Pelzer, 536 U.S. 730, 745 (2002); Hudson v. McMillian, 503 U.S. 1, 4 (1992) (both involving beatings by prison guards).

an incidental condition of confinement.[166] Although they are technically, under current categorical definitions, conditions of confinement and not punishments, deliberate deprivations of essentials such as food, heart, and medical care (for serious medical needs) can be cruel and unusual punishment,[167] but officials must have actual awareness of the risk and deliberately disregard known rules of custodial care.[168] The Eighth Amendment does not prohibit a second attempt at imposing death by electrocution after a badly botched first attempt;[169] it is not implicated in situations involving school punishment.[170] The execution of mentally incapacitated persons is considered cruel,[171] as is execution of those who were juveniles at the time of a crime's commission[172] – "juvenile" being a distinction that did not even exist at time Langdell took the reins at Harvard.

As Popper would have argued, given this set of data, there can be no sound justification for devising a general rule from the observation of particulars. Kuhn would further point out that the data here illustrates how knowledge is only as good as the particular examples that support the underlying paradigm – in this case, "evolving standards of decency."[173] When, as here, anomalies are not only discovered, but proliferate, it is time to question the basis of the paradigm itself and create new theories. Eventually, one will emerge that will find acceptance as the new paradigm.

### C. SEXUAL HARASSMENT

The old scientific method paradigm privileged common law over statutory law. With a new scientific model, it is far easier to see how law can be invented. One example in the field of constitutional law can be found in sexual harassment. Sexual harassment, as a legal concept, had no real existence even fifty years ago. The origins of the term, used to apply to behaviors well known to have been transpiring throughout history, reportedly go back to the early 1970s.[174] At that time, a group of feminists,

166. Lewis v. Casey, 518 U.S. 343, 349 (1996); *see also* Farmer v. Brennan, 511 U.S. 825, 834 (1994); Renchenski v. Williams, 622 F.3d 315, 338 (3d Cir. 2010); Arar v. Ashcroft, 532 F. 3d 157, 190 (2d Cir. 2008); Tesch v. County of Green Lake, 157 F.3d 465, 473 (7th Cir. 1998).

167. Wilson v. Seiter, 501 U.S. 294, 304-05 (1991); Estelle v. Gamble, 429 U.S. 97, 102-04 (1976).

168. *Brennan*, 511 U.S. at 836-37.

169. La. *ex rel* Francis v. Resweber, 329 U.S. 459, 459 (1947).

170. Ingraham v. Wright, 430 U.S. 651, 651 (1977).

171. Ford v. Wainwright, 477 U.S. 399, 399-40 (1986); Atkins v. Virginia, 536 U.S. 304, 304 (2002).

172. Roper v. Simmons, 543 U.S. 551, 551 (2005).

173. Trop v. Dulles, 356 U.S. 86, 100 (1958).

174. *See* SUSAN BROWNMILLER, IN OUR TIME: MEMOIR OF A REVOLUTION 281 (1999).

meeting on Cornell's campus and discussing a potential case, came up with the term to describe situational harms with which they were all familiar.[175] As a legal concept, the term first appears in the case law in 1974, in the case of *Barnes v. Train*.[176] Then, in 1976 *Williams v. Saxbe*[177] was decided, finding sexual harassment to be a form of sexual discrimination.[178] The judicial adoption of the legal concept was followed by enactment of EEOC guidelines in 1980, which explicitly prohibited sexual harassment as a form of sexual discrimination. In *Meritor Savings Bank v. Vinson*,[179] decided in 1986, the Supreme Court recognized sexual harassment as a violation of Title VII of the Civil Rights Act of 1964.[180]

Sexual harassment is a clear example of a paradigmatic change that has come about through creation, invention and experimentation. The women who analyzed existing data in the 1970s developed a new theory from a number of existing theories, relying on data both old and new. Initial attempts to obtain relief under the law began with a process described by Kuhn, which he credits Wittgenstein with developing.[181] The process is that by which one confronting a new situation assigns it to a category (or "natural family") believed to have similar characteristics or overlapping resemblances. In sexual harassment situations, those familiar "families" were criminal assault and sex discrimination. The transfer of a subset of assault victims into the category of sex discrimination signaled a "critical change" in the legal paradigm.[182] The new theories were tested in the courts and proffered to law and rule-making bodies, and with this methodological shift came a conceptual one.[183]

Thus, it is clear that the work of the lawyer-scientist-researcher was not (and is not) static or passive; discovery is only one aspect of the work that has been done. In fact, as recent commentators tell us, science most succeeds when it involves experimentation in, and a search for, recombinations of constituent elements.[184] Put another way, "ideas are

175. KATHRIN S. ZIPPEL, THE POLITICS OF SEXUAL HARASSMENT: A COMPARATIVE STUDY OF THE UNITED STATES, THE EUROPEAN UNION, AND GERMANY 53-54 (2006).

176. 13 FEP Cases 123 (D.C. 1974), *rev'd, sub nom.* 561 F. 2d 983, 983 (D.C. Cir 1977).

177. 413 F. Supp. 665, 665 (D. D.C. 1976), *rev'd and remanded on other grds*; *Williams v. Bell*, 587 F. 2d 1240 (D.C. Cir. 1978).

178. *Saxbe*, 413 F. Supp. at 665.

179. 477 U.S. 57, 57 (1986).

180. *Vinson*, 477 U.S. at 57.

181. KUHN, *supra* note 118, at 45.

182. *Id.* at 200.

183. This example of the women's brainstorming processes also illustrates the importance of innovative environments to progress. *See* JOHNSON, *supra* note 31, at 41.

184. *Id*.

works of bricolage; they're built out of detritus."[185] The lawyer's work has also involved theorizing, hypothesis testing, creation, invention, and reconceptualization. This has always been the lawyer's work, and it finds a parallel in scientific method.

## VI. CONCLUSION

In earlier times, one of the attractions of science as an analogy to law was its purported certainty and predictability. In 1934, Popper directly questioned this assumption and proposed a different way of looking at scientific study. As he later explained his thinking:

> The natural as well as the social sciences always start from *problems*, from the fact that something inspires *amazement* in us, as the Greek philosophers used to say. To solve these problems, the sciences use fundamentally the same method that common sense employs, the method of *trial and error*. To be more precise, it is the method of *trying out* solutions to our problem and then discarding the false ones as erroneous.[186]

What would happen if we were to think about law in this way? Or what if first-year teachers were to begin with a Kuhnian perspective, that the world of law is structured according to certain paradigms, that law is built on a belief that society needs these ordered paradigms to survive, but that they are more conventional and utilitarian than true or certain? Wills and contracts are the inventions of lawyers. Property, privacy, guilt – these are all intellectual constructs, operational principles, that aid in the ordering of "knowledge." They are not, and never were, essential truths.

We value order, we crave certainty and predictability, and it is clear that to avoid total anarchy or chaos, as a policy matter, society should not recreate the world with every dispute. But law can and must change; indeed, it is the responsibility of lawyers to advocate for change and to re-form the law by generating new paradigms and creating novel technologies. Law school should teach rising lawyers something about how to be creative and inventive and provide guidance in how to make responsible judgments about when paradigm shifting might be called for.

Today's law schools are undergoing a shift in perspective if not a revolution on the scale of Langdell's. The change is creating conflict, inevitably accompanied by both attempts to salvage the past and pressures to overthrow the past. As the evidence of a transformation grows, however,

185. *Id.* at 28.

186. POPPER, ALL LIFE IS PROBLEM SOLVING, *supra* note 117, at 3 (emphasis in original).

so too will the clamor for an analogy that can serve as a guiding rationale for any major changes. The lure of a scientific analogy is still powerful. As in the days of Langdell, many hold to the belief that "science" is "reserved for fields that do progress in obvious ways."[187] It is a club to which many professionals want to belong or with which they would like to be associated. For that reason, many academics are inclined to seek parallels between their own professions and the "hard" sciences, and look for analogic techniques, methods or ideologies that would permit a claim to the scientific appellation.

In this environment, what science might now offer to law is a process that includes these strategies:

1. Observations, using textual and sensory sources, by means of which students discover what the law "is," both textually and operationally;

2. Identification of the conceptual paradigms or perspectives that support the law;

3. Development of strategies for communicating and upholding the soundness of existing paradigms;

4. Development of skills needed to test existing rules and standards and to attempt new solutions, using multiple methodologies; and

5. Exploration and assessment of values needed to make judgments about the propriety of paradigm shifts.

The first two of these strategies incorporate the knowledge domain identified in the Carnegie Report,[188] but go beyond empirical data collection in courts and legislatures. Strategies 3 and 4 address the skill dimension of Carnegie;[189] and the values dimension is embedded in the last strategy.[190] Law schools have considerable expertise in these various strategies, although doctrinal knowledge, skills, and values have often occupied separate spheres and have been assigned to widely varying and often conflicting conceptual frameworks. Law school professors currently ask students to assert, defend, and compare, with an implicit emphasis on the importance of understanding existing paradigms. An unstated message of immutability, correctness, and permanence often accompanies this

187. KUHN, *supra* note 118, at 171.
188. SULLIVAN ET AL., *supra* note 3, at 28.
189. *Id.*
190. *Id.*

approach. Mastery of existing rules provides a source of satisfaction to learners of the law.

But in much the same way that academics approach problems in their scholarship, not only calling into question the rationale and efficacy of law and its operations, but offering new models and overlooked perspectives, they could, in their pedagogical roles, teach students how to do the same. Law professors could be more deliberate about asking students what is not working in the particular paradigm they are uncovering, and what might be some ways to think about making it better. The real pressures of societal needs – the consequences of law – should also be part of the analysis. The science paradigm of the twenty-first century provides a shift in perspective that allows for the reordering of knowledge that is more inclusive of multiple existing realities and opens the gates for creativity and new understanding. The law school classroom is an optimal environment for this work. The classroom can be modeled on a scientific think tank, where highly motivated and focused people come together, widening the pool of contributing minds and increasing the likelihood for innovation and progress.[191] This is not so different in concept from Langdell's vision of a legal scientific laboratory.

As much as we crave certainty, law cannot provide it. Through such inventions as rights, stare decisis, and legislative mandates, legal systems can provide a sense of order and enough predictability and stability to allow societies to function on this side of anarchy. But law, like science, is not static and the knowledge required to perfect legal decision making lies far beyond human capacity. What we can do is take account of what we do know and what we have given members of our community (notably judges and to some extent legislative and administrative bodies) the power to say, and from that point, engage in the inventive and creative work of science. This will allow us to measure progress and success "in terms of evolution from the community's state of knowledge at any given time."[192] We can then use the model of science not to discover the *right* answer – as in incontrovertible – but to create and use conceptual paradigms with a goal of aspiring to the *right* answer – as in fair and just.

191. JOHNSON, *supra* note 31, at 54, 58. Johnson relies heavily on the work of Kevin Dunbar in developing this idea. *Id*. at 59-62.

192. KUHN, *supra* note 118, at 171.