

HOLMES AND EVOLUTION: LEGAL PROCESS AS ARTIFICIAL INTELLIGENCE

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The law of fashion is a law of life. The crest of the wave of human interest is always moving, and it is enough to know that the depth was greatest in respect of a certain feature of style in literature or music or painting a hundred years ago to be sure that at that point it is no longer so profound. I should draw the conclusion that artists and poets, instead of troubling themselves about the eternal, had better be satisfied if they can stir the feelings of a generation, but that is not my theme. It is more to my point to mention that what I have said about art is true within the limits of the possible in matters of the intellect. [OLIVER WENDELL HOLMES, JR.]¹

A curious ambivalence toward the past underlies contemporary legal thought. On one hand, through the method of precedent, the judicial process venerates the past. Here one finds a subtle appreciation of what it means to be part of a tradition. The past is regarded as a valuable source of insights. Less obvious but equally important is the corollary: that learning and sense are needed to mediate between past and present. The judges thought great are not those who apply blindly rules from old books. It is understood that a living tradition implies a priesthood to reinterpret and reinvigorate, and thus to preserve.

Legal scholarship has not, by and large, shown a similar attitude toward

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¹ Oliver Wendell Holmes, *Law in Science and Science in Law*, 12 *Harv. L. Rev.* 443, 443 (1899), reprinted in *Oliver Wendell Holmes, Collected Legal Papers* 210–43 (1921) [hereinafter cited as *Holmes*. Page references will be to 12 *Harv. L. Rev.*].

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the work of its own past. With the exception of a handful of "classics" that still speak to contemporary issues in the law,² articles in legal publications are rarely read more than a few years after they appear, except perhaps by other legal scholars making the obligatory bow to prior work in their area. The absence of a strong sense of its own past is a distinctive feature of legal scholarship. Academic historians, philosophers, and literary critics cultivate a tradition. Legal scholars, imitating science, purport to be engaged in a quest for new knowledge which, if successful, would sweep aside the paradigms of their predecessors.

The purpose at present is not to quarrel with the dominant philosophy, but to acknowledge that the essay which follows is an experiment with a different approach. This is an article about an obscure and long forgotten article by Oliver Wendell Holmes, Jr., which appeared in the *Harvard Law Review* in 1899 under the title, "Law in Science and Science in Law."³ In that article, Holmes implicitly developed a sophisticated theory of how bodies of law evolve. Holmes's theory of legal evolution, once reclaimed from obscurity, can be a valuable source of insights into the nature of the judicial process and legal change.

The first premise for the present endeavor, then, is that the cycle of intellectual fashion referred to in the epigraph has come full circle, so that now may be a propitious moment to reconsider Holmes's theory of legal evolution. The second premise is that resources worth mining in our intellectual heritage, such as Holmes's article, do not present themselves easily to the casual reader, but require explication and elaboration. As intellectual concerns and languages of discourse change, ideas known to our predecessors become obscure and lose much of their power for us. It is fatuous to assume that this is because thinkers in the past were primitive and we are advanced. Rather, we must approach the legal scholarship of only three generations ago with something like the attitude with which one approaches Thucydides or Ben Jonson: with an awareness that translation will be both necessary and worthwhile. Using methods like those of the literary critic, one tries to bring the work back to life and to build on the themes which it suggests.

This effort to rediscover "Law in Science and Science in Law" will proceed in three sections. Each section takes the article as its center, but, like a series of concentric circles, each successive section will put Holmes's ideas into a broader context.

² For example, Harry Kalven, Jr. & Maurice Rosenfield, *The Contemporary Function of the Class Suit*, 8 U. Chi. L. Rev. 684 (1941); Samuel D. Warren & Louis D. Brandeis, *The Right to Privacy*, 4 Harv. L. Rev. 193 (1890).

³ Holmes, *supra* note 1.

The first section has the narrowest focus. It begins by locating "Law in Science and Science in Law" in Holmes's career. Next the argument of Holmes's paper is stated. The first section concludes by relating "Law in Science and Science in Law" to the ideas about the common law that Holmes expressed earlier in *The Common Law*. The article is a more mature, and in some ways a more sophisticated, statement of Holmes's views about legal change, although his earlier work has attracted far greater attention.

The second section adopts the perspective of intellectual history. The scholarship of the past is worth studying not only for the light that it casts on historical figures such as Holmes, but also for what it may teach us about ourselves. A text such as "Law in Science and Science in Law" is a fixed point which does not change as fashions in jurisprudence come and go. By engaging the text, we may be able to bring into view the unarticulated assumptions and unconscious preconceptions that our own age brings to thinking about law.

Holmes's ideas in "Law in Science and Science in Law" have been virtually ignored, as succeeding generations of lawyers have perceived Holmes's thought selectively, seizing portions of it which support a view, made fashionable by the legal realists, that judges are a subspecies of legislator. That theme is surely in Holmes, but in works such as "Law in Science and Science in Law," the view of the individual judge as lawgiver is counterbalanced by a vision of the law as a system.

In the third section, we explore the portion of Holmes's theory of law that has not been taken seriously until now, the view of law as a system that evolves according to a logic that is separate from the will of individual judges. Holmes's model of common-law evolution describes the law as an information system in which the internal structure of the system is continually modified by interactions with the environment. Legal "logic" generates hypotheses, which are tested by "experience," with the results feeding back to modify the set of legal principles that are available as the guiding logic for the future. Holmes's description of the common law as a cybernetic system raises the prospect not only that the law evolves, but that law is a form of artificial or social intelligence that is capable of learning about the environment.

I

In 1899, when "Law in Science and Science in Law" appeared, Oliver Wendell Holmes, Jr., was approaching his fifty-eighth birthday. He had reached a plateau in his long legal career which must, at the time, have appeared to be its pinnacle. An associate justice of the Supreme Judicial

Court of Massachusetts for sixteen years, Holmes had filled his office with diligence if not unusual public acclaim. His years of glory on the Supreme Court of the United States lay in the future.

Outside of Massachusetts, Holmes was known to lawyers more as a scholar than as a judge. During the 1870s, while in his early thirties, Holmes had published a series of articles in the *American Law Review*, a prominent law journal of the era, which he edited from 1870 to 1873. Holmes would also have been known to many practicing lawyers as the editor of the twelfth edition of Kent's *Commentaries*, which appeared in 1873. Holmes's fame, however, rested on a series of lectures that he had delivered at the Lowell Institute in Boston in 1880. The lectures were published the following year under the title *The Common Law*, and soon became the most celebrated American law book of that (and perhaps of all) time.

For an after dinner speaker at its annual meeting in January 1899, the New York State Bar Association chose this scholar of common-law history turned state appellate judge. The article which appeared later in the *Harvard Law Review* under the title "Law in Science and Science in Law" is verbatim Holmes's address to the bar association.⁴ For a topic, Holmes chose how the common law changes. This was a theme which he had explored nearly twenty years earlier in *The Common Law* (which Holmes referred to modestly, but frequently, in his speech as "a book which I printed a good many years ago").⁵

"Law in Science and Science in Law" is a significant milestone in Holmes's thinking about the law. Holmes introduced *The Common Law* with a famous aphorism: "The life of the law has not been logic: it has been experience."⁶ Holmes's biographer and editor, Mark DeWolfe Howe, has argued that there was for Holmes "a personal almost autobiographical significance in this pronouncement—an admission, as it were, that his first effort in jurisprudence had been mistaken."⁷ As a young man, under the influence of his training in philosophy at Harvard, Holmes sought a scheme of classification that would make the law "scientific" and "logical."⁸ A decade later, in *The Common Law*,

⁴ 22 Proc. of N.Y. State Bar A. 97-124 (1899) [hereinafter cited as Proceedings].

⁵ Holmes, *supra* note 1, at 447.

⁶ Holmes, *The Common Law* 5 (M. Howe ed. 1963). Holmes had used the same words previously in an unsigned review, 14 Am. L. Rev. 233, 234 (1880).

⁷ Mark DeWolfe Howe, Introduction to Holmes, *supra* note 6, at xxii.

⁸ *Id.* There is certainly some truth to Howe's point. The emphasis in Holmes's work does change, but Howe falls into the error of "discovering" a pattern that is neater than the evidence supports. Even Holmes's first article displays a strong leitmotiv on the importance of "experience." Holmes wrote that the common law "embodies the work of many minds,"

Holmes saw *both* logic and experience at work in the law (despite his introductory “life of the law” aphorism). In his initial lecture, Holmes emphasized historical forces. Anticipating some of the themes that he was to develop later in “Law in Science and Science in Law,”⁹ Holmes even referred to “survivals”¹⁰ and “transformations”¹¹ of legal doctrines. However, after the first lecture, Holmes’s emphasis changed. “Logic” became more important as Holmes considered areas of the common law one by one and sought to find, or to impose, a coherent theory on each. Even Howe admits that *The Common Law* is “not primarily a work of legal history” but “an endeavor in philosophy.”¹²

In “Law in Science and Science in Law,” written almost two decades after *The Common Law*, Holmes the judge returns to reexamine the roles of “logic” and “experience” in the law, an older and perhaps a wiser man. Somewhat immodestly, Holmes declares that his present objective is “to show the true process of law-making, and the real meaning of a decision upon a doubtful case”¹³ Holmes’s topic and the occasion were not well matched. Holmes’s text is difficult, replete with long, scholarly disquisitions into subjects as recondite as the techniques of land conveyancing under the fifth-century Germanic *Lex Salica*. One imagines that the gentlemen of the New York bar were a bit nonplussed, a sentiment which may be hinted at in their resolution after Holmes’s speech acknowledging his “scholarly and comprehensive paper.”¹⁴ Yet read as serious scholarship, Holmes’s address suffers from a lack of apparent organization, as if it were a series of disconnected musings about a miscellany of legal topics with no strong thesis.

The key that unlocks Holmes’s deeper meaning is to recognize the structure that underlies his argument. “Law in Science and Science in Law” has three main sections. In the first, Holmes describes “transformations” of ideas in the law as evidence of evolutionary change. In the second section, Holmes identifies the “evolutionary processes” that create change in the law. In the final section, Holmes focuses on “pathologies” that can impede the evolution of the law, which he calls

which is an advantage which cannot be made up by “any faculty of generalization, however brilliant.” Codes, and the Arrangement of the Law, 5 Am. L. Rev. 1, 1 (1870) reprinted 44 Harv. L. Rev. 725, 725 (1931).

⁹ Holmes, *supra* note 6, at 11.

¹⁰ *Id.* at 22.

¹¹ *Id.* at 24.

¹² *Id.* at xx. Accord Grant Gilmore, *The Ages of American Law* 52 (1977).

¹³ Holmes, *supra* note 1, at 455.

¹⁴ Proceedings, *supra* note 4, at 124.

“survivals” and “generalizations,” and proposes a role for judges to keep the law from stultifying.

A. Transformations

Patterns of Legal Evolution. “Law in Science and Science in Law” begins with a brief introduction in which Holmes muses about what it means to explain a thing, and more particularly, about the nature and uses of the “process of historical explanation.”¹⁵ Holmes then focuses on “the scientific study of the morphology and transformation of human ideas in the law.”¹⁶ He begins with “some examples . . . by way of illustration.”¹⁷ What Holmes finds noteworthy in the examples (which are drawn from the development of the law of land conveyancing extending back to the Salic Franks) is that a legal form gradually changes from age to age, a process that Holmes analogizes to the evolution of biological structures:¹⁸ “[I]t is the transformations which it has undergone to which I wish to call your attention. . . . Surely a flower is not more unlike a leaf, or a segment of a skull more unlike a vertebra, than the executor as we know him is remote from his prototype, the saleman of the Salic law.”

Such transformations, Holmes continues, are typical of the law:¹⁹ “I confess that such a development as that fills me with interest, not only for itself, but as an illustration of what you see all through the law—the paucity of original ideas in man, and the slow, coasting way in which he works along from rudimentary beginnings to the complex and artificial conceptions of civilized life.” The process of legal development, Holmes contends, is analogous to evolution in nature:²⁰ “It is like the niggardly uninventiveness of nature in its other manifestations, with its few smells or colors or types, its short list of elements, working along in the same slow way from compound to compound until the dramatic impressiveness of the most intricate compositions, which we call organic life, makes them seem different in kind from the elements out of which they are made, when set opposite to them in direct contrast.” Holmes goes on to generalize the comparison to evolution to the “broader field of the development of our more general legal conceptions”²¹ such as the origin of contract:²²

¹⁵ Holmes, *supra* note 1, at 443.

¹⁶ *Id.* at 445.

¹⁷ *Id.*

¹⁸ *Id.* at 446.

¹⁹ *Id.*

²⁰ *Id.* at 446–47.

²¹ *Id.* at 447.

²² *Id.*

“We have evolution in this sphere of conscious thought and action no less than in lower organic stages, but an evolution which must be studied in its own field.” Holmes is concerned here not with particular legal ideas, but rather with the process by which “more general legal conceptions” or “generalizations” such as contract are formed. He begins by attacking the prevalent “assumption . . . that there must have been some theory of contract from the beginning, if only you can find what it was.”²³ Instead, Holmes argues that particulars generate the theory, as results in concrete cases gradually coalesce.²⁴ “It seems to me well to remember that men begin with no theory at all, and with no such generalization as contract. They begin with particular cases, and even when they have generalized they are often a long way from the final generalizations of a later time. Down into this century consideration was described by enumeration, . . . and only of late years has it been reduced to the universal expression of detriment to the promisee.”

Holmes’s description of the evolution of discrete legal generalizations such as contract resembles the process by which species form in nature. As organisms adapt to niches in the environment, separate species gradually develop.²⁵ Holmes describes contract as a natural “field”²⁶ or “empire”²⁷ that could have been dominated by one of several “competing ideas.”²⁸

The Nineteenth-Century Meaning of Evolution. By the term “evolution” Holmes understood something different from what we do today. We tend to understand evolution in terms of the theory of genetic mutations in biology. Late nineteenth-century American writers such as Holmes demonstrably did not have genes in mind when they spoke of evolution. The concept of genetic mutations was not even proposed in biology until 1901, two years after Holmes wrote “Law in Science and Science in Law.”²⁹ Lacking population genetics, the late nineteenth-century’s concept of biological evolution was based largely on identification of patterns of gradual change in nature. This method of naturalistic observation had been utilized by Charles Darwin in his *On the Origin of Species by Means of Natural Selection, or the Preservation of Favored Races in the Strug-*

²³ *Id.* at 448.

²⁴ *Id.*

²⁵ For an account of the modern theory of “speciation,” see Michael J. White, *Modes of Speciation* (1978), esp. chs. 6–7.

²⁶ Holmes, *supra* note 1, at 448.

²⁷ *Id.* at 449.

²⁸ *Id.*

²⁹ See *Evolution*, *The New Columbia Encyclopedia* 909 (William H. Harris & Judith S. Levey eds. 1975).

gle for Life, which appeared in 1859. Holmes uses common-law history in roughly the same way that Darwin used observations of animals and plants in nature, as raw material to be searched for evidence of patterns of gradual, evolutionary transformations.

However, long before Darwin's theory and compilation of supporting naturalistic evidence, the concept of evolution had achieved currency among philosophers, historians, astronomers, and geologists as a metaphor for a gradual process of patterned growth.³⁰ Particularly in late nineteenth-century America, where Herbert Spencer's work generalizing evolution to areas far afield from biology was more read than Darwin's,³¹ evolution was conceived of as a universal process of gradual change in nature rather than as a narrow analogy to mutations in biology.

Evolution, in this broad sense, was an enormously influential concept at the turn of the century. In place of mechanical metaphors based on Newtonian physics, evolution introduced analogies to organic growth and probabilistic concepts such as variation and selection.³² Like Adam Smith's market, evolution was a way of explaining that systems could be more intelligent than the individuals who constituted them.³³ This probably helps to account for the appeal that evolutionary metaphors held for Holmes. For Holmes, common-law evolution, based in part on a rough analogy to Darwin's theory of natural selection, was a way of describing the common law as a product of legal systems, as opposed to the creation of individual judges. Evolutionary metaphors would give Holmes a means of explaining how the common law could be wiser than the judges who made it.³⁴

B. *Evolutionary Processes*

After describing patterns of historical development and transformation in the common law in terms of evolutionary growth, Holmes turns in the

³⁰ See R. C. Lewontin, *Darwin's Revolution*, 30 *The New York Review of Books* 21 (June 16, 1983); *Introduction to Darwinism Comes to America* xii (George Daniels ed. 1968).

³¹ See Richard Hofstadter, *Social Darwinism in American Thought* 31-32 (rev. ed. 1959).

³² Woodrow Wilson, *Constitutional Government in the United States* 54-55 (1911), testified to the influence that Darwin's ideas had on political thinking: "The government of the United States was constructed upon the Whig theory of political dynamics, which was a sort of unconscious copy of the Newtonian theory of the universe. In our own day, whenever we discuss the structure or development of anything, whether in nature or in society, we consciously or unconsciously follow Mr. Darwin: . . ."

³³ See Donald T. Campbell, *Variation and Selective Retention in Socio-Cultural Evolution*, in *Social Change in Developing Areas: A Reinterpretation of Evolutionary Theory* 19, 26-27 (Herbert R. Barringer, George I. Blanstien, & Raymond W. Mack eds. 1965). See also Robert Nozick, *Anarchy, State and Utopia* 18-22 (1974) (discussing appeal of "invisible hand" explanations).

³⁴ Compare the quotation from Holmes's first, unsigned article, *Codes, and the Arrangement of the Law*, *supra* note 8.

second section of "Law in Science and Science in Law" to identifying the mechanisms, or types of "evolutionary process,"³⁵ that produce change in the law. Holmes describes two separate processes, which he calls "the struggle among ideas" and "integration." The first is based on a rough analogy to Darwin's theory of natural selection and the second is drawn from Herbert Spencer.

The Struggle among Ideas. Darwin's theory of natural selection had three main components:³⁶ (1) *variation*: Darwin observed minute variations in physical characteristics among members of the same species and postulated that these variations were inherited; (2) *competition*: faced with inevitable scarcities of food and other necessities, a struggle for survival takes place in which minute differences give some animals an advantage; (3) *reproduction*: winners in the struggle for survival pass their characteristics on to the next generation. Holmes describes three analogous processes at work in the common law. Variation in legal "ideas" is the raw material for evolution in the common law. According to Holmes, the primary source of variation is factual differences.³⁷ Holmes asserts that the common law builds from the ground up, so that available legal ideas reflect the diversity of experience.³⁸

Even granting Holmes's (dubious) assumption that there was once a simpler time when "men begin with no theory at all,"³⁹ it does not follow that changing factual circumstances will continue to be a source of varia-

³⁵ Holmes, *supra* note 1, at 450.

³⁶ This conceptualization of the essential elements of Darwin's theory of natural selection is based on Daniels, *supra* note 30, at xiii-xiv. Daniels includes a fourth element, scarcity. However, this is a cause of the struggle for existence, rather than a separate process.

³⁷ Professor Jan Deutsch has made a related point: "Sufficiently persuasive precedents . . . are either voluntarily followed in the future or are applied again to situations that are different at least in the sense that time has passed and that different parties are involved. . . . [I]n almost all cases that reach the appellate level, there are other elements to justify the applicability of some precedent other than that being urged by one's opponent. It is precisely this complexity—the richness of factual detail in the judicial opinions enunciating governing legal principles—that restricts the number of times earlier opinions must be overruled . . ." Jan G. Deutsch, *Law as Metaphor: A Structural Analysis of Legal Process*, 66 *Geo. L. J.* 1339, 1340 (1978).

³⁸ Holmes, *supra* note 1, at 448: "It seems to me well to remember that men begin with no theory at all, and with no such generalization as contract. They begin with particular cases, and even when they have generalized they are often a long way from the final generalizations of a later time. Down into this century consideration was described by enumeration . . . and only of late years has it been reduced to the universal expression of detriment to the promise. So, bailment was Bailment and nothing further until modern times. It was not contract."

³⁹ *Id.* Compare J. Skelly Wright, *Law and the Logic of Experience: Reflections on Denning, Devlin, and Judicial Innovation in the British Context*, 33 *Stan. L. Rev.* 179 (1980), for the conventional modern account that common law originally grew out of "the expectations, customs, practices, and morality of the times . . ." *Id.* at 181. It is not clear whether Holmes's statement is meant to exclude such cultural sources of customary law.

tion in the law after a body of legal theories does exist. It is at least plausible that as cases presenting new combinations of facts arise they will be analyzed in terms of existing legal theories, rather than modifying the theories to fit the facts. Holmes himself describes the tendency for legal rules to become integrated into larger, more coherent structures (that is, generalizations such as contract), a trend that is the logical inverse of variation in legal rules.

The lack of a continuing source of variation is a substantial problem for the common law as Holmes describes it, and much of the latter part of "Law in Science and Science in Law" will be concerned with how to prevent the law from stultifying.⁴⁰

Holmes also describes a second source of variation in the common law. He points out that error in the transmission of a legal principle from one case to another can also introduce variation into the law. When a precedent is applied correctly from one case to another, a legal idea has reproduced; when the legal idea is misapplied (either intentionally or unintentionally), a mutant or variation has been introduced into the law. The new legal type may or may not win out against competitors in cases in the future. In suggesting that error can be a creative force in a legal system, Holmes anticipates one of the latest theories of cultural evolution, which also emphasizes the role of "copying error."⁴¹

⁴⁰ See text *infra* at notes 78–84. The problem discussed in the text applies with particular force in relatively unitary common-law systems such as England's (although even in that system that was a certain amount of borrowing back and forth between courts of law and equity). Holmes never discusses the effect that federalism and other forms of overlapping jurisdiction may have on the speed of common-law innovation in the United States. Others have seen that jurisdictional "redundancy" among multiple decision centers is a way of increasing variation, and hence the rate of innovation that is possible, see Robert M. Cover, *The Uses of Jurisdictional Redundancy: Interest, Ideology and Innovation*, 22 *Wm. & Mary L. Rev.* 639, 678 (1981). See also Martin Shapiro, *Toward a Theory of Stare Decisis*, 1 *J. Legal Stud.* 125 (1972); Mirjan Damaška, *Structures of Authority and Comparative Criminal Procedure*, 84 *Yale L. J.* 480 (1975) (discussing "coordinate model" of authority).

⁴¹ See L. L. Cavalli-Sforza & M. W. Feldman, *Cultural Transmission and Evolution: A Quantitative Approach* (1981). Cavalli-Sforza and Feldman define "culture" in terms broad enough to include law: "those aspects of 'thought, speech, action [*viz.* behavior] and artifacts' which can be learned and transmitted" (*id.* at 10 (original brackets)). Their theory of cultural transmission and evolution is based on the central notion of copying error, intentional or unintentional. They argue that once such errors in transmission occur, the altered cultural entity becomes a potential "model for other individuals who will transmit it" (*id.*). Cavalli-Sforza and Feldman then look to patterns of copying or transmission to build quantitative models to simulate the process of cultural evolution. Their approach has been reviewed as having revolutionized the field, and having laid "a sound mathematical foundation for the study of cultural evolution." C. Robert Cloninger, *The Dynamics of Social Learning*, 213 *Science* 858, 858, 859 (1981). In principle, quantitative methods similar to Cavalli-Sforza and Feldman's may be applicable to the study of the process of legal change, compare Robert A. Kagan, Bliss Cartwright, Lawrence M. Friedman, & Stanton Wheeler, *The Evolution of State Supreme Courts*, 76 *Mich. L. Rev.* 961, 991–94 (1978) (quantitative analysis of citation patterns as a function of caseload).

As in much of "Law in Science and Science in Law," Holmes's exposition of these points is by way of example; he traces the genesis of the rule that the deaf could not make a contract as follows:⁴²

The Roman law held very properly that the dumb, and by extension the deaf, could not make the contract called *stipulatio* because the essence of that contract was a formal question and answer which the dumb could not utter and the deaf could not hear. Bracton copies the Roman law and repeats the true reason, that they could not express assent, *consentire*; but shows that he had missed the meaning of *stipulari* by suggesting that perhaps it might be done by gestures or writing. Fleta copied Bracton, but seemed to think that the trouble was inability to bring the consenting mind, and whereas the Roman law explained that the rule did not apply to one who was only hard of hearing—*qui tardius exaudit*—Fleta seems to have supposed that this pointed to a difference between a man born deaf and dumb and one who became so later in life. In Perkin's "Profitable Book," this is improved upon by requiring that the man should be born blind, deaf, and dumb, and then the reason is developed that "a man that is born blind, deaf, dumb can have no understanding, so that he cannot make a gift or a grant." In a case before Vice-Chancellor Wood good sense prevailed, and it was laid down that there is no exception to the presumption of sanity in the case of a deaf and dumb person.

Holmes made much the same point in *The Common Law* when he wrote, "Ignorance is the best of law reformers."⁴³

From the standpoint of introducing variation into the law, it is immaterial whether a copying error is intentional (as in the case of Vice-Chancellor Wood's "good sense") or unintentional (as it appears to have been for Fleta and Bracton). However, Holmes is rather stodgy by modern standards about judges changing the law intentionally. He cautions: "I do not expect or think it desirable that the judges should undertake to renovate the law. That is not their province."⁴⁴

Following his discussion of variation, Holmes turns to his analogy to natural selection, the struggle among competing legal ideas. Once variation produces two or more legal ideas that are arguably applicable, Holmes imagines them in a competition for survival, as Darwin saw life as a competition among animals and plants. Holmes uses the evolution of contract law⁴⁵ to illustrate his conception of the common law as analogous to natural selection. He begins with the notion that there were a number of different "legal ideas" that might have served as sources for a theory of contract law: the oath, the sale, the hostage. Holmes sees "a struggle for life among competing ideas" such that there will be an "ultimate victory

⁴² Holmes, *supra* note 1, at 454 (footnotes omitted). Holmes's example is in turn drawn from one of his early articles, *Misunderstandings of the Civil Law*, 6 *Am. L. Rev.* 37 (1871), reprinted, 44 *Harv. L. Rev.* 759 (1931).

⁴³ Holmes, *supra* note 6, at 64.

⁴⁴ Holmes, *supra* note 1, at 460.

⁴⁵ The examples that Holmes discusses are drawn largely from Lecture VII on the history of contract law in *The Common Law*, *supra* note 6, at 195–226.

and survival of the strongest.”⁴⁶ He then mixes organic and military metaphors⁴⁷ to describe the struggle among competing legal ideas for dominion over the field of contract law:⁴⁸

There was a clash between the competing ideas, and just as commerce was prevailing over war the children of the sale drove the child of the hostage from the field. . . . But the hostage was not the only competitor for domination. The oath also goes back as far as the history of our race. It . . . might have been made to cover the whole field of promises. . . . But oath and plighting of troth did not survive in the secular forum except as an occasional solemnity, and I have mentioned them only to show a lively example of the struggle for life among competing ideas, and of the ultimate victory and survival of the strongest. After victory the law of covenant and debt went on, and consolidated and developed their empire in a way that is familiar to you all, until they in their turn lost something of their power and prestige in consequence of the rise of a new rival, Assumpsit. . . . There were other seeds which dropped by the wayside in early law, and which were germs of relations that now might be termed contractual. . . . I mention these only to bring still closer home the struggle for existence between competing ideas and forms to which I have referred. In some instances the vanquished competitor has perished. In some it has put on the livery of its conqueror, and has become in form and external appearance merely a case of covenant or assumpsit.

The mechanism by which the competition among legal ideas takes place is what Holmes called elsewhere “legislative” decisions by judges.⁴⁹ When two or more legal principles are in conflict, it is up to judges to exercise “the sovereign prerogative of choice” by saying which of them shall prevail.⁵⁰ Holmes does not advocate that judges follow their own

⁴⁶ Holmes, *supra* note 1, at 449.

⁴⁷ For an account of the influence that Holmes’s military experiences during the Civil War had on his view of the world, see generally Edmund Wilson, *Patriotic Gore: Studies in the Literature of the American Civil War 743–96* (1962); Saul Touster, *In Search of Holmes from Within*, 18 *Vand. L. Rev.* 437 (1965). Holmes’s description of the competition among legal ideas to gain acceptance is also similar to the marketplace of ideas metaphor which Holmes used twenty years later in his dissent in *Abrams v. United States*, 250 U.S. 616, 624 (1919) (Holmes, J., dissenting).

⁴⁸ Holmes, *supra* note 1, at 448–50 (footnotes omitted).

⁴⁹ See *Common Carriers and the Common Law*, 13 *Am. L. Rev.* 608, 630–31 (1879): “[I]n substance the growth of the law is legislative. And this in a deeper sense than that that [*sic*] which the courts declare to have always been the law is in fact new. It is legislative in its grounds. The very considerations which the courts most rarely mention, and always with an apology, are the secret root from which the law draws all the juices of life. We mean, of course, considerations of what is expedient for the community concerned. Every important principle which is developed by litigation is in fact and at bottom the result of more or less definitely understood views of public policy; most generally, to be sure, under our practice and traditions, the unconscious result of instinctive preferences and inarticulate convictions, but none the less traceable to public policy in the last analysis.” Holmes repeats these ideas, almost verbatim, in *The Common Law*, *supra* note 6, at 31–32.

⁵⁰ Holmes, *supra* note 1, at 461.

predilections in making that decision. For Holmes it is axiomatic that⁵¹ “. . . the justification of a law . . . must be found in some help which the law brings toward reaching a social end which the governing power of the community has made up its mind that it wants.” In ruling on a doubtful case—one which might arguably be governed by more than one legal principle—Holmes believes that judges must attempt to determine which legal rule would serve the community’s ends which are strongest in that case:⁵² “. . . whenever a doubtful case arises, with certain analogies on one side and other analogies on the other, . . . what really is before us is a conflict between two social desires, each of which seeks to extend its dominion over the case, and which cannot both have their way. The social question is which desire is strongest at the point of conflict.”

For Holmes the “more important part” of the “true science of law” does not consist of a “theological working out of dogma or a logical development as in mathematics;”⁵³ it is rather “the establishment of [the law’s] postulates . . . upon accurately measured social desires instead of tradition.”⁵⁴ In the long run, Holmes sees progress coming through scientific techniques to measure more accurately the relative weight of competing social policies. In Holmes’s closing vision, there is a faint prefiguration of lawmaking by agencies armed with cost-benefit analyses and computer simulations:⁵⁵

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, and, as I have tried to hint, it is our estimate of the proportion between these, not often blind and unconscious, that leads us to insist upon and to enlarge the sphere of one principle and to allow another gradually to dwindle into atrophy. Very likely it may be that with all the help that statistics and every modern appliance can bring us there never will be a commonwealth in which science is everywhere supreme. But it is an ideal, and without ideals what is life worth?

Holmes has more to say later about how judges should discharge their function in the near term, before science threatens them with obsolescence. However, for the moment it is enough to note that Holmes has

⁵¹ *Id.* at 452.

⁵² *Id.* at 460–61.

⁵³ *Id.* at 452.

⁵⁴ *Id.*

⁵⁵ *Id.* at 462. *Cf.* O. W. Holmes, *The Path of the Law*, 10 *Harv. L. Rev.* 457, 469 (1897) (“For the rational study of the law the black-letter man may be the man of the present, but the man of the future is the man of statistics and the master of economics.”) For a case study describing technocratic lawmaking in action, see Bruce A. Ackerman & William T. Hassler, *Clean Coal/Dirty Air: Or How the Clean Air Act Became a Multibillion Dollar Bail-Out for High-Sulfur Coal Producers and What Should Be Done about It* (1981).

brought his description of the “struggle among competing ideas” to a close.

Integration. Having described the struggle for life among competing ideas as analogous to Darwinian natural selection, Holmes begins the next section of his essay by describing “another evolutionary process which Mr. Herbert Spencer has made familiar to us by the name of Integration” (emphasis added).⁵⁶

Holmes’s invocation of Herbert Spencer may seem strange to the modern reader. In the decades after Holmes wrote “Law in Science and Science in Law,” the social and political theories of Social Darwinism attributed to Spencer would be rejected and discredited.⁵⁷ However, in late nineteenth-century America Spencer had a large popular following, and his ideas were a strong influence on Holmes.⁵⁸ When Holmes wrote “Law in Science and Science in Law,” he had not yet read Darwin, but he had been an avid reader of Spencer as a young captain come home from the Civil War to nurse his wounds.⁵⁹ Thereafter, the comprehensive,

⁵⁶ Holmes, *supra* note 1, at 450.

⁵⁷ The classic treatment of the rise and fall of Social Darwinism is Hofstadter, *supra* note 31. Some have incorrectly labeled Holmes himself a Social Darwinist, Richard A. Posner, *Economics, Politics and the Reading of Statutes and the Constitution*, 49 U. Chi. L. Rev. 263, 267 (1982). While Holmes did believe that legislation was the outcome of a struggle among interest groups, as Posner suggests (*id.*), in the unsigned article that Posner cites, Herbert Spencer: Legislation and Empiricism, in Justice Oliver Wendell Holmes: His Book Notices and Uncollected Letters and Papers 104, 107–109 (H. Shriver ed. 1936) [hereinafter cited as Shriver], Holmes dissociated himself from the arguments against state intervention that have come to be called Social Darwinism. For Holmes, politics was a legitimate forum for the evolutionary struggle, and he considered it a “singular anomaly” (*id.* at 106) that Herbert Spencer argued against legislation which favored one class over another. See also Howe, Introduction, in Holmes *supra* note 6, at xxvi. (“The social Darwinists followed the lead of Herbert Spencer in denying the legitimacy and wisdom of public control of private action. In Holmes’s case, however, his recognition that the common law had persistently worked its way towards objective standards of liability brought with it . . . an acknowledgment that the tendency if not the progress of civilization is towards the preference of social to private interests.”) For many, the symbol of the rejection of Herbert Spencer’s political ideas in the United States is Holmes’s famous line: “The Fourteenth Amendment does not enact Mr. Herbert Spencer’s Social Statics.” *Lochner v. New York*, 198 U.S. 45, 74 (1905) (Holmes, J., dissenting).

⁵⁸ Four years before “Law in Science and Science in Law,” as he was completing his reading of Spencer’s *Sociology*, Holmes had written to Lady Pollock: “H. Spencer you English never quite do justice to, or at least those whom I have talked with do not. . . . I doubt if any writer of English except Darwin has done so much to affect our whole way of thinking about the universe.” Letter from Holmes to Lady Pollock, July 2, 1895, 1 Holmes-Pollock Letters: The Correspondence of Mr. Justice Holmes and Sir Frederick Pollock 1874–1932, 57–58 (Mark DeWolfe Howe ed. 1941).

⁵⁹ 1 Mark DeWolfe Howe, Justice Oliver Wendell Holmes: The Shaping Years 1841–1870, at 156 (1957). But see Wilson, *supra* note 47, at 745 (asserting, without supporting evidence, that Holmes read Spencer while “at Harvard”). Compare Philip P. Wiener, *Evolution and the Founders of Pragmatism* 172 (1949) (arguing that Holmes “did not have to

evolutionary view of the world that Holmes found in Spencer became a "fixed element" in Holmes's thinking.⁶⁰

Although Spencer's terminology is not in general use today, many of his ideas have become commonplaces. Spencer argued that all things are continually in the process of either growth or decline. The constructive, or growth, stage Spencer called "integration," while its inverse, the degenerative process, was "disintegration."⁶¹ According to Spencer, all things go through a natural life cycle, characterized first by a period of building up, or integration, followed by a period of disintegration during which coherency is lost.⁶² Similar cycles of integration and disintegration have been noted by modern writers in many disciplines.⁶³

True to his word, Holmes describes the evolution of tort law as an example of Spencerian integration, the gradual building up of an organized structure.⁶⁴

read" either Darwin or Spencer for their ideas were "in the air" during his college days). See also Felix Frankfurter, *The Early Writings of O. W. Holmes, Jr.*, 44 *Harv. L. Rev.* 717, 722 (1931) (Darwin part of "Zeitgeist").

⁶⁰ Howe, Introduction to Holmes, *supra* note 6. See also Robert M. Cover, *The Left, the Right and the First Amendment: 1918-1928*, 40 *Md. L. Rev.* 349, 383 and n. 118 (discussing the influence of Spencer on Holmes's First Amendment jurisprudence).

⁶¹ Herbert Spencer, *First Principles* § 95 at 258 (6th ed. 1901): "All things are growing or decaying, accumulating matter or wearing away, integrating or disintegrating. . . . Both the quantity of matter contained in an aggregate, and the quantity of motion contained in it, increase or decrease; and the increase or decrease of either is an advance towards greater diffusion or greater concentration." Compare Jeremy Rifkin, *Entropy: A New World View* (1980) (proposing a "world view" not unlike Spencer's based on the second law of thermodynamics).

⁶² Spencer, *supra* note 61, § 96 at 260: ". . . there is always a differential progress towards either integration or disintegration. During the earlier part of the cycle of changes, the integration predominates—there goes on what we call growth. The middle part of the cycle is usually characterized, not by equilibrium between the integrating and disintegrating processes, but by alternate excesses of them. And the cycle closes with a period in which the disintegration, beginning to predominate, eventually puts a stop to integration, and after death undoes what integration had originally done."

⁶³ See, for example, Edward H. Levi, *An Introduction to Legal Reasoning* 8-9 (1949): "The first stage is the creation of the legal concept which is built up as cases are compared. The period is one in which the court fumbles for a phrase. Several phrases may be tried out; the misuse or misunderstanding of words itself may have an effect. The concept sounds like another, and the jump to the second is made. The second stage is the period when the concept is more or less fixed, although reasoning by example continues to classify items inside and out of the concept. The third stage is the breakdown of the concept, as reasoning by example has moved so far ahead as to make it clear that the suggestive influence of the word is no longer desired." See also Thomas S. Kuhn, *The Structure of Scientific Revolutions* (1970). Compare Oliver E. Williamson, *Markets and Hierarchies: Analysis and Anti-trust Implications: A Study in the Economics of Internal Organization* 16 (1975) (describing a theory attributed to George Stigler that "vertical integration will be extensive in firms in young industries; disintegration will be observed as an industry grows; and reintegration will occur as an industry passes into decline").

⁶⁴ Holmes, *supra* note 1, at 450-51.

The first stage of torts embraces little if anything beyond those simple acts of violence . . . known as the action of trespass. But when the action on the case let libel and slander and all the other wrongs which are known to the modern law into the civil courts, for centuries each of the recognized torts had its special history, its own precedents, and no one dreamed, so far as I know, that the different cases of liability were, or ought to be, governed by the same principles throughout. . . . You may see the change . . . by comparing Hilliard on Torts, which proceeds by enumeration in successive chapters through assault and battery, libel and slander, nuisance, trespass, conversion, etc., with Sir Frederick Pollock's Introduction, in which he says that the purpose of his book "is to show that there really is a Law of Torts, not merely a number of rules of law about various torts— . . ."

Holmes concedes that, in light of recent cases, "[i]t would be bold, perhaps, to say that the integration was complete . . .,"⁶⁵ however, Holmes saw a continuation of the trend as inevitable:⁶⁶ "But I have no doubt that the generalizing principle will prevail, as generalization so often prevails, even in advance of evidence, because of the ease of mind and comfort which it brings."

Unfortunately, Holmes does not go into detail in "Law in Science and Science in Law" about what mechanisms produce integration. The only clue is Holmes's reference to the "generalizing principle" and the "ease and comfort of mind which it brings."⁶⁷ This suggests that what Holmes has in mind is the law growing according to its own internal logic. Two years earlier, in *The Path of the Law*, Holmes remarked on what he called the "fallacy of logical form" in the law, by which he meant the tendency of the law to develop along lines determined by its internal logic or structure: "The development of our law has gone on for nearly a thousand years, like the development of a plant, each generation taking the inevitable next step, mind, like matter, simply obeying a law of spontaneous growth."⁶⁸

Unlike some,⁶⁹ Holmes does not believe that relentless elaboration of the logic of the existing legal system is the only factor at work in the law.

⁶⁵ *Id.* at 451.

⁶⁶ *Id.* Most contemporary scholars do not share Holmes's view that a general theory of tort (as opposed to a series of theories for particular torts) is inevitable, see George C. Christie, *Cases and Materials on the Law of Torts* 7 (1983). However, economic theories of tort law may eventually achieve the degree of generalization that Holmes predicted; see Guido Calabresi, *The Costs of Accidents: A Legal and Economic Analysis* (1970). See also Guido Calabresi & Jon T. Hirschoff, *Toward a Test for Strict Liability in Torts*, 81 *Yale L. J.* 1055 (1972).

⁶⁷ Holmes, *The Path of the Law*, *supra* note 55, at 468.

⁶⁸ *Id.*

⁶⁹ See Ronald Dworkin, *No Right Answer*, 53 *N.Y.U. L. Rev.* 1 (1978). See also Robert H. Bork, *The Antitrust Paradox: A Policy at War With Itself* 5 (1978) ("Law grows by analogizing new situations to old . . .").

For Holmes, the generalizing principle, the logic of the law, is important, but it is not sufficient.⁷⁰

C. Pathologies, or of Survivals and Generalizations

By the time he wrote "Law in Science and Science in Law," Holmes had grown intolerant of the tendency in the law for generalizations to persist and grow according to their own internal logic.⁷¹ The rest of "Law in Science and Science in Law" is devoted to Holmes's inveighing against the evils of "pure survival[s], having nothing or very little to back [them] except that the practice is established;"⁷² "unreal formulas and inadequate generalizations;"⁷³ "inadequate catch words . . . which, by their very felicity, delay further analysis for fifty years;"⁷⁴ and "phrases [which] have taken the place of real reasons."⁷⁵ He goes so far as to insist that in the law "generalities are worse than useless . . .,"⁷⁶ and that "[a]ny solution in general terms seems to me to mark a want of analytic power."⁷⁷

The gravamen of Holmes's complaint against the tendency in the common law to construct generalizations is that legal formulas get in the way of "scrutinizing the reasons for the rules which we follow . . ." ⁷⁸ If law is to fulfill its function to serve the ends of the governing power of the community,⁷⁹ "the only way to solve the problem presented is to weigh

⁷⁰ See Holmes, *supra* note 6, at 5: "It is something to show that the consistency of a system requires a particular result, but it is not all. The life of the law has not been logic: it has been experience" (emphasis added).

⁷¹ Two years earlier, in *The Path of the Law*, Holmes seemed more resigned to mankind's affection for generalizations: "Most of the things we do, we do for no better reason than that our fathers have done them or that our neighbors do them, and the same is true of a larger part than we suspect of what we think. The reason is a good one, because our short life gives us no time for a better, but it is not the best. It does not follow, because we all are compelled to take on faith at second hand most of the rules on which we base our action and our thought, that each of us may not try to . . . carry reason as far as it will go throughout the whole domain. In regard to the law, it is true, no doubt, that an evolutionist will hesitate to affirm universal validity for his social ideals, . . . Still it is true that a body of law is more rational and more civilized when every rule it contains is referred articulately and definitely to an end which it subserves, and when the grounds for desiring that end are stated or are ready to be stated in words." Holmes, *supra* note 55, at 468.

⁷² Holmes, *supra* note 1, at 453.

⁷³ *Id.* at 455.

⁷⁴ *Id.*

⁷⁵ *Id.* at 459.

⁷⁶ *Id.* at 462.

⁷⁷ *Id.*

⁷⁸ *Id.* at 460.

⁷⁹ See text at note 51 *supra*.

the reasons for the particular right claimed and those for the competing right . . . as well as one can, and to decide which set preponderates."⁸⁰ Immutable generalizations are impossible in the law because the environment is constantly changing, particularly in terms of the relative centrality of social norms:⁸¹ “. . . in the law we only occasionally can reach an absolutely final and quantitative determination, because the worth of the competing social ends which respectively solicit a judgment for the plaintiff or the defendant cannot be reduced to number and accurately fixed. The worth, that is, the intensity of the competing desires, varies with the varying ideals of the time, and, if the desires were constant, we could not get beyond a relative decision that one was greater and one was less.”

Holmes has come back to the paradox with which he began *The Common Law*: how logic and experience are woven together to shape the law. Holmes goes on at some length to describe the institutional solutions that the common law has developed to merge logic and experience so that the law is a joint product of the two. These include the jury, which introduces large amounts of “popular prejudice” into its verdicts and thus tempers the administration of the formal law with “the wishes and feelings of the community;”⁸² and more important, Holmes’s own conception of the proper judicial role, according to which judges are free to exercise “the sovereign prerogative of choice” based on explicit consideration of policy, at least in doubtful cases.⁸³

Holmes’s idea that judges may consider policy, controversial in its time,⁸⁴ has since gained general acceptance. Today this part of Holmes’s argument seems true but tame. Let us go back, however, to reconsider the significance of the evolutionary model of the legal process which Holmes develops in “Law in Science and Science in Law.”

II

Holmes apparently considered “Law in Science and Science in Law” to be a significant essay. Rather than include it in the collection of his occasional speeches to groups such as bar associations, Holmes published it in the *Harvard Law Review* and preserved it in his *Collected*

⁸⁰ Homes, *supra* note 1, at 462.

⁸¹ *Id.* at 456.

⁸² *Id.* at 460.

⁸³ *Id.* at 460–61. See also Benjamin N. Cardozo, *The Nature of The Judicial Process* (1921).

⁸⁴ See Harlan Fiske Stone, Introduction to Shriver, *supra* note 57, at xii: “We shall see [Holmes] proclaiming in 1879 the heresy that within limits the judge is a legislator, as the ultimate secret of the growth of the Common Law.”

Legal Papers.⁸⁵ Another indication that Holmes considered "Law in Science and Science in Law" substantial is that he sent the essay to his friend Sir Frederick Pollock, the English legal scholar, shortly after it appeared.⁸⁶

However valuable Holmes may have thought the essay, scholars generally have virtually ignored it, concentrating instead on *The Common Law* or Holmes's 1897 essay, "The Path of the Law,"⁸⁷ as the "masterpieces" which express Holmes's views about the legal process.⁸⁸ For example, the late Grant Gilmore tells us: "After his appointment to the bench Holmes never returned to the world of scholarship, so that the lectures in *The Common Law* remain as his only attempt to formulate a coherent, comprehensive statement of his theories about law."⁸⁹ Gilmore's statement may be literally true, if one is willing to put enough stress on the words "coherent" and "comprehensive," but it overlooks the fact that in "Law in Science and Science in Law" Holmes returned to the ground that he had covered eighteen years earlier in *The Common Law*.

Gilmore is not alone in overlooking "Law in Science and Science in Law." Most who have written about Holmes's theories of law give it no attention at all. On the few occasions when it has been cited, typically it has been regarded solely as a work of legal history,⁹⁰ rather than as an additional contribution in a series of pieces by Holmes about the common-law process and legal change.

From the vantage point of the history of ideas, "Law in Science and Science in Law" presents two puzzles: why Holmes regarded this partic-

⁸⁵ Holmes's editor and biographer, Mark DeWolfe Howe, reports that Holmes excluded "Law in Science and Science in Law" from the volume of his occasional speeches and included it in his *Collected Legal Papers* (1920) for the reason that it, "evidently seemed to Holmes to be something more significant than [one of his] 'chance utterances of faith and doubt,' . . ." Howe, Foreword to *The Occasional Speeches of Justice Oliver Wendell Holmes* ix (1962).

⁸⁶ Pollock wrote back politely, focusing on the roles of judge and jury, a peripheral point that Holmes discusses near the end of the piece: "Your paper in *Harv. L. Rev.* is most interesting. It suggests more questions than one can make up one's mind on off-hand. From pp. 457-460 I gather that you are oppressed by your statutory sharpenings of the line between the functions of judge and jury. As law and practice here go, there is not and never has been any hard rule either that juries are the judges of all questions of fact, or that they are judges of nothing else." Letter from Pollock to Holmes, March 15, 1899, 1 *Holmes-Pollock Letters* *supra* note 58, at 92.

⁸⁷ Holmes, *supra* note 55.

⁸⁸ See, for example, Saul Touster, *Holmes a Hundred Years Ago: The Common Law and Legal Theory*, 10 *Hofstra L. Rev.* 673, 674, 692 (1982).

⁸⁹ Gilmore, *supra* note 12, at 51.

⁹⁰ See for example, Theodore F. T. Plucknett, *Holmes: The Historian*, 44 *Harv. L. Rev.* 712, 715 n.7, 716 n.9 (1931).

ular speech as significant, and why generations of scholars have overlooked it.⁹¹

The text itself provides a clue as a starting point for understanding why Holmes thought “Law in Science and Science in Law” was significant. Holmes periodically invites his audience in the paper to compare his views in 1899, after nearly two decades as a judge, with the views that he had expressed as a young scholar in *The Common Law*.

“In a book which I printed a good many years ago I tried to establish . . .”;⁹²

“I have called attention elsewhere to . . .”;⁹³

“I venture to think . . . now, as I thought twenty years ago, before I went upon the bench, that . . .”;⁹⁴

We can understand “Law in Science and Science in Law,” then, as Holmes’s retrospective on *The Common Law*.⁹⁵

In many ways Holmes’s ideas are unchanged, but on some points there is a startling difference between Holmes the thirty-nine-year-old scholar and Holmes the fifty-eight-year-old judge. Perhaps the most important change is the depth of Holmes’s confidence that judges can adapt the law to a changing world. In *The Common Law*, Holmes assured his readers: “[T]he law is administered by able and experienced men, who know too much to sacrifice good sense to a syllogism [W]hen ancient rules maintain themselves . . . new reasons more fitted to the time have been found for them”⁹⁶ After sixteen years among these “able and

⁹¹ In part the answer to the second question may be stylistic. “Law in Science and Science in Law” is a difficult essay, complicated by the esoterica of legal history and lacking a clear organizing principle or theme, see *supra* text at note 16. But the same criticisms can be made equally of Holmes’s more famous works, including *The Common Law*, see Howe, Introduction to Holmes, *supra* note 6, at xi. Stylistic difficulties alone cannot explain the comparative obscurity of “Law in Science and Science in Law.”

⁹² Holmes, *supra* note 1, at 447.

⁹³ *Id.* at 449.

⁹⁴ *Id.* at 457 (emphasis added).

⁹⁵ Holmes made numerous marginal notations in his copy of *The Common Law*; see “A Note on the Text” in Holmes, *supra* note 6 at the unnumbered page following p. xxvii. In some instances, Holmes’s marginal notes on *The Common Law* closely parallel ideas he expresses in “Law in Science and Science in Law.” For example, on the first page of *The Common Law*, where he discusses the role of history, Holmes wrote in the margin: “Imagination of men limited—can only think in terms of the language they have been taught. Conservative instinct.” Holmes, *supra* note 6, at 5, note a. Near the beginning of “Law in Science and Science in Law” Holmes states: “. . . continuity with the past is only a necessity and not a duty. As soon as a legislature is able to imagine abolishing the requirement of a consideration for a simple contract, it is at perfect liberty to abolish it, if it thinks it wise to do so, without the slightest regard to continuity with the past. That continuity simply limits the possibilities of our imagination, and settles the terms in which we shall be compelled to think.” Holmes, *supra* note 1, at 444 (emphasis added).

⁹⁶ Holmes, *supra* note 6, at 32.

experienced men," the Holmes of "Law in Science and Science in Law" was less optimistic: "Judges commonly are elderly men, and are more likely to hate at sight any analysis to which they are not accustomed, and which disturbs repose of mind, than to fall in love with novelties. Every living sentence which shows a mind at work for itself is to be welcomed."⁹⁷

One need not probe too deeply into his experiences as a justice of the Supreme Judicial Court of Massachusetts to discover the sources of Holmes's discontent. In "Law in Science and Science in Law" Holmes calls to our attention a case decided several months earlier by the Court, *Commonwealth v. Cleary*,⁹⁸ concerning "the grounds upon which evidence of fresh complaint by a ravished woman is admitted as part of the government's case in an indictment for rape."⁹⁹ In an opinion by Holmes, the court in *Commonwealth v. Cleary* denounced that practice as a "perverted survival of the ancient requirement that [the victim] should make hue and cry as a preliminary to bringing her appeal."¹⁰⁰ Holmes's opinion went on to note that "Lord Hale's statement of the law has survived as an arbitrary rule . . . notwithstanding the later developed principles of evidence . . ."¹⁰¹

Experiences such as these as a judge must have shaken Holmes's confidence in the adaptability of the common law. To be sure, in *Commonwealth v. Cleary* Holmes led his fellow justices to abandon an ancient common-law survival, albeit several hundred years after its original purpose no longer applied and, according to Holmes, no valid new purpose had grown up to support its retention.¹⁰² Holmes did not always succeed, however, in persuading his colleagues not to "sacrifice good sense to a syllogism." Nor can it be said that Justice Holmes was always on the side of "good sense" as opposed to arbitrary historical rules.¹⁰³

Nonetheless, among the dissents in the Supreme Judicial Court of Massachusetts in the late 1890s one does occasionally find Holmes, sometimes joined by one or two others, vainly attempting to persuade the majority to modify traditional common-law rules in the light of "good

⁹⁷ Holmes, *supra* note 1, at 455.

⁹⁸ 172 Mass. 175 (1898), cited in Holmes, *supra* note 1, at 453, n.1.

⁹⁹ Holmes, *supra* note 1, at 453.

¹⁰⁰ 172 Mass. 175, 176 (1898).

¹⁰¹ *Id.*

¹⁰² Compare Holmes, *supra* note 6, at 26 (assuming that if an ancient doctrine "were not supported by an appearance of good sense, it would not have survived").

¹⁰³ In *Lewin v. Folsom*, 171 Mass. 188 (1898), a unanimous court denied a claim for compound, as opposed to simple, interest on a judgment. The only reason given in Justice Holmes's opinion is the law's "ancient unwillingness to allow compound interest." 171 Mass. 188, 192 (1898).

sense.” An example is *May v. Wood*,¹⁰⁴ a case decided about six months prior to “Law in Science and Science in Law.” Homes wrote a dissent (the only dissent by any justice in the decisions from August 1898 to March 1899). Margaret May, a domestic servant, sued, claiming the defendants maliciously induced her employer to discharge her. The majority dismissed her complaint for failure to plead false statements with specificity, stating tartly: “There is, so far as we are aware, no form of declaration for enticing masters away from servants.”¹⁰⁵ Holmes in dissent read the complaint not as “an action for slander with special damages, but [as] an action for malevolently and without justifiable cause inducing a third person to break a contract.”¹⁰⁶ It was “plain,” wrote Holmes, “that the fact that the conduct of the possible customer in abstaining from dealing is lawful does not affect the liability of the person who induced him to do so”¹⁰⁷

In “Law in Science and Science in Law” Holmes does not specifically mention his unsuccessful stand against rigid adherence to the traditional forms of action in *May v. Wood*. Perhaps it would have been unseemly to criticize a recent decision by his own court in which his views had not prevailed. Instead Holmes attacks the English House of Lords opinions in *Allen v. Flood*,¹⁰⁸ which he interprets as raising the same issues as his dissent in *May v. Wood*: “[E]minent judges intimated that anything which a man has a right to do he has a right to do whatever his motives.”¹⁰⁹ For Holmes, this kind of judicial reasoning stands as a lamentable example of “over-generalization,”¹¹⁰ of “the danger of reasoning from generalizations unless you have the particulars which they embrace in mind.”¹¹¹ “[I]f different rights are of different extent, if they stand on different grounds of policy and have different histories, it does not follow that because one right is absolute another is,—and if you simply say all rights shall be so, that is only a pontifical or imperial way of forbidding discussion.”¹¹² Holmes denounces legal reasoning based on abstract theories as “worse than useless” and “a mark [of] a want of analytic power.”¹¹³

¹⁰⁴ 172 Mass. 11 (1898).

¹⁰⁵ *Id.* at 14.

¹⁰⁶ *Id.* at 15.

¹⁰⁷ *Id.* at 14.

¹⁰⁸ [1898] A.C. 1, cited in Holmes, *supra* note 1, at 461.

¹⁰⁹ Holmes, *supra* note 1, at 462.

¹¹⁰ *Id.* at 461.

¹¹¹ *Id.*

¹¹² *Id.* at 462.

¹¹³ *Id.*

Holmes's harsh criticism of arbitrary survivals and of judicial over-generalization in "Law in Science and Science in Law" is in sharp contrast to the rhapsodic view of the common law as changing with the times with which he began *The Common Law*: "The life of the law has not been logic: it has been experience. The felt necessities of the time, the prevalent moral and political theories, intuitions of public policy, avowed or unconscious, even the prejudices which judges share with their fellow-men, have had a good deal more to do than the syllogism in determining the rules by which men should be governed. The law embodies the story of a nation's development through many centuries"¹¹⁴

These famous lines at the beginning of *The Common Law* aptly illustrate Holmes's own warning against the dangers of "phrases . . . which, by their very felicity, delay further analysis for fifty years."¹¹⁵ Holmes's ringing pronouncement that the life of the law is not logic but experience has led some to believe that the common law was in fact highly responsive to the felt necessities of the time.¹¹⁶ Even the Holmes of *The Common Law* was not so naive or simplistic as to believe that the common law always expressed perfectly the felt necessities of the time. Holmes's statement is at least as much aspirational as descriptive.¹¹⁷ Moreover, in *The Common Law* Holmes as scholar and historian was concerned with patterns of change that work themselves out in the common law over hundreds of years, in Holmes's phrase: "the story of a nation's development through many centuries"¹¹⁸ It may be slim comfort to a judge trying to do justice to litigants in cases such as *Commonwealth v. Cleary* and *May v. Wood* that the common law may adapt to felt necessities after another few centuries.

Between *The Common Law* and "Law in Science and Science in Law" there is, at minimum, a shift in Holmes's sense of the relevant time periods over which to evaluate the common law's adaptability. This shift parallels Holmes's own change in perspective from common-law scholar to judge. The survivals and over generalizations that Holmes denounces vehemently in "Law in Science and Science in Law" had appeared to him

¹¹⁴ Holmes, *supra* note 6, at 5.

¹¹⁵ Holmes, *supra* note 1, at 455.

¹¹⁶ See for example, Arthur S. Miller, Constitutional Decisions as *De Facto* Class Actions: A Comment on the Implications of *Cooper v. Aaron*, 58 U. Det. J. Urb. L. 573, 576 (1981). But see Richard A. Epstein, The Static Conception of the Common Law, 9 J. Legal Stud. 253 (1980).

¹¹⁷ "The felt necessities of the time . . . have had a good deal more to do than the syllogism in determining the rules by which men *should* be governed." Holmes, *supra* note 6, at 5 (emphasis supplied).

¹¹⁸ *Id.*

as but temporary snags on the road of progress from the Olympian perspective of *The Common Law*.¹¹⁹

This change in perspective, however real, understates the full difference between the Holmes of *The Common Law* and the Holmes of "Law in Science and Science in Law." Although Holmes's life of the law aphorism at the beginning of *The Common Law* should not be interpreted too literally, there is nonetheless a subtle but important change in his view of the relative roles of "logic"—deduction from the legal rules inherited from history—and "experience"—judges' views of good sense—in shaping the common law. When Holmes assays the relative roles of history and judicial policymaking in *The Common Law*, he concludes that judicial policymaking is the primary force shaping the substance of the law: "In order to know what it [the common law] is, . . . [w]e must alternately consult history and existing theories of legislation. But the most difficult labor will be to understand the combination of the two into new products at every stage. *The substance of the law at any given time pretty nearly corresponds, so far as it goes, with what is then understood to be convenient*; but its form and machinery, and the degree to which it is able to work out desired results, depend very much upon its past" (emphasis added).¹²⁰ In "Law in Science and Science in Law" Holmes the judge, gives far more weight to the internal logic of the law, a force which is independent of individual judges' ideas of what is "convenient."¹²¹

Holmes's vision of the common law in *The Common Law* as reflecting judicial judgments of "what is then understood to be convenient" leads him naturally to describe the common-law judge as a kind of legislator:

[I]n substance the growth of the law is legislative. And this in a deeper sense than that what the courts declare to have always been the law is in fact new. It is legislative in its grounds. The very considerations which judges most rarely mention, and always with an apology, are the secret root from which the law draws all the juices of life. I mean, of course, considerations of what is expedient for the community concerned. Every important principle which is developed by litigation is in fact and at bottom the result of more or less definitely understood views of public policy; . . .¹²²

The Holmes of *The Common Law* advocates a more explicit recognition and discussion of the legislative grounds which underlie the decisions of judges. Holmes even suggests that the primary justification for his lec-

¹¹⁹ See Holmes, *supra* note 6, at 26.

¹²⁰ *Id.* at 5.

¹²¹ See text at notes 160–61 *infra*.

¹²² Holmes, *supra* note 6, at 31–32.

tures about common-law history is to prove his jurisprudential point that judges, like legislators, act on considerations of policy.¹²³

This feature of Holmes's thought—assimilating, if not equating, judicial and legislative functions—struck a particularly responsive chord for twentieth-century legal scholars. James Landis has written that the image of the judge “as a creative artist in the making of law” is what distinguishes nineteenth- and twentieth-century theories of law.¹²⁴ This view of judges as creative artists or legislators who make law through individual will and creativity has come to be associated with the legal realists of the 1920s and 1930s.¹²⁵ For laying the jurisprudential foundation for the realist movement, Lon Fuller characterizes Holmes as “the most illustrious realist of them all.”¹²⁶

The affinity that later scholars have felt for the image of the judge as creative legislator which Holmes presents in *The Common Law* helps to explain why “Law in Science and Science in Law” has largely been ignored. As Grant Gilmore points out, Holmes has suffered the fate of all who become heroic figures; his ideas have been used selectively by later authors to advance their own causes: “The stalwarts of the post-Holmesian orthodoxy took from the master only what suited them; the disturbing and heretical aspects of his thought were ignored.”¹²⁷ On the few occasions on which “Law in Science and Science in Law” has been cited, what has captured notice have been the isolated passages that seem to support the view that individual judges are, or should be, the creative force that makes law.¹²⁸

¹²³ *Id.* at 32. See also *id.* at 64: “The philosophical habit of the day, the frequency of legislation, and the ease with which the law may be changed to meet the opinions and wishes of the public, all make it natural and unavoidable that judges as well as others should openly discuss the legislative principles upon which their decisions must always rest in the end, and should base their judgments upon broad considerations of policy to which the traditions of the bench would hardly have tolerated a reference fifty years ago.”

¹²⁴ James McCauley Landis, *Statutes and the Sources of Law*, in *Harvard Legal Essays* 214 (1934): “A chief point of departure between nineteenth- and twentieth-century theories of law lies in the emphasis placed upon the judge as a creative artist in the making of law.”

¹²⁵ See, for example, Jerome Frank, *Law and the Modern Mind* (1930), esp. at 259; Karl N. Llewellyn, *Jurisprudence: Realism in Theory and Practice* (1962), esp. chs. 28 & 29 (discussing Holmes).

¹²⁶ Lon L. Fuller, *The Law in Quest of Itself* 62 (1940). See also Touster, *supra* note 88, at 690: “What Holmes did was to set out a theory of the judicial process that recognized that judges in deciding cases played a creative role in laying down the rules by which we are governed.”

¹²⁷ Gilmore, *supra* note 12, at 67. For examples of movements in legal scholarship that claim Holmes as intellectual ancestor, see George L. Priest, *The Rise of Law and Economics*, 33 *J. Legal Ed.* 437 (1983); Touster, *supra* note 88, at 674–80.

¹²⁸ In his bicentennial essay on American contributions to jurisprudence, H. L. A. Hart

There is no question that the Holmes of “Law in Science and Science in Law” still sees judges as exercising the “sovereign prerogative of choice” when deciding a close case.¹²⁹ However, the legislative function of judges, which played such a prominent role in *The Common Law*, is at most a leitmotiv for Holmes in “Law in Science and Science in Law.” The view of the common law that Holmes wishes to defend in “Law in Science and Science in Law” is not that judges make law as an act of individual legislative or artistic creation. Rather, Holmes portrays the common law as the product of a system with a logic of its own which exists independent of any individual mind. The metaphor that Holmes uses to describe the corporate mind of the legal system is evolution.¹³⁰

In “Law in Science and Science in Law,” Holmes sees two different processes of evolution at work simultaneously in the law, one based on an analogy to Darwin’s theory of natural selection¹³¹ and the other based on an analogy to Spencer’s theory of integration.¹³² In the Darwinian type of legal evolution, competing “legal ideas” grow up and it is the task of judges to say which of them is stronger in a particular case. When a doubtful case, is presented, one with strong legal analogies on both sides, judges are to determine which of the competing social desires—what we might now call social policy goals—is “strongest at the point of conflict.”¹³³ As decisions by individual judges accumulate, the sphere of influence of one legal principle expands, that of another contracts.

The image of the common law that Holmes presents in “Law in Science and Science in Law” is not of judges legislating rules. The architecture of the common law is not the product of conscious design choices by individual judges. It is rather the product of the logic of selection by a system, of an “invisible hand” like that of the market, or of natural selection in biology. This is not to say that Holmes’s view is deterministic.¹³⁴

quotes Holmes in “Law in Science and Science in Law” for the proposition that in doubtful cases judges “exercise the sovereign prerogative of choice.” H. L. A. Hart, *Perspective of Philosophy in American Law: The Third Century* 417, 425 (B. Schwartz ed. 1976). See also a review of Holmes’s *Collected Legal Papers* by Morris Cohen which quotes Holmes’s observation that judges “commonly are elderly men,” Morris R. Cohen, 25 *The New Republic* 294 (1921), reprinted Morris R. Cohen, *Law and the Social Order: Essays in Legal Philosophy* 363, at 369 (1933).

¹²⁹ Holmes, *supra* note 1, at 461.

¹³⁰ See text at notes 155–159 *infra* for a description of the similarity between Holmes’s concept of common-law evolution and “artificial intelligence.”

¹³¹ See text at note 45, *supra*.

¹³² See text at notes 56–70, *supra*.

¹³³ Holmes, *supra* note 1, at 461.

¹³⁴ Although Holmes says the “strongest” legal idea prevails in competition, the strongest is not necessarily the fittest in a normative sense, see Cavalli-Sforza & Feldman,

Holmes's judges are free to decide, and whether they decide well does matter. Holmes's judges are to weigh social policy, but not with the aim of designing rules of law in the way that a legislator designs a statute. Rather, Holmes assigns judges the more modest task of weighing social policy for the limited purpose of saying that an existing legal rule should *not* be followed because it reaches a less desirable result in a particular case than an available alternative. The logic of selection is not constructive, but subtractive.

The judge capable of performing the task imagined by Holmes in *The Common Law*—to legislate wisely on all the subjects touched by the common law—would indeed have to be a “Hercules,”¹³⁵ not the narrow-minded “elderly men” that Holmes confronted during his tenure on the Massachusetts Supreme Court. The judge that Holmes imagines in “Law in Science and Science in Law” does not have to be so wise that he can be trusted to *make* law, at least not in the self-conscious way that an artist or legislator creates something. Instead, he is faced with the less ambitious, seemingly more manageable task of selecting *against* an existing legal rule or principle if another, competing rule or principle reaches a less undesirable result in a particular case.¹³⁶

The common law of the Holmes of “Law in Science and Science in Law” uses the limited, local intelligence of judges to build a global intelligence in the system as a whole. Thereby, the law may hope to be wiser than the individuals who make it.¹³⁷

III

Holmes's image of the judicial role in “Law in Science and Science in Law” seems refreshingly modest after decades of controversy about

supra note 41, at 15–17 (distinguishing between “cultural fitness,” the probability of acceptance by others, and “Darwinian fitness,” which increases adaptiveness to the environment). Holmes recognizes that factors such as linguistic similarities which have nothing to do with adapting the law to the goals of the community may influence judges to prefer it, Holmes, *supra* note 6, at 224–25 (misinterpretation of the Latin term *causa* helped to establish a weaker form of consideration doctrine in *assumpsit* than in *contract*).

¹³⁵ Compare Ronald Dworkin, *Taking Rights Seriously: New Impression with a Reply to Critics* 105 (1978) (imagining an ideal judge for “hard cases” as Hercules, “a lawyer of superhuman skill, learning, patience and acumen”). But see James M. Landis, *The Administrative Process* 41 (1938) (“[M]ost government affairs are run by men of average capabilities, and it is necessary to supply such men with a routine and ready-made technique . . .”).

¹³⁶ See also Herbert Simon's model of choice as “satisficing”—eliminating unsatisfactory alternatives—rather than making the elaborate optimizing calculations posited for the classical economic decision maker, Herbert A. Simon, *Rational Choice and the Structure of the Environment*, 63 *Psychological Rev.* 129–38 (1956), reprinted, *Systems Thinking: Selected Readings* 214–30 (F. Emery ed. 1969).

¹³⁷ See text at note 34 *supra*.

judges' legislating. There is, however, a basic problem underlying Holmes's description of the common-law process. Holmes portrays two different kinds of evolution at work in the common law. This duality gives Holmes's model much of its sophistication and power,¹³⁸ but at the same time it contains the seeds of its undoing. In many cases, Holmes's two evolutionary processes pull in different directions. How is Holmes's judge to decide which to follow? Holmes struggled with versions of this problem throughout his career, never finding an entirely satisfactory answer. At the end of this essay, I will suggest that Holmes's dilemma may be insoluble within a common-law system.

To appreciate his dilemma, reconsider the dualistic evolutionary model of the common-law process that Holmes presents in "Law in Science and Science in Law." The first evolutionary process that Holmes describes is the competition for survival among legal ideas, which is based on an analogy to Darwinian natural selection.¹³⁹ This evolutionary process requires that judges base their decisions in close cases on the "social end which the governing power of the community has made up its mind that it wants."¹⁴⁰ What is important to notice about this kind of evolution is that selection is in terms of a structure *outside* the system of laws: the community's goals and values. Holmes's Darwinian type of evolution is, therefore, an example of what has been called "external selection,"¹⁴¹ selection based on consistency with the environment outside a system.

The second type of evolution that Holmes describes in "Law in Science and Science in Law" is based on an analogy to Spencer's concept of integration.¹⁴² In this evolutionary process, judges decide according to patterns that already exist *inside* the system of legal rules and principles. When faced with a new problem, judges generalize from the body of decided cases.¹⁴³ Thus, Holmes's second type of evolution is an example

¹³⁸ See text at notes 155–59 *infra*.

¹³⁹ See text at note 45 *supra*.

¹⁴⁰ Holmes, *supra* note 1, at 452.

¹⁴¹ The distinction between internal and external selection is borrowed from social psychologist Donald Campbell, *supra* note 33, at 32: "A distinction can be drawn between internal selectors and external selectors. The selective criterion whereby random processes form orderly crystals is the internal one of stable combinations among molecules. When such combinations occur by chance they tend to stay put, while others continue to change, thus leading to a biased accumulation of orderly arrangements. . . . But external selective pressures enter the course of biological evolution, differentially modifying the reproductive opportunity of different molecules of equivalent internal stability."

¹⁴² See text at notes 56–70, *supra*. See also J. D. Y. Peel, Herbert Spencer: The Evolution of a Sociologist 141–46 (1971) (comparing Darwin's and Spencer's theories of evolution).

¹⁴³ See Holmes, *supra* note 1, at 450–51 (describing generalizing tendency in the law of torts). See also Dworkin, *supra* note 69 ("right answer" to legal questions determined by

of "internal selection," selection based on consistency with the structure that exists inside the system rather than in the environment outside it.¹⁴⁴ Internal selection is the kind of evolution that takes place in a closed system, in which parts of the system are influenced primarily by other parts of the same system; external selection is typical of open systems, which are significantly influenced by the environment.¹⁴⁵

Some later writers who have used evolutionary metaphors conceive of law as a closed system, which evolves (or, perhaps better, "grows") according to Spencerian internal selection.¹⁴⁶ Others use evolutionary metaphors to describe the legal process as an open system, which evolves as a result of Darwinian external selection.¹⁴⁷ Holmes is unique in describing both internal and external selection as operating simultaneously to shape the common law.

The two evolutionary processes that Holmes describes in "Law in Science and Science in Law" are roughly comparable to the logic and experience with which he opened *The Common Law*, but the focus has

best fit with body of cases and other legal materials); Bork, *supra* note 69 ("The law grows by analogizing new situations to old . . .").

¹⁴⁴ See note 141 *supra*.

¹⁴⁵ See generally Ludwig von Bertalanffy, *The Theory of Open Systems in Physics and Biology*, 111 *Science* 23-29 (1950). Admittedly, there are cases in which what is "system" and what is "environment" is not "a question with an obvious or trival answer." Ludwig von Bertalanffy, *General System Theory: Foundations, Development, Applications*, xxi (rev. ed. 1968).

¹⁴⁶ See Robert Clark, *The Morphogenesis of Sub-chapter C: An Essay in Statutory Evolution and Reform*, 87 *Yale L. J.* 90 (1977). Clark describes the evolution within a "corporate tax culture" with "comparatively clear boundaries" *Id.* at 91 as a process in which a "few basic decisions" work themselves out in a "cumulative, evolutionary way" toward "ever-increasing complexity and specificity." *Id.* at 92. See also Dworkin, *supra* note 69; Bork, *supra* note 69.

¹⁴⁷ Paul H. Rubin, *Why Is the Common Law Efficient?* 6 *J. Legal Stud.* 51 (1977); George L. Priest, *The Common Law Process and the Selection of Efficient Rules*, 6 *J. Legal Stud.* 65 (1977). Rubin and Priest are part of the tradition that views law as an open system that grows and changes in response to the social environment, see also Harry H. Wellington, *The Nature of Judicial Review*, 91 *Yale L. J.* 486 (1982); Henry M. Hart, Jr., & Albert Sacks, *The Legal Process: Basic Problems in the Making and Application of Law* (tent. ed. 1958) (unpublished teaching materials); Frederick Charles von Savigny, *The Vocation of our Age for Legislation and Jurisprudence* (A. Hayward trans. 1831) (law as expression of *Volksgeist*). The distinctive feature of Rubin and Priest's evolutionary theories of the common law is the hypothesis that settlement decisions by litigants are the source of the selection which shapes the law. Rubin and Priest interpret their theories as explaining why the common law would tend toward economic efficiency. The emphasis on efficiency is based on the assumption that other features of the social environment that might affect the litigation-settlement ratio are random, see Priest, *supra*, at 67-68. If that assumption is incorrect, and there are any values in addition to wealth that systematically affect settlement decisions, then by parity of reasoning, those values should also be reflected in the law. For example, the American Civil Liberties Union might influence the law by systematically relitigating issues which are contrary to its view of the First Amendment.

shifted from individual judge to legal system. Acting alone, no judge makes law; law is a function of legal systems, in which judges communicate and are influenced by one another.¹⁴⁸ The interesting issue is not why an individual judge decides as he does, but why others follow. Internal and external selection take place at the level of patterns of decisions within a legal system. When other judges follow a decision because it is consistent with the structure of ideas that already exists within the law—with legal logic—*internal* selection is at work. When instead a decision is followed because it is in harmony with patterns in the environment outside the legal system—with the felt necessities of the time and culture—then *external* selection is at work.

What occupies most of Holmes's attention in "Law in Science and Science in Law" is a struggle to define the proper relationship between these two different evolutionary processes. Gone are the confident assertions of the Holmes of *The Common Law* that experience, not logic, is the life of the law.¹⁴⁹ Instead, as Holmes surveys the history of the common law in "Law in Science and Science in Law," everywhere he looks Holmes sees survivals, by which the past "govern[s] the present in spite of ourselves,"¹⁵⁰ and "unreal formulas and inadequate generalizations" which "dodge difficulty and responsibility with a rhetorical phrase."¹⁵¹ What bothers Holmes in "Law in Science and Science in Law" is the prospect that legalistic logic may choke off experience and the ability of the common law to adapt.¹⁵²

By the time that he wrote "Law in Science and Science in Law," Holmes saw that ideally the common law's logic and experience should not be antagonistic, but complementary. Today's logic of the common law embodies yesterday's experience.¹⁵³ When common-law judges search for a solution compatible with the community's goals and values, they are guided by existing legal doctrines which represent, to a degree at least, the community's ideals as distilled from past experience. On the other hand, if the law is to remain alive, experience must act as a continu-

¹⁴⁸ See Paul D. Carrington, *Adjudication as a Private Good: A Comment*, 8 J. Legal Stud. 303, 313 (1979). See also Deutsch, *supra* note 37; Martin Shapiro, *Decentralized Decision-Making in the Law of Torts*, in *Political Decision-Making* 44, 44-45 (Sidney Ulmer ed. 1970).

¹⁴⁹ See text at notes 114-21, *supra*.

¹⁵⁰ Holmes, *supra* note 1, at 452.

¹⁵¹ *Id.* at 455-56.

¹⁵² Holmes does not delve into why internal selection tends to dominate, except to blame the law schools for "teaching dogma," *id.* at 460.

¹⁵³ This is the import of Holmes's statement that the common law is a "great anthropological document" which we can study "to discover what ideals of society have been strong enough to reach that final form of expression." *Id.* at 444.

ing check on yesterday's logic, adapting it when it is out of phase with the community's values or has become outdated.¹⁵⁴

The relationship which Holmes posits between internal and external selection—the common law's logic and experience—takes his description of the common-law process in "Law in Science and Science in Law" beyond a simple analogy to biological evolution. Rather, by describing a two-part evolutionary structure in which internal and external selection are linked together, Holmes was groping toward theories of cybernetic feedback and "organizational intelligence" which were only invented two generations later.¹⁵⁵

Holmes's common law is a system of artificial intelligence as surely as any computer program.¹⁵⁶ The key feature that gives the common law the ability to learn about the environment is cybernetic feedback: legal logic generates first approximations, which have a better than random chance of being tolerable to the community because they are based on analogies to solutions accepted in the past; external experience then operates to modify those results which the community cannot accept, thereby transforming the law for the future.¹⁵⁷ In much the same way, an artificial

¹⁵⁴ The relationship between "logic" and "experience" outlined in the text is an instance of the general process by which organizations adapt internal selection systems which are proxies for external selection by the environment, see Campbell, *supra* note 33 at 33: "Another type of internal selection criterion occurs when processes of evolution build in internal selective criteria which are vicarious representatives of external selectors. Thus the nutritiousness of foods represents an external criterion of direct survival relevance. It is represented in us by approximately appropriate internal selective criteria of taste buds and associated pleasure and pain mechanisms The adaptive appropriateness of these vicarious criteria are to past ecologies, and if the environment has markedly changed, the vicarious selective system may operate in ways irrelevant to current adaptiveness." See also Herbert A. Simon, *Administrative Behavior: A Study of Decision-making Processes in Administrative Organization* 100–101 (3d ed. 1976).

¹⁵⁵ See, for example, Charles E. Lindblom, *The Intelligence of Democracy: Decisionmaking Through Mutual Adjustment* (1965); Karl W. Deutsch, *The Nerves of Government: Models of Political Communication and Control* (1963). See also Alfonso Shimbel, *Collective Intelligence*, 20 *General Sys.: Y.B. Soc. General Sys. Research* 205 (1975). The application of theories of organizational intelligence to law is still in its infancy, see Shapiro, *supra* note 148; Shapiro, *supra* note 40; Martin Shapiro, *Stability and Change in Judicial Decision-Making: Incrementalism or Stare Decisis?* 2 *Law in Transition Q.* 134 (1965).

¹⁵⁶ See generally *Artificial Intelligence: An Introductory Course* (A. Bundy ed. 1978). There have been several attempts in recent years to apply the artificial intelligence literature to legal scholarship, Bruce G. Buchanan & Thomas E. Headrick, *Some Speculation about Artificial Intelligence and Legal Reasoning*, 23 *Stan. L. Rev.* 40 (1970); L. Thorne McCarty, *Reflections on Taxman: An Experiment in Artificial Intelligence and Legal Reasoning*, 90 *Harv. L. Rev.* 837 (1977). Unlike prior work, which attempts to use artificial intelligence principles to simulate the reasoning process of an individual lawyer, the text of the present article is meant to suggest that a more productive use of artificial intelligence concepts can be made in understanding the operation of legal systems.

¹⁵⁷ Compare Arthur Linton Corbin, *Principles of Law and Their Evolution*, 64 *Yale L. J.*

intelligence program learns about the environment, uses that information to guide searches, and then uses the results of those searches to improve its internal model of the environment.¹⁵⁸ Had Holmes cared less for the felicity of a phrase, he could have written: "The life of the law is the cybernetic process by which experience modifies the available logic set."

What makes it possible for a system to learn about the environment is the relationship between internal and external selection. For the common law to adapt to a changing environment, external selection must be able to correct the results generated by the internal selection system.¹⁵⁹ Here is where Holmes's account of the common law runs into trouble. At least in the works of his middle age, such as "Law in Science and Science in Law" Holmes is unwilling to subordinate legal logic to judicial views of what experience teaches. For the Holmes of "Law in Science and Science in Law," the common-law judge is not a legislator. The legislature is "at perfect liberty to abolish" the requirement of consideration for a contract "if it thinks it wise to do so."¹⁶⁰ The judge is not. Holmes maintains in "Law in Science and Science in Law" that judges must follow established doctrine, even if it appears outdated or unwise:

I do not think it desirable that the judges should undertake to renovate the law. That is not their province. . . . But I think that it is most important to remember whenever a doubtful case arises, with certain analogies on one side and other

161, 162 (1954) ("although no two cases are ever exactly alike, . . . by careful and imaginative analysis and comparison . . . it is possible to construct general rules, doctrines, principles, which are of great value in directing and predicting future human and judicial action . . . [as] tentative working rules, . . .") with Eugene V. Rostow, *American Legal Realism and the Sense of the Profession*, 34 *Rocky Mt. L. Rev.* 123, 141-42 (1962) (describing law as a "continuing process" in which judges collectively "back and fill, zig and zag, groping . . . for a line of thought which will in the end satisfy their standards of craft and their vision of the policy of the community . . ."). See also Bruce A. Ackerman, *The Structure of Subchapter C: An Anthropological Comment*, 87 *Yale L. J.* 436, 444-45 (1977) (suggesting a similar process of first borrowing "existing tools" and then "adaptation" in the evolution of statutes).

¹⁵⁸ See Marvin Minsky, *Steps toward Artificial Intelligence in Computers and Thought* 407, 425-26 (Edward A. Feigenbaum & Julian Feldman eds. 1963). See also Allen Newell, *Artificial Intelligence and the Concept of Mind in Computer Models of Thought and Language* (Roger C. Schank & Kenneth Mark Colby eds. 1973). It has been argued that human beings use analogous rules of thumb in making certain decisions, see Amos Tversky & Daniel Kahneman, *Judgment under Uncertainty: Heuristics and Biases*, 185 *Science* 1124 (1974).

¹⁵⁹ Herbert Simon has called the necessary relationship between internal and external selection "nested hierarchy," and identifies this structure as characteristic of both evolution and learning, Herbert A. Simon, *The Architecture of Complexity*, 106 *Proc. Am. Phil. Soc.* 467 (1962), reprinted in Herbert A. Simon, *The Sciences of the Artificial* 84, 94-98 (1969). See also B. F. Skinner, *Selection by Consequences*, 213 *Science* 501 (1981).

¹⁶⁰ Holmes, *supra* note 1, at 444.

analogies on the other, that what really is before us is a conflict between two social desires. . . . The social question is which desire is strongest at the point of conflict. *The judicial one may be narrower, because one or the other desire may have been expressed in previous decisions to such an extent that logic requires us to assume it preponderate in the one before us.* [Emphasis added.]¹⁶¹

It would not solve Holmes's problem to return to *The Common Law* and the judge as legislator. Judges must be willing to follow established legal doctrine if the system is to be wiser than the individuals who constitute it.¹⁶² On the other hand, the law cannot adapt unless judges are also free to modify logic in the light of experience. Thus, Holmes faces a true dilemma. Judges have inconsistent roles in a common-law system. They must bring to bear the accumulated wisdom of the past; however, they must also serve as the portals through which "experience" enters the law so that it can keep pace with a changing world.¹⁶³

It is not necessarily impossible for judges to perform both functions, but Holmes cannot give an explanation that is compatible with the rest of his theory for when judges are to follow logic and when experience.¹⁶⁴ The best he can do is to suggest that judges may disregard precedent if they can find very good historical reasons for doing so.¹⁶⁵ On the other hand, no special effort is required to enforce a "survival."¹⁶⁶

¹⁶¹ *Id.* at 460–61.

¹⁶² Text at notes 134–35, *supra*. Paul Carrington has made much the same point: "A legal system that is not able to assure the accountability of officials for their fidelity to law is one that allows little opportunity for truly effective judicial lawmaking When every judge seeks in every case to emulate the creative career of Learned Hand there can be no Learned Hands, because little that any of them write can be expected to control the behavior and decisions of other judges in the future who claim equal wisdom and equal right to the creative role." Paul D. Carrington, *Ceremony and Realism: Demise of Appellate Procedure*, 60 A.B.A.J. 860, 862 (1980).

¹⁶³ It is not self-evident that the common law *should* change with the times in all areas, see Epstein, *supra* note 116. Compare Holmes, *supra* note 1, at 460 (" . . . because I believe that the claim to our especial code to respect is simply that it exists, that it is the one to which we have become accustomed . . . I am slow to consent to overruling a precedent . . .").

¹⁶⁴ To reject established law, one needs a "criterion" by which to measure "judicial mistake," see Wellington, *supra* note 147, at 514. This is a difficult concept, if not a contradiction in terms, for a positivist who believes, with Holmes, that law is "The prophecies of what the courts will do in fact and nothing more pretentious . . ." Holmes, *supra* note 55, at 461.

¹⁶⁵ Holmes, *supra* note 1, at 452, 454.

¹⁶⁶ If other things were equal, the comparative ease of enforcing survivals could be expected to bias the law toward rigidity, compare Jerry L. Mashaw, *How Much of What Quality? A Comment on Conscientious Procedural Design*, 65 Cornell L. Rev. 823, 833–34 (1980) (availability of appeal to correct errors in one direction but not the other tends to "skew" results).

IV

Since Holmes wrote "Law in Science and Science in Law," the common law has gradually been supplanted in many areas by more complex lawmaking systems in which courts, agencies, and legislatures make law jointly. Unlike the common law, these composite lawmaking systems are characterized by elaborate hierarchies of institutional roles (reflected in bodies of "meta-law" such as principles of statutory construction and administrative law). The multiple levels of internal and external selection in a composite lawmaking system give it the capability, in theory, to store more information about the environment and to engage in more subtle forms of exploratory behavior.

No single reason adequately explains a change in lawmaking institutions of this magnitude. Perhaps its significance can at least be symbolized by juxtaposing Holmes's 1880 pronouncement, "the life of the law has not been logic: it has been experience,"¹⁶⁷ with James Landis's from 1934: the common law "feeds too much upon itself."¹⁶⁸

¹⁶⁷ Holmes, *supra* note 6, at 5.

¹⁶⁸ Landis, *supra* note 124, at 213.