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### ARTÍCULOS

## The growth of meaning and the limits of formalism: in science, in law<sup>1</sup>

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### Abstract

A natural language is an organic living thing; and meanings change as words take on new, and shed old, connotations. Recent (post-Fregean) philosophy of language has paid little attention to the growth of meaning; radical philosophers like Feyerabend and Rorty have suggested that meaning-change undermines the pretensions of science to be a rational enterprise. Thinkers in the classical pragmatist tradition, however -Peirce in philosophy of science and, more implicitly, Holmes in legal theory- both recognized the significance of growth of meaning, and understood how it can contribute to the progress of science and to the adaptation of a legal system to changing circumstances. This paper develops these insights, and illustrates them by reference to (1) the growth of meaning of "DNA" from the identification of "nuclein" to the discovery of mtDNA almost a century later, and (2) the growth of meaning of "the establishment of religion" in the First Amendment to the U.S. Constitution from its ratification in 1791 to the present day. Arguing that the growth of meaning can indeed contribute to rationality, it also shows why narrowly formal models are inadequate both to science and to law.

**KEY WORDS:** Meaning; Logic; C. S. Peirce; Oliver Wendell Holmes; Science; Law.

### Resumen

Un lenguaje natural es una cosa viviente orgánica, y los significados cambian a medida que las palabras adquieren nuevas connotaciones y abandonan viejas. La filosofía del lenguaje reciente (post-fregeana) ha prestado poca atención al crecimiento del significado; filósofos radicales, como Feyerabend y Rorty han sugerido que el cambio de significado socava las pretensiones de la ciencia de ser una empresa racional. Pensadores en la tradición del pragmatismo clásico, sin embargo -Peirce en filosofía de la ciencia y, más implícitamente, Holmes en teoría legal- ambos reconocieron la importancia del crecimiento del significado, y entendieron cómo puede contribuir al progreso de la ciencia y a la adaptación de un sistema legal a circunstancias cambiantes. Este artículo desarrolla estas ideas, e ilustra con referencias a (1) el crecimiento del significado de "DNA" desde la identificación de "nucleína" hasta el descubrimiento de mtDNA casi un siglo después, y (2) el crecimiento del significado de "el establecimiento de la religión" en el Primer Enmienda a la Constitución de los Estados Unidos desde su ratificación en 1791 hasta el presente día. Argumentando que el crecimiento del significado puede contribuir a la racionalidad, también muestra por qué modelos estrechamente formales son inadecuados tanto para la ciencia como para el derecho.

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pretensiones de la ciencia de ser una empresa racional. Pensadores en la tradición pragmatista clásica, la filosofía de la ciencia y, más implícitamente, Holmes en la teoría del Derecho- reconocieron la importancia del significado y comprendieron cómo éste puede contribuir al progreso de la ciencia y a la adaptabilidad jurídico a las circunstancias cambiantes. Este trabajo desarrolla estas ideas, y las ilustra por medio del desarrollo del significado de "ADN" desde la identificación de la "nucleína" hasta el descubrimiento de un siglo más tarde, y (2) el desarrollo del significado de "el establecimiento de una religión" en la Primera Constitución de los Estados Unidos desde su ratificación en 1791 hasta la actualidad. Argumentando que el significado puede contribuir mucho a la racionalidad, también muestra por qué los modelos estrechos e inadecuados, tanto para la ciencia como para el Derecho.

**PALABRAS CLAVE:** Significado; Lógica; C. S. Peirce; Oliver Wendell Holmes; Ciencia; Derecho.

## 1. The Life of Language

A natural language is an organic, living thing.<sup>2</sup> Over the long haul a language may, like several different, new languages, and eventually fall into desuetude and die.<sup>3</sup> And all slowly -and sometimes not so slowly- shift, change, and adapt: borrowing words from and from the specialized jargon of scientists, soldiers, sailors, lawyers, bureaucrats, and live metaphors to new purposes or domesticating them as comfortable clichés; sports buzzwords, slang, and catchphrases.

Modern English is replete with now-dead sailing metaphors, like "taken aback" (disoriented), "three sheets to the wind" (reeling drunk), "not enough room to swing a cat" (crammed), "scuttlebutt" (gossip);<sup>4</sup> it has borrowed a clutch of its scientific words, from "alkali" (Arabic); and has inherited words like "pajamas" and "curry"<sup>5</sup> as a legacy of the era of imperialism. Of late, it seems to have become acceptable to use "hopefully" not only to modify a verb but the German "*hoffentlich*," to modify an entire sentence; and trade names like "Xerox" have become verbs in almost everyone's vocabulary. In American English, over just a few years (the name of the building at the center of the Nixon-era political scandal) gave birth to the Watergate scandal over the White House travel office), "Hillarygate" (the scandal over Hillary Clinton's alleged coup), and "zippergate" (the scandal over President Clinton and Monica Lewinsky). And every year or so, it seems, I stumble on intriguing changes of meaning in some words of philosophical interest. A few years ago I learned that in eighteenth century English "busy" meant simply a busy person; that by the late nineteenth century it had come to mean someone who meddles officiously in other people's business; and that it only relatively recently acquired its current connotation of someone who goes by expediency rather than principle.<sup>6</sup> I also learned that "integrity" derives from the Latin "*in*" and "*tangere*," meaning the untouchable or pure; and that in English this word once connoted -as I am told its closest equivalent in Portuguese and, though by now only with respect to the Virgin Mary, in Spanish- virtue. My present topic, the growth of meaning -by which I mean not only words' acquiring new meanings but also words' losing older connotations, as well as the coining of new terms or co-opting old terms to express new concepts and distinctions- is just one aspect of this much larger, enormous phenomenon of the evolution and development of languages.

So far as I am aware at least, this topic hasn't attracted much attention in recent philosophy, though Donald Davidson came close to it when he strayed from the relatively well-trodden path of natural languages into the outlaw realm of metaphors, puns, and malapropisms. This eventually led him to announce that he had abandoned, not only the Tarskian regimentation of language but also "the ordinary notion of a language" and "the boundary between knowing a

knowing our way around the world generally"; and to conclude that "there is no such language, not if a language is anything like what many philosophers have supposed. rigorous but rigid formal languages on which Alfred Tarski focused, natural language rich and flexible -capable of their own kind of precision, different from but no less valid than mathematical precision, but shifting, diffuse, and sometimes elusive. And since there are many languages, the "ordinary notion of a language" taken for granted by those "many philosophers" Davidson alludes to was hopelessly Procrustean.

Previously, the growth of meaning had drawn some attention from philosophers concerned with the rationale for the methods of linguistic philosophy. In "A Plea for Excuses" J. L. Austin [c]ertainly ... ordinary language is not the last word" on philosophical questions, "it is not because "our common stock of words embodies all the distinctions men have found worth marking, in the lifetimes of many generations" but because "our common stock of words embodies all the distinctions men have found worth marking, in the lifetimes of many generations" in his introduction to *Individuals*, Peter Strawson argued that though "[u]p to a point, reliance on ordinary language is the best, and indeed the only true way in to philosophy" but "in metaphysics "the structure we seek ... lies submerged"; and, while he allowed that "change," he also insisted there is "a massive central core of human thinking which has remained constant." Strawson focuses on those core concepts he takes to be unchanging; and Austin does not. The *next* word might be, after we have consulted the wisdom of earlier generations embodied in ordinary language. Nor do more recent analytic philosophers seem to have taken much interest in this. Reading in the literature on the "Gettier paradoxes," however, I found William Rozecki (whatever folk wisdom may be implicit in it) ordinary language is simply not built for philosophical theoretical work, and that "we will have to go beyond its "simplistic presuppositions and uncritical categories."<sup>10</sup> Few seem to have paid attention.<sup>11</sup>

More recently, it seems to have been mostly radicals like Paul Feyerabend, who seen the "meaning-variance" of theoretical terms undermines the purported rationality of science. Richard Rorty, who looked forward to a literary or "poetic" post-Philosophical culture, and a project of representing the world accurately, and aspires only to devise ever-new "representations" have paid attention to meaning change.

I think the growth of meaning is much more significant than the recent philosophical literature acknowledges; but so far from being, as the radicals suppose, invariably a hindrance to rationality, it contributes to the cognitive flexibility that rationality demands. So I am, as usual, disagreeing with current fashion -but, as so often, quite close to some elements of the classical philosophy. For conceptual shifts and changes are a significant theme both in C. S. Peirce's philosophy and, albeit more implicitly, in Oliver Wendell Holmes's legal theory. Moreover, neither sees conceptual shifts and changes as any threat to rationality; on the contrary, Peirce sees the growth of scientific concepts as essential to scientific inquiry, and Holmes sees the growth of legal concepts as part of the process by which the common law has advanced beyond its beginnings.

Writing in the late 1860s that as our knowledge grows, scientific concepts acquire new meanings, older connotations, the young Peirce observes that "[s]cience is continually gaining new meanings." "How much more the word *electricity* means now than it did in the days of Franklin, and how much more the term *planet* means now than it did in the time [of] Hipparchus. The growth of scientific information." "[M]en and words," he concludes, "reciprocally educate each other." twenty years later he returns to the theme, now writing not of natural-scientific but

[s]ymbols grow... A symbol, once in being, spreads among the peoples. In use and its meaning grows. ... Such words as *force, law, wealth, marriage*, bear for us a very different meaning than they bore to our barbarous ancestors."<sup>15</sup>

In Peirce, stress on the growth of meaning is closely connected with the Pragmatic Maxim, articulated as early as 1878, in "How to Make Our Ideas Clear"<sup>16</sup> (though he was not using the word "pragmatism" in print, fearing that its new, philosophical sense would be confused with its ordinary meaning, "officious meddling").<sup>17</sup> The Pragmatic Maxim ties pragmatic meaning - according to Peirce, the third and highest grade of clearness - to the experiential consequences of a concept. In his later, more realist formulation, the Pragmatic Maxim says in effect that the meaning of a word is given by a list of subjunctive conditionals, along the lines of "if you were to do A<sub>1</sub>, experiential consequence E<sub>1</sub> would result," "if you were to do A<sub>2</sub>, experiential consequence E<sub>2</sub> would result," and so on. I say, "and so on," because it is clear that Peirce intends the list to be open-ended, to change as our knowledge grows, as "men and words reciprocally educate each other." The Pragmatic Maxim had two purposes - one critical, the other constructive: to show that the disputes in traditional or as Peirce says, "ontological" metaphysics are (pragmatically) meaningless and to explain the (pragmatic) meaning of "hard" or "intellectual" concepts generally. Peirce uses the Pragmatic Maxim when he argues that the dispute between Catholics and Protestants over transubstantiation is pragmatically meaningless, and when he explains such philosophical concepts as truth and reality.<sup>19</sup> Most relevant to my purpose here, in a striking passage of 1902 he applies the Pragmatic Maxim to "lithium" (the chemical element first identified in 1818): "if you search among minerals that are very hard, brittle, and insoluble, for one which imparts a crimson tinge to a flame, this mineral being triturated [*sic*] with lime or witherite rats-bane, and then filtered and dissolved in muriatic acid, ...,"<sup>20</sup> etc., etc. - his list of conditionals goes on for most of the page. (By now, the list would be even longer, as lithium has been found to have many other properties useful in industry, medicine, etc.)<sup>21</sup>

But my argument here will depend, not on the viability of the Pragmatic Maxim, but on the distinction between having a merely verbal understanding of a scientific concept and having a knowledgeable grasp of what it involves, to which Peirce's distinction of three grades of meaning is relevant. And my argument will not be completely general, but will focus specifically on the vocabularies of science and of the law. Both scientific and legal concepts grow, though in different ways and for rather different reasons; and this partly explains why exclusively formalist approaches in philosophy of science and philosophy of law are inadequate. So far from being an aspiration of the sciences to find out something of how the world is, however, the growth of meaning can contribute to progress towards this goal; and, so far from revealing that legal decisions are arbitrary and capricious, the growth of meaning can help the law adapt in a rational way to changing social circumstances.

## 2. The Growth of Meaning and the Progress of Science

"Rational" and its cognates are slippery and ambiguous, to say the least;<sup>22</sup> so I should not talk of "the rationality of science" as if it were meant to suggest that there is a special Scientific mode (or modes) of inference or procedure (or procedures) of inquiry used by all scientists, and explaining the successes of the sciences. Rather - over centuries of work

array of constantly evolving instruments of observation, techniques of experimental metaphors, mathematical and statistical procedures, computer programs, etc., etc. - gradually refined and amplified the underlying methods, procedures, and modes of all serious empirical inquirers rely. Nor is my talk of the rationality of science meant every step, science always or inevitably advances. The progress of science is ragged and as a whole, or this or that part of science, may advance astonishingly quickly, or more glacially slowly, or stagnate, or even regress. Science is a human enterprise and, like all enterprises, thoroughly imperfect. Nevertheless, it is a rational enterprise insofar as (some of) the truth about the world and, at its best, goes about that task in such a way that sometimes does, succeed.

For much of the mid- to late-twentieth century, many in mainstream philosophy of science have taken for granted that what makes science rational must be explicable exclusively in logical, i.e., formal, syntactically characterizable, terms. The many and various deductive, confirmationist, probabilist, Bayesian, decision-theoretical, etc., etc., philosophies of science testify to the power of this idea; as does the fact that critics who, seeing that these logicians promptly jumped to the conclusion that science is *not* really a rational enterprise, but an intellectual confidence trick. Nevertheless, the idea was mistaken. Elsewhere, I have written at length;<sup>23</sup> here, I will simply note that Nelson Goodman's "grue" paradox<sup>24</sup> already points unmistakably to this conclusion. "All emeralds are green" has exactly the same *form* as "All grues are grue"; so if the first is supported<sup>25</sup> by our evidence thus far, but the second is not, the difference must lie in the *content* of the two claims. Carl Hempel recognized this as well when he wrote in his "Postscript on Confirmation" that "the search for purely syntactical confirmation presupposes that the hypotheses in question are formulated in terms of projectible predicates; and *such terms cannot be singled out by syntactical means alone.*"<sup>26</sup>

Though Goodman's paradox points to a true and important conclusion, his own projectibility only predicates currently entrenched in the scientific vocabulary are projectible, without revealing the profound conceptual conservatism on the sciences. And this, I believe, leads in exactly the opposite direction. Degree of supportiveness of evidence depends on increment of explanatory integration. Briefly and roughly, whether and to what degree evidence supports a claim depends on how much the addition of the evidence to the claim improves the explanatory integrity of the account -or, more roughly yet, on how well the claim and the evidence fit together in an explanation. And explanation is not a purely logical concept. The covering-law model of explanation is useful but it oversimplified a genuine insight: that explanation is always, overtly or covertly, dependent on a vocabulary of real kinds and laws; and so it requires carving things into real kinds, and a vocabulary that corresponds to those kinds.<sup>28</sup>

This vocabulary-dependence is one reason why science cannot be understood in exclusively logical terms -not that logic has no role, but it is at most part of the story.<sup>29</sup> It also shows why scientists constantly shift and adjust the language of their field, introducing new terminology and subtly adapting the meaning of older terms: they are working towards a vocabulary that corresponds with the real kinds of thing or stuff.<sup>30</sup> (Of course, these efforts may be more, or less, successful. In the progress of science generally, the development of good scientific terminology is a rational process.)

Some examples from the history of cellular biology illustrate the point. The word "protein" - a complex combination of amino acids containing carbon, hydrogen, nitrogen, oxygen and sometimes other elements, derives from the Greek "*protos*," meaning "first"; and entered the scientific vocabulary around 1844. As etymology suggests, proteins were long assumed to be of great biological importance.

In 1869 Friedrich Miescher discovered a hitherto-unknown substance, not a protein, in the nuclei of cells; he called it "nuclein." (He thought its chief function was to store phosphorus.) In 1889 Altmann purified nuclein of proteins, and suggested a new name for this newly-purified substance: "nucleic acid"<sup>31</sup> - presumably because it was found in the nucleus and, because of the many phosphate groups it contained, was acidic. The idea that nucleic acid was somehow involved in heredity was not widely accepted until the late nineteenth century, when Miescher found that the sperm of salmon, Albert Kossel found in herring, and Albert P. Mathews that the sperm of sea urchins all contained a salt of "nucleic acid." This "nucleic" or "nucleinic acid" was the stuff we now know as "DNA."

In 1922 Hermann Staudinger proposed the concept of a macromolecule, a very long chain of atoms held together by bivalent bonds and compactly folded in the cell. This new concept was widely accepted when Staudinger presented it at a conference of the Zurich Chemical Society, several years later. Some members of the audience tried to persuade him it was a really bad idea - until by the time he was so frustrated that he was reduced to bellowing, "*Hier stehe ich, ich kann nicht anders*." Eventually, however, the concept was found to be indispensable; and now, of course, we know that DNA is a molecule of this type.

The "deoxyribo" part of what we now call "deoxyribonucleic acid" or "DNA" indicates that it does not contain ribose sugars ("ribo"), but with one of the hydroxyl groups replaced by a hydrogen atom. For a while, this stuff was also called "deoxypentose nucleic acid" - the term Maurice Wilkins and James Watson used in the paper of theirs published in *Nature* in 1953 alongside James Watson's and Francis Crick's famous paper.<sup>34</sup> The abbreviation "DNA" dates from 1944;<sup>35</sup> since then, scientists have used "DNA" to distinguish A-DNA, B-DNA (the less ordered, paracrystalline form, with a higher water content), and Z-DNA (in which the helices have a lefthanded twist).<sup>36</sup>

After the discovery of the structure of DNA, what had formerly been called "pentose nucleic acid" became known as "ribonucleic acid" or "RNA": introduced in 1948, the term refers to nucleic acids containing ribose and uracil as structural components, and associated with transcription and translation activities. Earlier, scientists had called DNA "true nucleic acid," and RNA "pseudo-nucleic acid." RNA was known to be found in the cytoplasm, while nucleic acid, as the name suggests, was thought to be in the nucleus only.

"Ribosome," referring to the RNA-rich cytoplasmic granules that are sites of protein synthesis, was introduced around 1958; "messenger RNA," for an RNA that carries the code for a particular protein from the nuclear DNA to a ribosome and acts as a template for the formation of that protein, was introduced in 1958; "transfer RNA" for a relatively small RNA that transfers a particular amino acid to a growing polypeptide chain were introduced in 1961.

In the 1960s scientists showed that mitochondria<sup>37</sup> - organelles in the cell that convert food molecules to the fuel that drives it, now known to have had their origin as bacteria - contain their own DNA, "mitochondrial DNA," or "mtDNA." Until 1962, attention focused on the mtDNA of plants and organisms like yeast; between 1963 and 1968, animal mtDNA was discovered. By 1981 scientists were able to identify genes on mtDNA, and to understand the processes of replication and transcription, etc.<sup>38</sup> (And by now, if you Google "mitochondrial DNA," you will find

the use of mtDNA identification techniques in physical anthropology, genealogical science, and so forth.)

This history, abbreviated as it is, suggests something of the processes by which science readjust their terminology and shift and adapt the meanings of existing words to what that better represents real kinds of stuff. The word "protein" has lost any suggestion of importance; it has ceased to be analytic that nucleic acids are found exclusively in the old word "nuclein" has eventually been replaced, in several steps, by "DNA"; and "DNA" has acquired new, complex connotations, and produced new, elaborate terminological baggage. The dictionary definition of "DNA" confirms that, by a kind of sedimentation of knowledge and meaning, this term has indeed "acquired information," as Peirce puts it, "in use and

**DNA** ... (deoxyribonucleic acid): any of various nucleic acids that are localized esp. in cell nuclei as the basis of heredity in many organisms, and are constructed of a double helix, held together by hydrogen bonds between purine and pyrimidine bases, which project inward from two chains containing alternating deoxyribose and phosphate.<sup>39</sup>

Some might object that this conflates the meaning of "DNA" with what is known about it and take it at face value as simply giving the meaning of the term is to misrepresent important discoveries -that DNA is the genetic material, that it has this doublehelical structure, etc. as analytic truths. Of course I don't deny that these were major biological discoveries; but when they were made, it was not part of the meaning of "DNA" that it is the genetic material, that it has a double helix, etc. Nevertheless, the objection misfires. For my thesis is in part that reality as we know it grows, and that growth of meaning can aid the growth of knowledge; and that the supposed distinction between "the meaning of 'X'" and "our presumed knowledge of X" is an artificial one, and that "analytic" is best understood as elliptical for "analytic given the current state of knowledge *at time t*."<sup>40</sup> (This last thought should not be shocking: "a simple truth is silly" is an analytic truth in modern English; but it was analytic in Shakespeare's day, when "silly" meant "truth" -as in "soothsayer" - meant "truth.")

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It is a familiar fact that mastery of a language comes in degrees. Some people are bilingual in two or several languages; some have a reading knowledge of a language that they can understand but cannot speak well; many might be best described as able to "get by" in a language that is not their own. A few people are masters of their native language; more have some dexterity, agility, flexibility, and rhythm; and some are only barely articulate, or not even that. -from cellular biologists and string theorists to cooks and composers, map-makers and gardeners and grammarians, etc., etc.- have a deeper understanding of the relevant vocabularies of the language than the rest of us either have or need. In every language, there is a complex combination of core vocabulary familiar to virtually every competent speaker, and a more complex combination of specialized vocabulary well-understood by practitioners of this or that trade or art or field of science. Some vocabularies are understood less fully but up to a point by some outsiders, and perhaps entirely opaque to non-speakers. Not everyone who uses the term "DNA" -not even everyone who uses it for everyday purposes- knows even that small part of the scientific story built into Webster's definition. Of course many lay people at best half-understand the term.

Peirce's three grades of clarity can be seen as located along a continuum of degrees of understanding: from being able to use a word more or less correctly (the first grade)

able to give a verbal definition (the second grade), to being able to work with the terminology in inquiry, to employ them deftly and adapt them as needed (the third grade). So the idea of "division of linguistic labor"<sup>41</sup> has a significant place in the picture I am sketching. Putnam, however, I think of this division of labor gradually, because understanding comes in degrees; and dynamically, because both specialists' and lay people's understanding of scientific (etc.) terminology changes over time. And in other respects my picture is different from Putnam's.

Shifts and changes in the vocabulary of the natural sciences contribute to progress when they fit closer with the real kinds of thing or stuff in the world. Reference certainly matters, but the theme is that the meanings of scientific terms grow and shift with the growth of knowledge. We presuppose that they *have* meanings; and so, obviously, resist the assimilation of kind terms to designators. This doesn't mean, however, that I think of kind terms as disguised definite descriptions. Rather, I see them as first and foremost common nouns. Neither an assimilation of kind terms to designators nor an assimilation to definite descriptions meshes well with the historical record. Nor, though I accept a kind of realism about kinds, do I assume that every general term corresponds to a real kind in the world; *which* kinds are real is something to be discovered, not something that can simply be read off our (or scientists') current vocabulary. Now, I am being metaphysical; just when it is time to turn, as advertised, to my second topic: the growth of the language of the law.

### 3. The Growth of Meaning and the Adaptation of Legal Systems

A legal system is not, as a scientific discipline is, primarily engaged in inquiry into the nature of the world;<sup>42</sup> its core business is finding ways to settle the disputes that inevitably arise between individuals and communities. Rather than growing, like scientific concepts, as part of a process of discovery that correspond to real kinds of thing and stuff in the world, legal categories shift and adapt to provide livable resolutions of disputes in ever-changing social circumstances. And Holmes's reflections on the growth of meaning in the law are much less explicit than Peirce's reflections on the growth of scientific concepts. Nevertheless, the ideas Holmes articulates in *The Common Law* and "Of the Law of the Law" are undeniably apropos.

At the very beginning of *The Common Law*, Holmes explains that to accomplish his purpose of providing a general view of the Common Law, "other tools are needed besides logic." "There has not been logic; it has been experience," he continues; "the felt necessities of the time, the moral and political theories, intuitions of public policy, avowed or unconscious, even those which judges share with their fellow-men," are much more relevant than the rules of logic. As the law evolves, "old form receives new content, and in time even the form modifies itself to fit the meaning it has received."<sup>43</sup>

Now we see how an idea that features prominently in the early pages of "The Path of the Law" fits my theme. "If you want to know the law and nothing else," Holmes writes, you should look to the courts. "If courts would decide were a question to come before them."<sup>44</sup> There is an obvious parallel to Peirce's Pragmatic Maxim;<sup>45</sup> and, by focusing attention on the law as partly constituted by judicial decisions, the prediction idea contributes to Holmes's understanding of the evolution of legal systems. A crucial point is that judges are not simply cranking out algorithms: all legal provisions are subject to interpretation, and will leave some room for interpretation; and no formal-logical apparatus, however powerful, can tell us how best to interpret or extrapolate these provisions and precedents so as to harmonize them with the

dispute that arise in new, unforeseen and perhaps unforeseeable circumstances. When courts have to decide whether the right to privacy guaranteed by the U.S. covers a public telephone booth<sup>48</sup> or a department-store dressing room,<sup>49</sup> or how rules governing formation of contracts are to be applied when agreements are made electronically,<sup>50</sup> copyright in an age of electronic filesharing,<sup>51</sup> etc., etc., they aren't simply figuring out the consequences of existing law; they are extrapolating its meaning. And as the legal system changes with changing circumstances, changing moral sensibilities, and changing understandings of our place in it, initially thin, schematic legal concepts take on new meaning and shed old connotations; in law, as in science, "men and words reciprocally educate each other." I guarantee, of course, that this gradual adaptation and evolution of legal concepts will inevitably be successful in its purpose, any more than there is that the gradual adaptation of scientific concepts will always or inevitably be successful in its, very different, purpose. The perspective taken here is very close to some ideas developed by Edward Levi in *Introduction to Legal Reasoning* -like Rozeboom's paper on the Gettier paradoxes, and also in a sometimes dispiriting field. "The law forum is the most explicit demonstration required for a moving classification system," Levi writes; "new situations arise [ and change. The categories used in the legal process must be left ambiguous ... to permit new ideas." He is quite clear, moreover, that while this means that legal decisions are not unchanging, nor formally derivable from legislation or precedent, it doesn't mean that they are arbitrary and capricious, either.<sup>52</sup>

Holmes illustrates how legal concepts shift and change, describing older conceptions of liability that could be held legally liable for an injury or death. At one time, an animal or even an inanimate object might be punished: *Exodus* prescribes that "if an ox gore a man or woman, that the ox shall surely be stoned..."; Plutarch tells us that "a dog that had bitten a man was to be hung up to a log four cubits long"; Plato's *Laws* provided that "[ i] f a slave killed a man, he was to be sold to the relatives of the deceased," while "if a beast killed a man it was to be slain and its skin to be cast out of the borders," and an inanimate thing that killed a man was also to be cast out; as late as the 17th century AD some courts "still sat in judgment on inanimate things...". And even much later, an inanimate thing that caused injury or death would be legally forfeited: in the time of the Middle Ages, if a tree fell from a tree, the tree was deodand [ forfeited] . If a man drowned in a well, the well was forfeited, and a book from the reign of Henry VIII reports that when a man killed another with a book, the book was forfeited.<sup>53</sup> Closer to our time, Levi provides a splendid history of the evolving legal concept of an inherently dangerous object.<sup>54</sup> The legal concept of causation -which seems gradually to be accommodating not only lengthy casual chains, but also complex congeries of interacting factors, and even circumstances where defendants' actions made evidence of causation in the ordinary sense, unavailable- would also provide a good illustration.<sup>55</sup>

But here I will illustrate by sketching some highlights of the story of the Establishment Clause of the First Amendment to the U.S. Constitution, which provides that "Congress shall make no law respecting the establishment of religion." Devised for a new nation of which virtually all citizens were members of rival sects -and many of whom had come to America to escape religious persecution- the Establishment Clause was intended, at a minimum, to preclude the establishment of a national church, i.e., a church that would be an arm of the government as the Church of England was in England,<sup>56</sup> and had been in Virginia until shortly before the First Amendment was passed. Now, however, the question of the relation of church and state has become a many-

the meaning of the Establishment Clause has been stretched and adapted to cope with circumstances that arise in these new circumstances. ("Originalists" regard these adaptations as faithless to the original meaning that the Constitution means only what its framers specifically intended it to mean; Jefferson, we know, was far-sighted enough to anticipate that the Constitution would have to be amended to handle circumstances that would change in ways that could not be foreseen.)<sup>57</sup>

The first application of the Establishment Clause to the states came, long after its ratification. While in the very young nation of 1791 most children had been educated, so far as that education went, either by their families or in church schools, by 1947 a system of public schools had been in place for decades; and the dispute in *Everson* was over school buses. Mr. Everson challenged the constitutionality of a New Jersey statute that authorized reimbursing parents for their children's bus fares, regardless of whether the children attended a public or a parochial school; this violated the Establishment Clause, he argued, by forcing taxpayers to support schools teaching religion. Writing for the majority of the U.S. Supreme Court, Justice Black explained that the Establishment Clause "means at least this":

Neither a state nor the Federal Government can set up a church. Neither can pass laws which aid one religion, aid all religions, or prefer one religion over another. Neither can force or influence a person to go to or to stay away from church against his will or force him to profess belief or disbelief in any religion. No person can be punished for entertaining or professing religious beliefs, for church attendance or non-attendance. No tax in any amount, large or small, can be levied to support any religious activities or institutions...<sup>58</sup>

For a first case, this was extraordinarily difficult (and had the reimbursement gone to the children rather than the parents, the upshot might have been different). Ruling for the defendants, Justice Black argued that, since it simply extended state benefits to all citizens regardless of their religious beliefs, the New Jersey statute was constitutional; it was a close call, but this statute was on the right side of the line.<sup>59</sup>

Now, sixty years after *Everson*, the United States is significantly different from the United States of 1947, and over the intervening decades the phrase "the establishment of religion" has grown to encompass more and more. By now, the Establishment Clause has been taken to prohibit laws requiring public schools to begin each day with a Bible reading;<sup>60</sup> forbidding the teaching of religion in schools or universities;<sup>61</sup> providing for the reimbursement of non-public schools for transportation, etc., for secular purposes;<sup>62</sup> requiring that any public-school textbook that offers an account of the origin of man should say explicitly that it is a theory, not a fact;<sup>63</sup> putting a copy of the Ten Commandments on the wall of a public-school classroom;<sup>64</sup> mandating equal time in biology classes for evolution and creation science;<sup>65</sup> allowing schools and churches to sell liquor, whether liquor licences should be granted to businesses within 50 yards of their premises;<sup>66</sup> a statute to mandate a minute of silence for "meditation or prayer" in the public-school classroom;<sup>67</sup> the teaching of evolution in public schools unless creation science is also taught;<sup>68</sup> the placement of a crèche surrounded by potted poinsettias on the staircase in a courthouse;<sup>69</sup> a resolution at a high-school graduation ceremony;<sup>70</sup> a school district deliberately drawn to follow the boundaries of a religious enclave;<sup>71</sup> an evolution disclaimer to be read before public-school biology classes;<sup>72</sup> a one-minute statement to be read before ninth-grade biology class to the effect that evolution is a theory, not a fact, and that students might want to consult the *Intelligent Design Creationism* *and People*, which the Dover, PA School Board had made available.<sup>73</sup>

In a scathing dissent in *Lee*, in which a "non-sectarian" prayer at a high-school graduation was ruled unconstitutional in part on the grounds that graduating students would not attend, Justice Scalia complained that the majority of his colleagues on the Supreme Court have transmuted the traditional understanding of "coercion," referring to compulsion and threat of legal penalty, into a flimsy amateur-psychological *ersatz*.<sup>74</sup> In his notable dissent in *Kyrias Joel*, in which the boundaries of a school district had been delineated so as to include members of a small, strict Jewish sect, he complained that the majority seemed to ignore the powers that Be, up in Albany, have conspired to effect an establishment of Satmar. In cases they were calling "establishment" what would more properly be described as toleration. In cases where the majority was wisely decided or, as Justice Scalia believed, unwisely, he was certainly right. The legal meaning of "the establishment of religion" has grown significantly.

Equally certainly, its meaning has grown at least in part in response to the fact that, as new situations arise and people's wants change." This is brought out particularly clearly in Justice O'Connor's "endorsement test," first articulated in her concurrence in a 1984 case involving a display in a public park -including a crèche along with a plastic Santa Claus, plastic candy canes, and a talking wishing well- was held *not* to violate the Establishment Clause. In determining whether a government practice violates this clause, she wrote, courts should ask whether the practice conveys to a reasonable observer that the government endorses one religion over another, endorses religion in general over non-religion, and so makes a person's religious beliefs relevant to his standing in the polis, his status as a citizen.<sup>77</sup>

Whether or not the endorsement test is wise or practicable, it clearly represents an accommodation in terms with the fact that, though it remains a country of strong religious feeling, the United States is not a uniformly Christian nation; among its citizens are devotees of virtually every religion, not to mention plenty of evangelical atheists. The possibility that Anglicanism or Mormonism might be legally established as a national church (or even that Mormonism might be established as a state church in Utah) seems remote; the danger to be averted now is, rather, that Catholics or Jews or Unitarians or Anabaptists or Jehovah's Witnesses or Seventh-Day Adventists or Christian Scientists or Muslims or Hindus or practitioners of Santería or of one or another American religion or ... etc., etc., be treated as less than full citizens. And this is the danger that Justice O'Connor tried to articulate.

Some who would prefer more ample government accommodation of religion think that the current test goes too far; some who would prefer a more thoroughly secular government think they have gone too far. But it is no part of my argument that the present legal meaning of "establishment" is an ideal, or that courts' reasoning on this matter is always cogent; far from it. It is part of my argument, however, that the gradual, untidy, sometimes jerky evolution of the meaning of the Establishment Clause -now in the direction of more government accommodation of religion, now in the direction of less government entanglement with religion- is one way our legal system has adapted to the needs and demands of an ever-changing society; and that this process of adaptation is not necessarily an impediment, but can be a contribution, to rationality.

\*

Do these arguments extend to the language of the social sciences, or of civil-law systems, or to the language of philosophy? (How exactly does Peirce's acknowledgment of the episodic nature of the process of adaptation to the needs and demands of an ever-changing society contribute to rationality?)

importance of the growth of meaning bear on his insistence on the need for philosophical precise, "scientific" vocabulary governed by the principles of his "ethics of terminology": meaning grows through the whole of language or, as Strawson suggested, primarily in the vocabularies of this or that specialized field? What can be said about what kinds of changes are beneficial, and what neutral, or damaging? How radically would the application oblige us to modify the conception of language that has dominated philosophy since the 19th century; but they will have to wait for another occasion.<sup>80</sup>

## Notes

1 © 2009 Susan Haack.

2 Two recent books, Crystal (2007) and Abley (2007), exploring regional (Crystal) and international (Abley) English, illustrate the point.

3 According to Barber (2007), half of the world's roughly 7,000 languages are dying. (According to Google, there is a revival of Latin on the internet.)

4 "Aback" means "in a position to catch the wind upon the forward surface of a square sail"; hence "taken by surprise." "Sheet" refers to "a rope or chain that regulates the angle at which a sail is set in relation to the wind." "Three sheets to the wind" for "drunk." "Acat-o'-nine-tails" was the whip with which sailors were flogged as a discipline (so-called because scars it left looked like scratches from a cat); hence "not enough room to maneuver" for "scuttlebutt" for "water cooler." The scuttlebutt was the cask of fresh water from which sailors drank; hence "scuttlebutt" for "water cooler" in the office. (I rely here on a standard dictionary of American English, Merriam-Webster (1991), 214 ("cat"), 1057 ("scuttlebutt").

5 "Pajamas" derives from the Hindi, which derives in turn from the Persian, "pā" (leg) and "jāma" (garment). (Merriam-Webster (1991), p. 847). Madhur Jaffrey conjectures that "curry" may derive from "kari," a Tamil word referring to a spice called kari leaf; or from "karhi," a North Indian dish made with spices and chickpeas. (Jaffrey, pp.14-17).

6 For details, see Haack (2005a, pp. 74-75).

7 For details, see Haack (2006).

8 On metaphor, see Davidson (1978); Haack (1995). On malapropisms, see Davidson (1986) (the quotation is from Hacking (1986)).

9 Austin (1956-1957) in Urmson and Warnock (1961) (the quotations are from pp.133 and 130 respectively).

10 Rozeboom (1967), in Pojman (1993, p. 183). The "Gettier paradoxes" are the supposed counter-examples to the traditional concept of knowledge as justified true belief presented by Edmund Gettier in (1963).

11 In the Introduction to Haack (1993), suggesting that the Gettier paradoxes arose from the mismatch between the traditional concept of knowledge and the gradational concept of epistemological justification, I urged that we focus on understanding the determinants of degree of justification, i.e., of evidential quality; not, however, because of the paper, which I discovered only recently - in fact, only after I had already written much of the present paper. The Gettier paradoxes, Haack (1983), hitherto unpublished, is included in the second, expanded, edition of *Philosophy of Language*.

12 Feyerabend (1975), chapter 17, argues that "[t]he content classes of certain theories are incommensurable with none of the usual logical relations... hold between them" (see the "Analytical Index," p.15). (I say "see" because part of Feyerabend's point may have been that philosophers of science have construed rationality too narrowly.)

13 See e.g. Rorty (1982), p.xlii ("The urge to make philosophy into Philosophy is to make it the search for a grand theory of everything.")

which can somehow be known in advance ..."; p.xliii ("[Pragmatism] sees philosophy as one genre of a way of trying to cope with various bits of the universe; ethics is a matter of trying to cope with other bits" ("Philosophy is best seen as a kind of writing"). See also Rorty (1988) and Rorty (1989).

14 Peirce, in Hartshorne *et al.* (1931-58), 7.587. The editors write that the material on "Consciousness as this appears is probably the manuscript for Peirce's Lowell Institute Lectures for 1866-67 (lectures some of which Holmes attended. See Wiener (1949), p. 75 in the 1972 edition.) Recently, of course, the word "planet" took on a new meaning when an international congress of astronomers voted to demote Pluto to the status of "dwarf planet."

15 Peirce, in Hartshorne, *et al.* (1931-58) 2.302 (c.1895). Recently, of course, "marriage" also took a note: successful in some jurisdictions, to legalize same-sex marriages. In the U.S., Massachusetts has legalized it, and a few other states have "limited relationship recognition laws." In May 2008 the California Supreme Court granted the right to marry, "as characterized in the California Constitution, "guarantees same-sex couples the same rights as opposite-sex couples." *In Re. Marriage Cases*, 43 Cal. Rptr. 757, 829 (2008). In November 2008, however, the California Constitution to ban gay marriage, was passed. Wildermuth (2008). See <<http://www.nolo.com>> legal state of play across the states in the U.S.; <http://www.lambdalegal.org> is also a useful source. California also includes information about the law in European countries and elsewhere.

16 Peirce, in Hartshorne *et al.*, eds. (1931-58), 5.388-410 (1878).

17 The section headings "The Pragmatic Maxim" and "Applications of the Pragmatic Maxim" in "How to Succeed in Life" (note 16 above) are not Peirce's, but were added by the editors of the *Collected Papers*.

18 Not, however, like the later Verification Principle, to show that metaphysics is wholly misconceived. See Hartshorne, et al., eds. (1931-58), 5.423 (1905); see also Haack (2007). (Peirce's use of "ontological" in this context is misleading; it should not be taken to imply that he thinks ontological questions, in general, illegitimate.)

19 Peirce, in Hartshorne *et al.*, eds. (1931-58), 5.405-10 (1878).

20 Peirce, in Hartshorne, *et al.*, eds. (1931-58), 2.330 (c.1902). I note that Peirce was trained as a chemist and was a working scientist.

21 "Pour lithium in molten glass and it comes out lighter and stronger. Add lithium to concrete and it kills algae, scrubs carbon dioxide from the air in spaceships and puts the juice into wristwatch batteries." (quotation is from A.1) Lithium is also used in the treatment of manic depression.

22 See Haack (1995), in Haack (1998, pp. 142 ff.)

23 See Haack (2003), chapter 2 for a summary history of formal models of science; and chapter 7, for many of the irrationalist critics of science share the assumption that rationality must be explicable in formal-logical terms.

24 Goodman (1954).

25 Goodman would say "confirmed"; but see Haack (2003, pp. 73-77), where I distinguish supportiveness and confirmation.

26 Hempel (1964), in Hempel (1965, p. 51) (*italics mine*). Many years later, Hempel would conclude that truth along - that truth has no role to play in an understanding of the scientific enterprise. See Hempel (1990).

27 Hempel (1945).

28 In this paragraph, I have drawn on Haack (2003, pp 66-67, 84-86 and 129-135). I don't mean to suggest that the solution to the "grue" paradox is simply that "grue" is not a natural-kind term; neither, after Quine (1969). Rather, the problem lies in the false assumption that the only evidence we have that all emeralds are green is that all so-far observed emeralds have been green.

29 See also Haack (2005b) for my views on the limits of formal methods in philosophy.

30 Haack (2003, chapter 5).

31 Levene and Bass (1931, chapter VIII). Portugal and Cohen (1977, chapter 1).

32 Taylor, ed., (1965, p. 153).

33 [ Here I stand, I can do no other] . Olby (1974, pp. 6-10), quoting (p. 7) Frey-Wyssling (1964, p. 5).

34 Watson and Crick (1953); Wilkins, Stokes, and Wilson (1953).

35 Merriam-Webster (1991, p. 370).

36 Crick (1988, p. 75).

37 According to the Oxford English Dictionary online, the word "mitochondrion" was first introduced in an earlier term "*Nebenkern*."

38 Mounolou and Lacroute (2005).

39 Merriam-Webster (1991, p. 370).

40 Perhaps I need to add that the fact that the meanings of scientific terms changes over time does not suggest, that supposedly rival theories are never really incompatible; that would require a stronger theory in one theory has the same meaning as any sentence in the other. See Haack (1987, pp. 291-295).

41 The idea is presented in Putnam (1973).

42 Which is not, of course, to deny that legal proceedings normally *involve* inquiry, both factual and legal.

43 Holmes (1881), in Novick (1993, pp.115 and 119).

44 Holmes (1897), in Novick (1993, p. 391).

45 Indeed, Max Fisch once suggested that Holmes's "prediction theory" might have inspired Peirce's theory rather than the other way round. See Fisch (1942).

46 It should be said, however, that while the idea of law-as-prediction sounds reasonably plausible if it involves advising a client what the legal consequences of a proposed course of action would be, it is much less plausible instead, of a judge deciding how existing law should be applied in these new circumstances. See also I.

47 I say, "however powerful" because, as his references to "the syllogism" indicate, Holmes was not aware of the advances in formal logic that had been made by Frege and Peirce just before the publication of *The Court* (2007).

48 In *Katz v. United States*, 389 U.S. 347 (1952) the U.S. Supreme Court ruled that the right to privacy extends to telephone calls.

49 In *State of Ohio v. McDaniel*, 44 Ohio App. 2d 163, 337 N.E.2d 173 (1975) the U.S. Supreme Court ruled that there is a reasonable expectation of privacy in a department store dressing room.

50 See Watnick (2006), Norwood (2005-6).

51 See Litman (2001); Ginsburg, Litman, and Kevin (2004; 4th edition 2007).

52 Levi (1949, pp. 4-5); the quotation is from p.4. Not so incidentally, perhaps, Levi cites two classical philosophers, John Dewey and George Herbert Mead.

53 Holmes (1881), in Novick (1993, pp. 118 and 127).

54 Levi (1949, pp. 9-27). The problem arose in cases concerning the liability of a seller of an article who someone who, further down the line, bought it from someone else.

55 Some of this story is told in Porat and Stein (2001).

56 "Remains" in a more than somewhat etiolated form, however.

57 Thomas Jefferson wrote: "I am certainly not an advocate for frequent and untried changes in laws a know also, that laws and institutions must go hand in hand with the progress of the human mind. As .. made, new truths disclosed, and manners and opinions change with the change of circumstances, inst also, and keep pace with the times. We might as well require a man to wear still the coat which fitted h society to remain ever under the regimen of their barbarous ancestors." Jefferson (1816).

58 *Everson v. Board of Education of Ewing Tp.*, 330 U.S. 1 (1947), 15.

59 *Everson* (note 58 above), 16.

60 *School District of Abington Twp. v. Schemp*, 374 U.S. 203 (1963).

61 *Epperson v. Arkansas*, 373 U.S. 47 (1968).

62 *Lemon v. Kurtzman*, 403 U.S. 602 (1971).

63 *Daniel v. Waters*, 515 F.2d 485 (6th Cir. 1978).

64 *Stone v. Graham*, 440 U.S. 39 (1980).

65 *McLean v. Arkansas*, F29 F. Supp. 1255 (1982).

66 *Larkin v. Grendel's Den*, 459 U.S. 116 (1982).

67 *Wallace v. Jaffree*, 472 U.S. 38 (1985) (the modification was the addition of the words "or prayer").

68 *Edwards v. Aguillard*, 482 U.S. 578 (1987).

69 *County of Allegheny v. American Civil Liberties Union*, 492 U.S. 573 (1989).

70 *Lee v. Weisman*, 505 U.S. 577 (1992).

71 *Board of Education of Kyrias Joel v. Grumet*, 512 U.S. 687 (1994).

72 *Freiler v. Tangipahoa Board of Ed.*, 185 F.3d 337 (1999).

73 *Kitzmiller v. Dover Board of Ed.*, 400 F.Supp.2d 707 (2005).

74 *Lee v. Weisman* (note 70 above), 631-46; the discussion of "coercion" is on 640-41.

75 *Kyrias Joel* (note 71 above), 732. Albany is the capital of the state of New York.

76 *Lynch v. Donnelly*, 4675 U.S. 668 (1984).

77 I am paraphrasing Justice O'Connor's amplification of the rationale for her "endorsement test" in *Allegheny v. ACLU* (note 69 above), in which Justice Blackmun adopted her test in his ruling for the Coi

78 20 years ago, in 1987, there were estimated to be 1,347 religious organizations in the U.S. *Edwards v* above), 608 n.6 (Justice Powell, concurring). For updated information, see Pew Forum on Religious an

79 See Hartshorne *et al.*, eds. (1931-58), 2.219-26 (1903), where Peirce offers his "ethics of Terminology he introduces "pragmaticism"; and 5.502 (c.1905), where he discusses the meanings of "is." See also H

80 My thanks to Mark Migotti for helpful comments on a draft; to David Wilson for help with the historical terminology; to María-José Frápolli for our discussions about rationality and cognitive flexibility; to Ed for a helpful conversation; to Mark Plotkin and Pamela Lucken for material on same-sex marriage; and to Tom drawing Levi's book to my attention.

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