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THE QUEST FOR ENABLING METAPHORS FOR LAW AND LAWYERING IN THE INFORMATION AGE

*Pamela Samuelson**

SHAMANS, SOFTWARE, AND SPLEENS: LAW AND THE CONSTRUCTION OF THE INFORMATION SOCIETY. By *James Boyle*. Cambridge: Harvard University Press. 1996. Pp. xvi, 270. \$35.

LAW IN A DIGITAL WORLD. By *M. Ethan Katsh*. New York: Oxford University Press. 1995. Pp. viii, 294. \$35.

INTRODUCTION

It has become a truism, if not a cliché, that developments in information technologies are causing a fundamental transformation in society, taking us out of the industrial era and into an information age.¹ The last few years have witnessed the appearance of an ample literature exploring this theme.² Some may think that too much has already been written on this subject. Yet more books on this theme keeps rolling off the printing presses, including those by James Boyle³ and M. Ethan Katsh⁴ that are the subject of this review. The continuing popularity of printed books on this subject seems rather ironic, for books are artifacts of a supposedly declining era.

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1. See, e.g., Bryan Appleyard, *Economic Prophet of the Information Age*, THE INDEPENDENT (London), Dec. 11, 1995, at 13.

2. See, e.g., KEVIN KELLY, *OUT OF CONTROL* (1994); NICHOLAS NEGROPONTE, *BEING DIGITAL* (1995); ITHIEL DE SOLA POOL, *TECHNOLOGIES OF FREEDOM* (1983); SHOSHANA ZUBOFF, *IN THE AGE OF THE SMART MACHINE* (1988).

3. Professor of Law, American University, Washington College of Law. Boyle's book elaborates on themes first developed in James Boyle, *A Theory of Law and Information: Copyright, Spleens, Blackmail, and Insider Trading*, 80 CAL. L. REV. 1413 (1992).

4. Professor of Legal Studies, University of Massachusetts, Amherst. Katsh has published parts of his book as law review articles. See M. Ethan Katsh, *Rights, Camera, Action: Cyberspatial Settings and the First Amendment*, 104 YALE L.J. 1681 (1995); Ethan Katsh, *Digital Lawyers: Orienting the Legal Profession to Cyberspace*, 55 U. PITT. L. REV. 1141 (1994).

Katsh and Boyle concern themselves with the impact of information technologies on law and the legal profession.⁵ Despite some overlap in the topical coverage in these two works — both, for example, give some attention to developments in copyright and privacy law — the books hardly could be more different. Boyle pays relatively little attention to the digital medium or to digital technologies.⁶ His focus is on the contradictory assumptions underlying justifications for decisions about the commodification of information. He points out that information is sometimes regarded as likely to be underproduced unless the law confers property rights on its producers; other times, information is regarded as something that must be freely available for the economy and democracy to operate in an optimal manner (Boyle, Chapter Four). Boyle explores how these contradictory conceptions about information play themselves out in particular legal decisions. He questions whether legal authorities and commentators have provided principled bases for invoking “property rights” or “public domain” rationales in those cases. Katsh, on the other hand, regards digital technologies as the driving force behind major transformations in law and the legal profession. Information as such is of only incidental interest to him. Katsh primarily hopes to help lawyers understand and adapt to coming changes so that they can avoid the obsolescence likely to overtake lawyers who resist these changes.

The books are also starkly different in tone. Boyle raises alarm about the course our society will likely chart in the absence of a social theory well-suited to promoting democratic values, justice, and efficiency in the information age. Katsh is more sanguine about the trajectory of the law in the information age, which causes Boyle to characterize him as a vague optimist.⁷ While Katsh does appear generally optimistic about the changes underway, just under the surface of his text lies a warning that lawyers must either change the way they practice law or risk being put out of business. Ultimately, however, Boyle explores the potential dark side of the information age in much greater depth than does Katsh.⁸

5. Two other recently published books that explore some information age legal issues are PAUL GOLDSTEIN, *COPYRIGHT'S HIGHWAY* (1994) and ANNE WELLS BRANSCOMB, *WHO OWNS INFORMATION?* (1994).

6. Boyle explains that such a focus would require him to ignore the information policy issues arising from exploitation of genetic information. Boyle, p. 4.

7. Boyle, p. 202 n.7 (citing M. ETHAN KATSH, *THE ELECTRONIC MEDIA AND THE TRANSFORMATION OF LAW* (1989)).

8. Boyle and Katsh do not stand alone in investigating these issues. For those who follow the literature about information as property or about the consequences of being digital, both books have much to offer not only for the sustained inquiry and insights they provide but also for the broad range of disciplines from which they draw ideas. Furthermore, those seeking initiation into the literature and controversial issues in each subject area will find these books helpful. Although the primary audience for both books is likely to be lawyers and law students, nonlawyers concerned with information policy and the impact of digital technologies

Despite differences between the two books, they have at least one pervasive theme in common. Both authors are deeply concerned about the disabling consequences likely to attend hanging on to metaphors of the waning era. Both are in search of enabling metaphors suitable to the new era. Each has, of course, a different metaphor to offer as *bête noire*.

For Boyle, the disabling metaphor that should be discarded is the romantic concept of the creative author. This concept is asserted often to justify a broad grant of property rights in works of authorship. Boyle asserts:

[W]e are driven to confer property rights in information on those who come closest to the image of the romantic author, those whose contributions to information production are most easily seen as original and transformative. I argue that this is a bad thing for reasons of both efficiency and justice; it leads us to have *too many* intellectual property rights, to confer them on the *wrong people* and dramatically to undervalue the interests of both *sources of* and *audiences for* the information we commodify. [Boyle, pp. x-xi]

He hopes to elevate concerns for efficiency, justice, democratic values, and privacy to an equal status with concerns about creator interests so that judges and legislators who formulate legal rules about rights in information will do so in a more balanced manner.

Katsh seeks to overcome the disabling metaphor of print. He shows how much current legal doctrine and lawyering rely on printed material (Katsh, p. 8). He explains how and why digital technologies will fundamentally change the framework in which lawyers think about the law, substantive legal doctrine, and the manner in which lawyers will practice their profession (Katsh, p. 16).

This review will assess the success of each author's effort to enable readers to overcome disabling metaphors of the past and to aid in the emergence of new metaphors that will better serve the information society of the future.

will find both books rich in information. Boyle is particularly adroit in demonstrating how complex social problems emerge as legal issues. The law, he says, is:

a complex interpretive activity, a practice of encoding and decoding social meaning that merges imperceptibly with rhetoric, ideology, "common sense," economic argument (of both a highly theoretical and a seat-of-the-pants kind), with social stereotype, narrative cliché and political theory of every level from high abstraction to civics class chant.

Boyle, p. 14. Court opinions explaining whether someone should be liable for a particular act or omission illustrate this complex interpretive activity. The underlying issues often interest nonlawyers as well as lawyers. Katsh's book holds a broader appeal because Katsh writes more as an anthropologist of the legal profession than as a practitioner or legal academic. Indeed, nonlawyers may find it easier than lawyers to read Katsh's diffuse and discursive writing, while lawyers probably have greater need to think about the issues he discusses.

I. MOVING BEYOND THE AUTHOR METAPHOR

A. *Of Shamans and Spleens*

Boyle's book is less about shamans and spleens than its title might suggest. In fact, Boyle does not explain what shamans have to do with his thesis until Chapter Eleven. Spleens appear in Chapter Nine, but even then spleens are less the issue than the DNA borne in one man's spleen (Boyle, pp. 97-107). Boyle intends for his title to pique the curiosity of prospective readers about what shamans, software, and spleens could possibly have in common. Few are they who would find *Law and the Construction of the Information Society* as compelling a title as *Shamans, Software, and Spleens*. But Boyle does not use his title merely to grab the reader's attention. He also uses it to signal that his work will not be yet another dreary academic dissertation. Boyle delivers on the promise of his title: His book proves an enjoyable read; and he also explores the connection among shamans, software, and spleens.

So what do shamans have to do with the construction of the information society? To answer this question, one must understand a few basic principles of the intellectual property laws of Western industrialized nations. These laws typically grant exclusive rights to individual creators who develop certain kinds of intellectual products. Authors of original writings are eligible for copyright protection, and inventors of new machines or technological processes may qualify for patent protection.⁹ Boyle regards these laws as embodiments of romantic concepts about individual creators. The romance lies in the idea of individual genius authors and inventors who are said to deserve property rights in the creative products that spring from their minds without regard to what has come before (pp. 16, 52-54).

Boyle argues that romantic entitlement theory yields laws that ignore creations that do not conform to the romantic creator model. For example, creations emanating from collective effort, such as the knowledge of shamans, are ineligible for protection under such laws because there is no one individual author-inventor to designate as the rightsholder. Armed with romantic entitlement notions, Westerners traveling to the outback of Australia or other exotic climes may regard as freely appropriable aboriginal designs, folklore, or shamanic knowledge that they find attractive or useful. After all, these creations do not derive from a particular author or inventor whose rights the Western appropriator would be violating. Consequently, Western explorers perceive the designs, folklore, and sha-

9. See 17 U.S.C. § 102(a) (1994) (making a copyright available to authors of original works); 35 U.S.C. § 101 (1994) (entitling an inventor to patent new and nonobvious technologies).

manic knowhow of undeveloped or underdeveloped nations as raw material just waiting for Western creative discovery and exploitation. By mixing their labor with the appropriated subject matter and thereby refining it, Westerners could become romantic author-inventors entitled to intellectual property rights under their own culture's laws.¹⁰

Boyle makes both justice and efficiency arguments against the unfettered appropriation of shamanic and other collective creations from undeveloped nations. Boyle argues that justice requires Westerners to accept the rights of non-Western cultures to control the commercial exploitation of their collective creations (pp. 125-28). He urges Westerners to abandon — or at least moderate — the ideology that has blinded them from appreciating the valuable sources from which they draw products or understanding the justice claims of non-Western cultures.¹¹ Predictably, Boyle approves of the efforts undertaken by some countries to protect their collective creations against Western exploitation.¹² He also favors international recognition of intellectual property rights in collective works.¹³

Boyle's efficiency argument focuses on the potential shortsightedness of failing to compensate indigenous cultures for their knowhow or other collectively generated creative artifacts. Compensation may prevent destruction of resources necessary for the development of new products. Boyle considers the plight of Madagascar, "the unique home of perhaps 5 per cent of the world's

10. Boyle cites the example of a Western drug company that developed a cure for Hodgkin's disease from vinca alkaloids in the rosy periwinkle of Madagascar. The vinca alkaloids long had been used in Madagascar to treat diabetes. These therapeutic qualities led the company to investigate the plant, which led to the development of a drug that cures Hodgkin's disease and earns its manufacturer \$100 million per year. Madagascar shared in none of these profits. See pp. 127-29.

11. Boyle writes that:

At the moment, [the author concept] is a gate that tends disproportionately to favor the developed countries' contributions to world science and culture. Curare, batik, myths, and the dance "lambada" flow out of developing countries, unprotected by intellectual property rights, while Prozac, Levis, Grisham, and the movie *Lambada!* flow in—protected by a suite of intellectual property laws, which in turn are backed by the threat of trade sanctions.

P. 125.

12. See Boyle, p. 127 (citing DARRELL POSEY & GRAHAM DUTFIELD, BEYOND INTELLECTUAL PROPERTY RIGHTS: TOWARDS TRADITIONAL RESOURCE RIGHTS FOR INDIGENOUS AND LOCAL COMMUNITIES (1995)) (providing "indigenous communities with the first accessible summary of the existing intellectual property, human rights, indigenous rights, biodiversity, and environmental rules that bear on the issue").

13. See Boyle, app. B (The Bellagio Declaration) at 192 (indicating Boyle's participation in the authorship of this Declaration). This Declaration resulted from discussions conducted at the weeklong conference entitled *Cultural Agency-Cultural Authority: The Politics and Poetics of Intellectual Property in the Post-Colonial Period*. This conference was held at the Rockefeller Study Center at Bellagio, Italy, and was organized by Peter Jaszi and Martha Woodmansee. See Boyle, app. B at 192.

species[:] It is the biological equivalent of an Arab oil sheikdom. Yet, without an income from its huge biological wealth, it has chopped down most of its forests to feed its people."¹⁴ Boyle responds with a quip and a more general observation:

Now *there's* a public goods problem. Precisely because they can find no place in a legal regime constructed around a vision of individual, transformative, original genius, the indigenous peoples are driven to deforestation or slash and burn farming. Who knows what other unique and potentially valuable plants disappear with the forest, what generations of pharmacological experience disappear as the indigenous culture is destroyed? [pp. 128-29]

Boyle urges the West to realize that compensating indigenous cultures for appropriations of their biological resources will serve the long-term interest of the West in the continued availability of those resources. Boyle leaves to others the job of addressing the complex questions that arise once one accepts the general concept that non-Western cultures have a right to compensation for collective creations.¹⁵ Boyle's contribution is to call attention to some underlying assumptions of Western intellectual property law and to raise questions about the justice and efficiency of applying Western concepts to shamanic knowledge and other indigenous creations.

Spleens are of interest to Boyle because they raise questions about rights to control and benefit from the exploitation of genetic information.¹⁶ After doctors at the University of California surgically removed John Moore's spleen during his treatment for leukemia, medical researchers discovered that Moore's cells produced an unusually high quantity of lymphokines. Using genetic-engineering techniques, the researchers cloned Moore's genetic material. They then patented this cell line and licensed the patent to a drug company. The estimated commercial value of the patented cell line was three billion dollars. When Moore eventually learned of the commercialization of his cell line, he sued the Regents of the University of California for, among other things, wrongful conversion of his

14. P. 128 (quoting Fred Pearce, *Science and Technology: Bargaining for the Life of the Forest — Poor Nations Want Drug and Food Companies to Pay for the Plants They Plunder*, THE INDEPENDENT (London), Mar. 17, 1991, at 37 (internal quotation marks omitted)). See *supra* note 10 for an example of Western appropriation of a Madagascar plant without recompense to the indigenous people.

15. Boyle does not, for example, address questions such as whether the people of Madagascar should receive compensation whenever a Western company appropriates a plant or plant DNA from that country, whether it should be necessary for the plant to have been known to shamans of that country to claim a right of compensation, or whether mere knowledge by ordinary farmers, for example, of therapeutic qualities would suffice to trigger a right to compensation. Nor does he confront the even more difficult question of who would represent the collectivity for the purposes of receiving the compensation.

16. See pp. 97-118.

property.¹⁷ Moore thought that he should share in the largesse deriving from the special characteristics of his DNA.

Boyle makes colorful use of the analytic morass in the appellate court opinions in the *Moore* case. The lower court, having made Moore's doctors "sound like high-tech vampires, sampling Moore's blood and bodily fluids for their own, hidden, purposes," decided that Moore had property rights in his genetic code (p. 99). In reaching the opposite conclusion, the California Supreme Court focused on the impact such a ruling would have on medical research. Boyle highlights the seemingly contradictory rhetorics of public domain and of property rights in the court's opinion:

Property rights given to those whose bodies can be mined for valuable genetic information will hamstring research because property is inimical to the free exchange of information. Yet property rights *must* be given to those who do the mining, because property is an essential incentive to research. How can the court tell when property rights will have the effect of stopping the flow of information and when they will be necessary to start that flow? [p. 101]

Boyle also sees traces of romantic entitlement theory in the supreme court's opinion. It discounted Moore's claim to property rights in his genetic material because his genetic information contained nothing particularly original.¹⁸ It approved of the grant of property rights to the medical researchers because they used ingenuity in converting the "naturally occurring raw material" of Moore's genetic code into a commercially valuable product.¹⁹

Although Boyle hints at some sympathy with Moore's claim, he ultimately rejects the privacy-personal autonomy basis for that sympathy:

[T]he market has taken from [Moore] the most "private" information of all, information about his own genetic structure. Yet our intuitive notions of privacy are constructed around the notion of preventing disclosure of intimate, embarrassing, or simply "personal" *socially constructed facts* about ourselves to others like ourselves. I could stare at my own genetic code all day and not even know it was mine. [p. 105]

Boyle goes on to observe that "[t]he difficulty with Moore's case is, first, that no one would think worse of him for having a genetic make-up that could be mined for a socially valuable drug and, second, that specialized knowledge would be necessary to make the connection between the 'facts revealed' and the 'inner life'" (p. 105). In the end, Boyle offers neither justice nor efficiency arguments in support of Moore's claim.

17. *Moore v. Regents of the University of California*, 249 Cal. Rptr. 494 (Ct. App. 1988), *modified*, 793 P.2d 479 (Cal. 1990), *cert. denied*, 499 U.S. 936 (1991).

18. See 793 P.2d at 490.

19. 793 P.2d at 492-93.

Although Boyle's criticism of the California Supreme Court's decision is witheringly good, he does not address the court's strongest argument. Upholding Moore's property claim would not just stop medical researchers from making unauthorized commercializations of patient cell lines; it would also render *any* unauthorized use of a patient's genetic material for research purposes a conversion of personal property.²⁰ This would have a chilling effect on medical research. Boyle does not dispute this conclusion.

The California Supreme Court, as Boyle acknowledges, did not leave Moore completely without a remedy (p. 107). It upheld his claim that university researchers breached their fiduciary duty in failing to obtain his informed consent before doing research with his genetic material for potentially commercial purposes. The court decided that if public support existed for a right to compensation under these circumstances, the legislature could provide it.²¹ In the absence of such legislation, the court reached a reasonable result, even if it bumbled en route to its conclusion.

B. *Of Insider Trading and Blackmail*

For Boyle, insider trading and blackmail laws that forbid certain kinds of lucrative information exchanges are the flip side of the shaman and spleen problem.²² Boyle wonders why we permit the commodification of shamanic lore and genetic information when we prohibit commodification of information for insider trading or blackmail purposes. Romantic entitlement theory would suggest that both insider trading and blackmail — at least that which pertains to lawfully obtained information — ought to be legal. The fact that both are illegal suggests that something other than romantic entitlement theory underlies these two bodies of law.

Boyle finds some choice examples of the rhetoric of romantic entitlement in the ample literature on insider trading.²³ These examples conjure up the image of the creative entrepreneur, a person who, out of his sole genius, originates a new business and deserves to enjoy the fruits of his labors, including the fruits that derive from knowledge about his own business.

The literature on blackmail does not depict blackmailers in romantic terms. Not even Boyle goes to the trouble of conjuring up a romantic image of a blackmailer, but this is not hard to do. After all, it may require a considerable amount of time, money, and en-

20. Conversion is a strict liability rule; even inadvertent use of a patient's genetic material would be illegal. See 793 P.2d at 493-94.

21. See 793 P.2d at 496.

22. See chapter 7 (blackmail), chapter 8 (insider trading).

23. Pp. 92-95 (citing HENRY MANNE, *INSIDER TRADING AND THE STOCK MARKET* (1996)).

ergy, and no small amount of insight, to learn an embarrassing fact about a person. Developing a successful strategy for inducing the person to pay the blackmail also calls for creativity. Of course, a creative blackmailer sometimes may learn the embarrassing fact through pure serendipity, but if patent law does not disqualify a serendipitous inventor from entitlement to a patent,²⁴ neither should the law regulating commercial exchanges about personal information.

The blackmail literature principally addresses economic explanations for the illegality of blackmail.²⁵ Blackmail seems a clear instance in which commodification of information naturally would take place in the absence of legal rules forbidding it. Boyle provides a synopsis and critique of the various explanations for the illegality of blackmail, including those put forward by Richard Posner and Richard Epstein (pp. 62-72).

Boyle regards the promotion of privacy and personal autonomy values as the principal rationale for blackmail law (p. 77). He explains insider trading laws as laws that promote democratic values by ensuring relatively equal access to commercially valuable information affecting stock prices (p. 83). His thesis seems to be that blackmail and insider trading laws deserve careful study because they subsume romantic entitlement theory to other social values. Boyle, however, does not explain how democratic, privacy, or personal autonomy values can be used to moderate or subsume romantic entitlement theory in policymaking about intellectual property. Boyle leaves this job to his readers.

C. *Poetry v. Engineering Metaphors for Software*

Software sits between shamans and spleens in the title of Boyle's book, yet Boyle discusses software only briefly. He merely points to the substantial disagreement in the software industry about whether patent protection should be available for software innovation (p. 133), and calls attention to a group organized by a software genius that believes that patent protection for software impedes freedom of expression in programming.²⁶ Perhaps the sheer volume of literature about intellectual property protection for software deterred Boyle from exploring software issues in more detail.²⁷

24. See 35 U.S.C. § 103 (1994).

25. See, e.g., Ronald H. Coase, *Blackmail*, McCorkle Lecture delivered at the University of Virginia School of Law (Nov. 10, 1987), in 74 VA. L. REV. 655 (1988).

26. See pp. 132-33. Richard Stallman, who organized the League for Programming Freedom, received the MacArthur Fellowship known as the "genius" award. See, e.g., Nathan Cobb, *Power to the Programmer*, BOSTON GLOBE, Oct. 21, 1990 (Magazine), at 16.

27. See, e.g., Donald S. Chisum, *The Patentability of Algorithms*, 47 U. PITT. L. REV. 959 (1986); Kenneth W. Dam, *Some Economic Considerations in the Intellectual Property Protec-*

Boyle's limited foray into the software protection literature is unfortunate for two reasons. First, this literature provides some outstanding examples of the rhetoric of romantic entitlement.²⁸ Second, recent software copyright cases demonstrate that judges sometimes do reject romantic entitlement arguments in applying copyright law to software.²⁹

The best illustration of romantic entitlement rhetoric as applied to computer software is a law review article cleverly entitled *Silicon Epics and Binary Bards*. This article about the application of copyright law to computer programs was written by a group of IBM litigation attorneys.³⁰ Computer programs are, of course, the "silicon epics" to which the title refers, and "binary bards" the programmers who write them. The article begins with a prefatory quote from an eminent computer scientist, Dr. Frederick Brooks. Brooks compares a programmer to a poet in that he "works only slightly removed from pure thought-stuff. He builds his castles in the air, from air, creating by exertion of the imagination. Few media of creation are so flexible, so easy to polish and rework, so readily capable of realizing grand conceptual structures."³¹ Programming is fun, Brooks says, "because it gratifies creative longings built deep within us and delights sensibilities we have in common with all men."³² *Silicon Epics* derides as ignorant and mistaken the view that programs are a technology and that programmers are software engineers.³³

The authors of *Silicon Epics* are straightforward about why they characterize programmers as poets. The principal thesis of the arti-

tion of Software, 24 J. LEGAL STUD. 321 (1995); Dennis S. Karjala, *Copyright, Computer Software, and the New Protectionism*, 28 JURIMETRICS J. 33 (1987); Peter S. Menell, *An Analysis of the Scope of Copyright Protection for Application Programs*, 41 STAN. L. REV. 1045 (1989); Arthur R. Miller, *Copyright Protection for Computer Programs, Databases, and Computer-Generated Works: Is Anything New Since CONTU?*, 106 HARV. L. REV. 977 (1993); J.H. Reichman, *Computer Programs as Applied Scientific Know-How: Implications of Copyright Protection for Commercialized University Research*, 42 VAND. L. REV. 639 (1989); Pamela Samuelson et al., *A Manifesto Concerning the Legal Protection of Computer Programs*, 94 COLUM. L. REV. 2308 (1994).

28. See, e.g., Anthony L. Clapes et al., *Silicon Epics and Binary Bards: Determining the Proper Scope of Copyright Protection for Computer Programs*, 34 UCLA L. REV. 1493 (1987).

29. See, e.g., *Computer Assocs. Intl., Inc. v. Altai Inc.*, 982 F.2d 693 (2d Cir. 1992).

30. See Clapes et al., *supra* note 28.

31. *Id.* at 1497 (quoting FREDERICK P. BROOKS, JR., *THE MYTHICAL MAN-MONTH: ESSAYS ON SOFTWARE ENGINEERING* 7 (1975)).

32. Clapes et al., *supra* note 28, at 1497 (quoting BROOKS, *supra* note 31, at 7).

33. Clapes et al., *supra* note 28, at 1501 n.19. Yet Brooks, the very source of Clapes's programmers-as-poets metaphor, regards programming as an engineering activity. In fact, Brooks subtitled his book "Essays On Software Engineering." See also Frederick P. Brooks, Jr., *No Silver Bullet: Essence and Accidents of Software Engineering*, COMPUTER, Apr. 1987, at 10. For a discussion of the appropriateness of the engineering metaphor for software development, see Samuelson et al., *supra* note 27, at 2326-32, 2357-58, n.194.

cle is that the "arcane epic poetry"³⁴ of computer programs so resembles traditional works of literature that programs should receive the same broad protection accorded to novels, plays, and poetry. Computer programs are "literary works" under the copyright statute.³⁵ If copyright law protects the detailed structure of a novel or dramatic play, so too, they argue, should it protect the detailed structure of computer programs.³⁶ Although courts have not found the programmer-as-poet metaphor compelling, the syllogistic logic of the literary work metaphor has had considerable effect upon the software copyright case law.³⁷

Recent decisions have taken the rhetorical turn that the authors of *Silicon Epics* hoped to avert. Once courts accept the technically accurate characterization of computer programs as utilitarian works, the inexorable result is that programs will have a thinner scope of copyright protection than works of art or literature.³⁸ When Judge Walker rejected Apple Computer's argument that the design of the Macintosh user interface was artistic and fanciful and embraced Microsoft's argument that the design was largely functional,³⁹ Apple was well on its way to losing its lawsuit.⁴⁰ Armed with the rhetoric of functionality and a statutory provision that excludes functional design elements from the scope of copyright,⁴¹ courts lately have resisted arguments for a broad scope of copyright protection for software. They have become aware of the potential availability of patent protection for functional aspects of software innovations, and of the danger that overly broad copyright protection for computer programs could thwart competition policy concerns underlying both patent and copyright law.⁴² Thus, the courts have held romantic entitlement rhetoric in check and have formulated rules that achieve competitively sensible results.

However much praise these courts may deserve for averting the overprotection likely to flow from unquestioning acceptance of the programs-as-poetry rhetoric, this praise should be tempered by an understanding that there is some danger — one that goes unnoticed

34. Clapes et al., *supra* note 28, at 1584.

35. See 17 U.S.C. § 101 (1994) (definitions of "computer program" and "literary works").

36. Clapes et al., *supra* note 28, at 1548-58, 1568-71.

37. See, e.g., *Computer Assocs. Intl., Inc. v. Altai, Inc.*, 982 F.2d 693 (2d Cir. 1992); *Whe-lan Assocs., Inc. v. Jaslow Dental Lab., Inc.*, 797 F.2d 1222 (3d Cir. 1986).

38. See, e.g., *Sega Enters. Ltd. v. Accolade, Inc.*, 977 F.2d 1510, 1524 (9th Cir. 1992).

39. See *Apple Computer, Inc. v. Microsoft Corp.*, 799 F. Supp. 1006 (N.D. Cal. 1992).

40. See *Apple Computer, Inc. v. Microsoft Corp.*, 821 F. Supp. 616 (N.D. Cal. 1993), *modified*, 35 F.3d 1435 (9th Cir. 1994), *cert. denied*, 115 S. Ct. 1176 (1994).

41. 17 U.S.C. § 102(b) (1994); *Sega*, 977 F.2d at 1522 (functional requirements for achieving compatibility with another program not protected under § 102(b)).

42. See, e.g., *Atari Games Corp. v. Nintendo of Am. Inc.*, 975 F.2d 832, 842 (Fed. Cir. 1992).

by Boyle — of underprotection of program innovation by existing law. This danger arises from the rapid, inexpensive appropriability of valuable program innovations⁴³ embedded in programs as well as other commercially valuable information products.⁴⁴ As Professor Jerome Reichman explains:

[M]uch of today's most advanced technology enjoys a less favorable competitive position than that of conventional machinery because the unpatentable, intangible knowhow responsible for its commercial value becomes embodied in products that are distributed in the open market. A product of the new technologies, such as a computer program, an integrated circuit design, or even a biogenetically altered organism may thus *bear its know-how on its face*, a condition that renders it as vulnerable to rapid appropriation by second-comers as any published literary or artistic work.⁴⁵

Existing forms of legal protection do not suffice to protect against the rapid appropriation of innovations revealed on the face of information products: Trade secret law does not protect information borne on or near the face of products sold in the open market. Copyright law does not protect know-how or industrial designs. Patent law does not protect incremental innovations, such as those typically embodied in computer programs.⁴⁶

New forms of legal protection may be needed to provide artificial lead time to developers of incremental innovation bearing know-how on its face so that developers of these products have an opportunity to recoup their investments and make sufficient profits to justify further investments in these works.⁴⁷ Although Boyle calls for *sui generis* forms of legal protection for computer programs (Boyle, p. 172), it is difficult to predict how he would react to the idea of granting additional legal protections to programs that would diminish the public domain he cherishes.

D. *Copyright and Social Dialogue*

Copyright is the body of law that currently embraces romantic entitlement theory most heartily. This was not always so. English "copy-rights" initially vested in publishers by virtue of the publishers' investments in purchasing manuscripts and in printing books.⁴⁸

43. See Samuelson et al., *supra* note 27, at 2333-42.

44. See, e.g., J.H. Reichman, *Legal Hybrids Between the Patent and Copyright Paradigms*, 94 COLUM. L. REV. 2432 (1994).

45. J.H. Reichman, *Design Protection and the New Technologies: The United States Experience in a Transnational Perspective* (pt. 2), 1991 INDUS. PROP. 251, 269.

46. For an analysis of the existing laws' failure to protect much of the valuable innovation in computer programs, see Samuelson et al., *supra* note 27, at 2342-64.

47. See, e.g., Reichman, *supra* note 44, at 2544-56; Samuelson et al., *supra* note 27, at 2378-428.

48. See, e.g., L. RAY PATTERSON, COPYRIGHT IN HISTORICAL PERSPECTIVE 8, 42-77 (1968).

The first author-centered copyright law, the English Statute of Anne in 1710, offered a utilitarian rationale for granting authors exclusive rights to control the printing of their books: Without a statutory grant of exclusive rights, authors might decline to write or publish at all.⁴⁹ Not until the late eighteenth century did the romantic theory of authorship arise, and not until the nineteenth century did it make its way into the law.⁵⁰ Romantic theory posited that authors deserve broad property rights in the products of their original genius.⁵¹ While this notion took a firm hold in Continental Europe, the utilitarian approach to copyright policymaking has historically predominated in the United States.⁵² Lately, however, the rhetoric of romantic entitlement has become more pronounced in the United States, as American copyright industries have gained ascendancy in both domestic and international markets. Boyle gives numerous examples of this recent trend (pp. 135-39, 141-42).

Notwithstanding this development, there is reason to be optimistic about the ability of U.S. copyright law to weigh in policy considerations other than those embodied in romantic entitlement theory. The values of justice, democracy, free expression, and personal autonomy are all reflected in U.S. copyright decisions.⁵³ Other U.S. copyright decisions also proclaim the importance of protecting the public domain from undue incursion.⁵⁴ Efficiency considerations also appear in decisions determining the proper breadth of protection for particular copyrighted works.⁵⁵ One recent Supreme Court decision has recognized that creative works inevitably borrow from and build upon prior creative works.⁵⁶ In view of the utilitarian purposes that U.S. courts frequently ascribe to copyright law,⁵⁷ courts will probably continue to consider these other

49. See, e.g., CRAIG JOYCE ET AL., COPYRIGHT LAW 7 (3d ed. 1994) (reproducing the Statute of Anne's preamble, where the utilitarian rationale appears).

50. See MARTHA WOODMANSEE, THE AUTHOR, ART, AND THE MARKET 35-56 (1994); see also Peter A. Jaszi, *Toward a Theory of Copyright: The Metamorphoses of "Authorship,"* 1991 DUKE L.J. 455.

51. WOODMANSEE, *supra* note 50.

52. See, e.g., *Sony Corp. of Am. v. Universal City Studios, Inc.*, 464 U.S. 417, 429 (1984); see also Wendy J. Gordon, *An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory*, 41 STAN. L. REV. 1343 (1989).

53. See, e.g., *Campbell v. Acuff-Rose Music, Inc.*, 114 S. Ct. 1164, 1169-71 (1994) (free expression values); *Keep Thomson Governor Comm. v. Citizens for Gallen Comm.*, 457 F. Supp. 957 (D.N.H. 1978) (democratic values); *Sony*, 464 U.S. at 431-34 (justice and personal autonomy values).

54. See, e.g., *Feist Publications, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340 (1991) (holding that the phone book is generally not entitled to copyright protection).

55. See, e.g., *Computer Assocs. Intl., Inc. v. Altai, Inc.*, 982 F.2d 693 (2d Cir. 1992); *Sega Enters. Ltd. v. Accolade, Inc.*, 977 F.2d 1510 (9th Cir. 1992).

56. See *Campbell*, 114 S. Ct. at 1167-68.

57. See *supra* notes 38-42 and accompanying text.

factors, along with the need to protect the authors to induce them to create and publish works of learning.

Boyle trenchantly criticizes the romantic entitlement rhetoric in copyright law and raises more than a few reasons to worry about the current direction of copyright policymaking. However, he provides less guidance than some readers might expect about how to weave justice, free expression, and efficiency considerations into copyright policymaking or about how this more balanced policy analysis would aid in the construction of a social theory of the information society.

Even so, Boyle persuaded this reader of the need for a social theory of the information society. Boyle aptly argues that copyright law must move beyond its current romance with authorship. To do so, it must reconstruct the concept of authorship in a way that will overcome the blindnesses of romantic entitlement theory. Success in this reconstruction effort would likely have broader effects on the law regulating information, for, as Boyle demonstrates so adroitly, courts applying other legal doctrines sometimes draw on romantic entitlement notions (pp. 81-107). Such a reconstruction is possible, for conceptions of copyright have changed over time and will continue to change.⁵⁸ Once we recognize that copyright is “a culturally, politically, economically, and socially constructed category rather than a real or natural one,”⁵⁹ we can reconstruct it to reflect the values our democratic society chooses for it. Niva Elkin-Koren has recently suggested a conception of copyright that “perceives the creation process as an engagement in a social dialogue.”⁶⁰ She believes that some property rights in works of authorship “are necessary to secure the freedom to express oneself. Yet, the scope of rights should be adjusted to accommodate free dialogue.”⁶¹ Like Boyle, she believes that we must redefine the private-public distinction in copyright in a way that will promote personal autonomy and democratic values.⁶²

58. See generally, Jaszi, *supra* note 50.

59. *Id.* at 459.

60. Niva Elkin-Koren, *Copyright Law and Social Dialogue on the Information Superhighway: The Case Against Copyright Liability of Bulletin Board Operators*, 13 CARDOZO ARTS & ENT. L.J. 345, 400 (1995). She points out that:

[p]ostmodernist scholars emphasize the significance of dialogue over meaning as the essence of the human cultural being and the struggle over meaning making as the essence of political action in postmodernity. Culture is thus perceived as an ongoing process of meaning-making through communicative activities, that is through social dialogue. This sphere is both constituted by the individuals engaged in it and constitute[s] them. Social agents enjoy different levels of power to fix and transform meaning depending on their ability to access and control access to sources of signification and circulation.

Id.

61. *Id.* at 401 n.290.

62. See chapter 3; Elkin-Koren, *supra* note 60, at 391-99.

Elkin-Koren points out that digital networked environments are well suited to promote personal autonomy and democratic values because they permit more decentralized forms of communication. She suggests that such environments "may allow more individuals to engage in a public discourse. Furthermore, [they] may allow for the expression of more views."⁶³ She argues against imposing strict liability for copyright infringement on bulletin board system (BBS) operators and other on-line service providers: "The overall effect of a [strict] liability rule reinforces the existing centralized structure of power. Consequently, imposing liability perpetuates the pre-digitized distribution structures and prevents BBSs from achieving [their] potential for becoming a mecca of social participation and decentralization of power."⁶⁴ Elkin-Koren does not argue that providers should be exempt from liability if they know of or encourage copyright infringement.⁶⁵ She seeks to balance the legitimate interest of copyright owners with other social values.⁶⁶

The interactive and dynamic nature of digital networked environments⁶⁷ makes Elkin-Koren's social dialogue theory especially well suited to enable the reconstruction of copyright law for the information age. An interdisciplinary consensus is emerging that digital technologies are having a profound impact on our conceptions of documents, and that documents themselves are changing in ways that those still caught in the print paradigm find difficult to grasp.⁶⁸ Some now conceive of documents as "social technologies,"⁶⁹ that is, artifacts that provide "a powerful means for structuring and navigating information space . . . [and] a powerful resource for constructing and navigating social space."⁷⁰

In their essay, *The Social Life of Documents*, John Seely Brown, Chief Scientist of Xerox Corporation, and Paul Duguid explain the importance of social context in understanding documents:

63. Elkin-Koren, *supra* note 60, at 403.

64. *Id.* at 407.

65. *See id.* at 410; *Sega Enters. Ltd. v. MAPHIA*, 857 F. Supp. 679 (N.D. Cal. 1994) (holding a BBS operator liable for infringement because he encouraged up- and downloading of commercial video games).

66. *See* Elkin-Koren, *supra* note 60, at 410 (arguing against strict liability); REPORT OF THE WORKING GROUP ON INTELLECTUAL PROPERTY, NATIONAL INFORMATION INFRASTRUCTURE TASK FORCE, INTELLECTUAL PROPERTY AND THE NATIONAL INFORMATION INFRASTRUCTURE 114-24 (Sept. 1995) [hereinafter WHITE PAPER] (asserting on-line service providers should be strictly liable for user infringement).

67. *See, e.g.*, Katsh, p. 125; DOCUMENTS IN THE DIGITAL CULTURE: A REPORT ON A WORKSHOP HELD AT THE HAWAII INTERNATIONAL CONFERENCE ON SYSTEM SCIENCE (Jan. 1995) [hereinafter DIGITAL DOCUMENTS].

68. Katsh, p. 125; *see also* RICHARD A. LANHAM, *THE ELECTRONIC WORD* (1993).

69. LANHAM, *supra* note 68, at 10.

70. John Seely Brown & Paul Duguid, *The Social Life of Documents*, RELEASE 1.0, Oct. 11, 1995, at 2.

Seeing documents as the means to make and maintain social groups, not just the means to deliver information, makes it easier to understand the utility and success of new forms of documents. This social understanding should better explain the evolution of [the World Wide] Web as a social and commercial phenomenon.⁷¹

This social-context conception of documents appreciates the importance of audiences in relation to documents and to the sources from which authors have drawn material without losing sight of the value that authors provide. This approach overcomes the limitations of romantic entitlement theory which, as Boyle shows, tend to ignore social context and to treat documents as the author's work alone. The social-context conception of documents melds well with Elkin-Koren's social-dialogue theory of copyright that, in turn, builds toward the social theory of the information society that Boyle aims to construct.

A countertrend to this approach can be found in the current effort to maximize the power of copyright owners — mainly in the hands of publishers — over all uses of their protected works, no matter how public or private in character.⁷² Insofar as this effort embodies a social theory of the information society, it would seem to envision the role of the citizen principally as a passive consumer of prepackaged information products licensed by copyright owners on whatever terms they choose to establish.⁷³ "Shut up and shop" sums up the likely reaction of many on-line providers if customers show more interest in using the service to interact with one another instead of to make on-line purchases (p. 249 n.12).

The social-dialogue theory of copyright holds promise as an alternative to the copyright maximalist paradigm for the information society, one that envisions a more active role for citizens. It would also enable development of a fair-use rule under which no copyright liability would attach to such simple acts as sharing a poem with a friend. Shortly before his untimely death, the poet Joseph Brodsky expressed a widely shared sentiment: "[O]nce you've learned something by heart it's as much yours as the author's."⁷⁴ This does not mean that readers are entitled to commercially exploit the memorized lines in competition with the poet or her publisher, but it illustrates that private exchanges of information among friends make up part of our social dialogue that should be encouraged. The social-dialogue conception of copyright also would

71. *Id.*

72. See WHITE PAPER, *supra* note 66; Pamela Samuelson, *The Copyright Grab*, WIRED, Jan. 1996, at 134 (criticizing WHITE PAPER).

73. See, e.g., Margaret J. Radin, *Evolving Property Rules for Cyberspace*, 15 U. PITT. J.L. & COM. (forthcoming 1996) (discussing passive consumer conceptions of copyright rules).

74. Joseph Brodsky, *English Lessons from Stephen Spender*, NEW YORKER, Jan. 8, 1996, at 58, 60.

be more consistent with the constitutional purposes of copyright law⁷⁵ than the maximalist pay-per-use perspective.

II. MOVING BEYOND THE PRINT METAPHOR

A. *What Digital Does to Contract and Copyright Law*

Katsh's previous book traced the extent to which the print medium affected the evolution of important legal concepts.⁷⁶ He argued that modern legal consciousness:

is still demarcated and mediated by printed texts. Whether, for example, in the formation or interpretation of wills or contracts or in the review of court trials and legislative proceedings, the law's primary instrument remains the printed document. Wherever we turn, legal reality is largely shaped by the printed word.⁷⁷

In *Law in a Digital World*, Katsh follows through on these themes by looking forward to the transformations the electronic medium will bring to law and lawyering. Katsh understands that this is no easy task: "Our expectations about words on paper are so deeply ingrained that it is difficult to stand back and look at what a change in technology means for the manner in which we orient many of our relationships" (Katsh, p. 115). He sees the need for a dispassionate reconceptualization of the role of the lawyer for the digital age, and is brave enough to make some predictions for lawyers to ponder.

Katsh predicts, for example, that digital technology will bring changes in the substantive law of contracts. He cites the Statute of Frauds as an example of a contract rule that reflects the existing law's strong bias for written documents (p. 116). He points out that in the preprint era, oral statements were thought to be more authoritative evidence of the existence of contracts and their terms than writings because at the time memories were thought to be more reliable than written documents.⁷⁸ The Statute of Frauds derives from an era in which written documents came to be more highly valued than human memory. Even though the Statute of Frauds currently is being reconsidered,⁷⁹ our cultural preference for written or printed contracts remains strong, and lawyers will surely continue to make their livings drafting them.

75. See, e.g., L. Ray Patterson, *Free Speech, Copyright, and Fair Use*, 40 VAND. L. REV. 1 (1987).

76. See KATSH, *supra* note 7.

77. P. 8 (quoting Ronald K.L. Collins & David M. Skover, *Paratexts*, 44 STAN. L. REV. 509 (1992) (internal quotation marks omitted)).

78. See p. 116 (citing M.T. CLANCHY, *FROM MEMORY TO WRITTEN RECORD* (1979)).

79. Reconsideration of the rule arises from doubt about its continuing ability to deter fraud. See, e.g., U.C.C. REVISED ARTICLE 2, § 2-2201 reporter's note 4 (Tent. Draft 1994) [hereinafter U.C.C. DRAFT]. Katsh does not mention this development, let alone suggest that digital technology caused it.

How will digital technologies affect contracts? Katsh asserts that unlike printed documents, which are fixed and final, digital contracts will be dynamic and fluid (pp. 118-25). He says that while paper contracts "bind parties to an act[, t]he electronic contract binds parties to a process" (p. 129). Katsh predicts that lawyers who negotiate digital contracts will become involved in an interactive process of monitoring the relationships of parties to the contract and the ongoing evolution of their agreements (pp. 125-29). He expects groupware software to assist the digital lawyer in managing these evolving digital contracts (p. 125). Katsh predicts that contract rules will, as a consequence, become more focused on interpreting the parties' changing understandings and less on the static printed document embodying the parties' original understanding.⁸⁰

Modern contract law is less dependent on written documents than Katsh assumes. While the Uniform Commercial Code still requires written evidence of most contracts,⁸¹ it provides many default rules for interpreting contracts, such as those that allow trade usages, prior dealings between the parties, a course of performance under that contract,⁸² and relevant oral statements made by the parties to supplement the terms of a writing to reflect the larger agreement of the parties.⁸³ These rules, which effectively diminish the importance of writings in commercial law, predate digital technology. This suggests that it may be easier than Katsh realizes for contract law to evolve toward the dynamic, process-oriented model Katsh posits.

Digital technology may also cause contract law to evolve in ways that Katsh does not foresee. For example, a recent draft of rules to regulate the licensing of intangibles includes a proposed rule that would validate, as a matter of contract law, the making of automated contracts about digital information products.⁸⁴ This rule contemplates a scenario in which a potential buyer or licensee of digital information would instruct an intelligent digital agent to search the network for a particular kind of information on terms within certain parameters. Somewhere out there in cyberspace, her agent would find and interact with the intelligent agents of sellers or licensors of the desired information. Through an exchange of messages, those agents would "negotiate" terms that, once agreed

80. Katsh, pp. 127-28. Katsh regards Ian Macneil's concept of relational contracts as a step in the right direction for digital contracts. See IAN R. MACNEIL, *THE NEW SOCIAL CONTRACT* (1980).

81. See U.C.C. § 2-201 (1994).

82. See *id.* §§ 1-205, 2-208.

83. See *id.* §§ 2-202, 2-204.

84. UCC DRAFT, *supra* note 79, § 2-2202.

upon by the agents, would bind the persons for whom they are acting even though neither the seller-licensor nor the buyer-licensee was aware of the specific contract terms at the time the contract was made. Not all digital contracts, it appears, will be relationship-enhancing, dynamic, or fluid.

Writings are even more important in copyright than in contract law. The U.S. Constitution designates "writings" of authors as a subject matter about which Congress can legislate.⁸⁵ Although U.S. copyright law now regulates far more than the printing and re-printing of books, the print metaphor continues to have importance in that body of law.⁸⁶ Copyright, says Katsh, "is in a difficult and highly challenging period not simply because copying is rampant and enforcement is difficult, but because even though it has not been widely recognized, the nature of our relationship with electronic information is vastly different from our relationship with print" (p. 219). Here, Katsh is even more correct than he realizes.⁸⁷

One current controversy nicely illustrates the challenges that digital technologies pose for copyright law. The controversy concerns whether a temporary reproduction of a copyrighted work in the random access memory (RAM) of a computer — that is, a copy that will cease to exist when the computer is turned off — is a potentially infringing copy of the work.⁸⁸ U.S. law defines the term *copy* as requiring a "fixation" of the work in a tangible medium.⁸⁹ Is a RAM copy "fixed"? The legislative history of the copyright

85. U.S. CONST. art. I, § 8, cl. 8.

86. The first U.S. copyright law protected only printed matter, such as maps, charts, and books. See, e.g., *JOYCE ET AL.*, *supra* note 45, at 10. It now protects nonprint material such as motion pictures, photographs, and sound recordings. See 17 U.S.C. § 102(a) (1994). Even so, copyright law continues to rely on many print-originated concepts. For example, it designates the owner of rights as the "author" and it relies heavily on the concept of "publication." 17 U.S.C. §§ 101 (definition of "publication"), 201, 304.

87. Katsh apparently does not realize that copyright law has evolved beyond print-based concepts. In the early twentieth century, the Supreme Court thought that copyright protected particular artifacts, not all forms of representations of works. In *White-Smith Music Publishing Co. v. Apollo Co.*, 209 U.S. 1 (1908), the Court held that a piano roll recording did not infringe the copyright in a printed musical composition. It decided that the piano roll was not a "copy" of the print artifact. Although Congress soon amended copyright law to make mechanical recordings of musical compositions an infringement, it was not until the Copyright Act of 1976 that copyright law focused on protecting all original works of authorship without regard to their particular form, as long as one copy of each work exists in a tangible form. See 17 U.S.C. § 202 (1994). Thus, the statute protects a "literary work" whether embodied in a printed book or in "books-on-tape."

88. Cf. Jane C. Ginsburg, *Putting Cars on the "Information Superhighway": Authors, Exploiters, and Copyright in Cyberspace*, 95 COLUM. L. REV. 1466 (1995); Jessica Litman, *The Exclusive Right To Read*, 13 CARDOZO ARTS & ENT L.J. 29 (1994).

89. See 17 U.S.C. § 101 (1994) (definition of "fixed").

statute suggests not.⁹⁰ Yet, a few courts and some policymakers insist that a RAM copy is fixed enough to infringe.⁹¹

The RAM copy infringement theory would seem to make it illegal to visit sites on the World Wide Web or to browse any other information in digital form. This idea appeals to those who wish to move the focus of economic activity in digital networked environments away from the supplying of individual copies to individual customers and towards the granting of access to digital information. The fact that every use of digital versions of copyrighted works involves the making of temporary reproductions in computer memory leads others to suggest that the reproduction right may not be viable as the central regulatory mechanism of copyright law in the digital environment. Perhaps we should reconstitute the exclusive-right provisions of copyright law to regulate the commercial exploitation of protected works.⁹² The very fact that questions are arising about the legal authority of copyright owners to control all uses of digital works supports Katsh's argument that the digital medium is changing the relationship between authors, publishers, and readers. Further changes in these relationships will arise with the use of technological forms of legal protection for copyrighted works.⁹³

B. *Hypertextuality of Law*

Law is inherently hypertextual.⁹⁴ Katsh gives the West key number system as an example of a legal hypertext.⁹⁵ There is, however, far more hypertext in the law than this. Hypertext in law exists wherever a section of a statute refers to another section, wherever a regulation refers to its guiding statute, wherever a court opinion cites a prior case or legal treatise, and wherever a law review article refers to other texts. Links between or among chunks of text are the essence of hypertext.⁹⁶ Hypertext has been with literate cultures since at least the Talmud.

90. See H.R. REP. NO. 1476, 94th Cong., 2d Sess. 62 (1976) (indicating that temporary storage in computer memory was not fixed enough to be an infringing copy).

91. See, e.g., *MAI Systems Corp. v. Peak Computer, Inc.*, 991 F.2d 511 (9th Cir. 1993), cert. dismissed, 114 S. Ct. 671 (1994); WHITE PAPER, *supra* note 66, at 65.

92. See Jessica Litman, *Revising Copyright Law for the Information Age*, 75 OR. L. REV. (forthcoming 1996) (manuscript at 22-30, on file with author).

93. See Proceedings, *On Technological Strategies for Protecting Intellectual Property in the Networked Multimedia Environment*, 1 J. INTERACTIVE MULTIMEDIA ASSN. 1 (1994).

94. "Hypertext," a term coined by Theodor Nelson, describes the digital texts that enable users to create and follow links among different documents or components of documents. See THEODOR HOLM NELSON, *LITERARY MACHINES passim* (1987). For a discussion of Nelson's legal and economic model for hypertext, see Pamela Samuelson & Robert J. Glushko, *Intellectual Property Rights for Digital Library and Hypertext Publishing Systems*, 6 HARV. J.L. & TECH. 237 (1993).

95. See p. 204. The principal function of the West key number system is as a navigational aid to hypertext.

96. See NELSON, *supra* note 94, at 1/15.

Digital hypertexts have some unique properties. They make the contents of different documents seem to be part of the same document. They also make documents from different sources seem to be contiguous in a manner that print materials cannot achieve (pp. 204-05). Instead of "dead" links between one printed text and another, such as a cross-reference in each text to the other, digital technology enables creation of "live" links that allow the reader to "jump" immediately to the cited material. Using printed texts, a reader must get up and take yet another book off the shelf and thumb through it to find the same material.⁹⁷ A hypertext designer also can "type" links so that potential users will know what kind of information to expect if she follows the link.⁹⁸ In a legal hypertext, statutory cites might, for example, be identified by a particular attribute, such as a color or font type.⁹⁹ Links to other kinds of source materials might be assigned other attributes.

Katsh is among those who admire hypertext for the nonlinear reading experiences it makes possible (pp. 198-99). Printed texts tend to have a highly linear character: They start with this thought, then move to that, and continue with numerous other thoughts until the linear narrative ends.¹⁰⁰ The author is the "authority" who dictates the reader's path through the text. Hypertexts, by contrast, are said to liberate readers because they permit readers to determine their own paths through texts and sometimes to create their own links (pp. 198-201). This changes the power relationship between authors and readers. By charting her own course through the text and creating her own links among its parts, the reader, in a sense, becomes the author of the text constructed from the raw material provided by the hypertext author.¹⁰¹ In the liberationist rhetoric of hypertext, readers throw off the chains of passivity that print has imposed on them and become their own masters, empowered to take a more active role in uses of texts. Katsh believes that hypertext "threatens to dismantle the print model even further by releasing the page from its binding and even by allowing a reordering of words, sentences, and paragraphs by each and every user" (p.

97. The text describes a "live" link to two "dead" texts. One also may create "live" links to "live" information. For example, a link in a digital hypertext may connect to updated versions of a document. A link also may connect to a site that will generate, in real time, information tailored to the interests of the individual following the link based on that person's history of interaction with the site or other characteristics. Conversation with Robert J. Glushko, Chief Scientist, Passage Systems, in Ithaca, New York (Feb. 3, 1996).

98. See, e.g., NELSON, *supra* note 94, at 4/41-4/60. Katsh does not discuss link types.

99. The *Bluebook* rules that govern law review citation form include link-type conventions for legal reference materials. See, e.g., signals one type of link; cf. signals another. See BLUEBOOK: A UNIFORM SYSTEM OF CITATION 22-23 (15th ed. 1991).

100. See pp. 198-99; see also JAY DAVID BOLTER, *WRITING SPACE* (1991).

101. See, e.g., Pamela Samuelson, *Some New Kinds of Authorship Made Possible by Computers and Some Intellectual Property Questions They Raise*, 53 U. PITT. L. REV. 685 (1992).

198). Katsh seems to regard the "page" as a concept that makes sense only in print (p. 205).

Katsh exaggerates the extent to which digital and print-based research experiences differ. When lawyers do legal research in a traditional print-based law library, they engage in a lot of nonlinear activities. They typically jump from one part of a judicial opinion to the midpoint of another, from a part of a case that cites a statute to the relevant subsection in the statute book, from there to a legislative history of the subsection, and so on. Tools, such as the West key number system, enable legal researchers to skip past most parts of judicial opinions to locate their golden nuggets. Many legal reference materials, such as *Shepard's Citations*, also were never meant to be read from beginning to end. Thus, ordinary print-based legal research often can be a multipath, active reading process. Law professors who ask their students to research a single issue based on a hypothetical fact pattern often discover that the students chart many different navigational paths through the same set of resource materials. The paths will vary considerably regardless of whether the students use only print materials, only digital materials, or a combination of both.

The continuing importance of the concept of pages is illustrated by the most extensive hypertext system ever developed, namely the World Wide Web. People put information on the Web by creating a "home page." A Web page is not an artifact of print conventions, but it has in common with print pages that it is a self-contained unit of separately indexable content. The digital environment thus has transformed the page concept, not made it obsolete. However, new conventions for locating content, such as the numbering of paragraphs of a text, will likely supplement the page concept in the digital environment.¹⁰²

Katsh does not recognize how much control a hypertext developer exercises over the degrees of freedom users will have to make nonlinear uses of a hypertext. The developer determines how many links will be available, whether the links will be one-directional or bi-directional, and whether users will be able to make their own links. The extent of nonlinearity permitted by the hypertext will depend partly on the inclinations of the developer and partly on the nature of the application domain. Designers of virtual reality products will tend to maximize nonlinearity because getting lost in cyberspace can be fun. Authors of hypertextual reference materi-

102. Nonproprietary citation systems for legal information, including the use of paragraph numbers instead of page numbers for case citations, may soon emerge. See, e.g., Robert Berring, *On Not Throwing Out the Baby: Planning the Future of Legal Information*, 83 CAL. L. REV. 615 (1995).

als, however, will heavily structure their works and allow users very little opportunity to cavort around in experimental ways.¹⁰³

Besides, linearity may have abiding value for many kinds of legal materials, such as briefs, judicial opinions, and law review articles. Legal argumentation, by its very nature, proceeds linearly, taking logical steps from one idea to the next to a conclusion. Although Katsh never suggests that lawyers will stop making linear arguments, neither does he explore the future of linearity in digital forms of legal texts.

Forward-looking lawyers will learn to make use of digital technologies to facilitate the intertextual nature of legal analysis. One of these days, briefs submitted by lawyers to a court will contain links to the full texts of cited authorities. Lawyers will strengthen reply briefs by constructing links between portions of their opponent's brief and sources that undermine the opponent's argument. Judges will be able to pose questions for counsel before motion hearings by writing hypertext "pop-up" notes on the briefs. As these examples illustrate, hypertext can enable new forms of interactive experiences with legal texts. Thus, Katsh's prediction that hypertexts will effect the way lawyers organize and use information, and that this will affect how they conduct their business, seems sound.

C. *Macbeth Multimedia*

Katsh also predicts that digital technologies will enable lawyers to construct legal documents embodying graphics, sound, and video, as well as text, and this too will change the practice of law (pp. 133-71). Katsh does not use the term "multimedia," but he seems enthusiastic about the concept of it for future legal documents. Mixed media works have been difficult to create because of limitations of traditional media types. One cannot, for example, include motion picture clips in a printed book. In digital form, however, all information types — text, pictures, sound recordings, motion pictures, or video recordings — consist of binary digits. Thus, digital authors encounter far fewer impediments to mixing different types of information into one document. Digital multimedia creation requires a considerable amount of hard-disk storage space, good editing tools, and effective compression algorithms, but with current technology, one can quite easily compile a document that includes text, pictures, sound recordings, and video.

103. A considerable amount of hypertext research focuses on designing easy-to-use navigational aids to help users avoid getting lost in hypertexts. See, e.g., Manfred Thuring et al., *Hypermedia and Cognition: Designing for Comprehension*, 38 COMM. OF THE ACM 57 (1995).

Katsh predicts that digital multimedia will have a profound effect on lawyers, the practice of law, and law itself, by fundamentally changing the way lawyers represent, organize, and use information (pp. 133-71). The transition from the print medium to digital multimedia will, he thinks, prove as profound as the transition from scribal transcriptions to printed texts. Katsh observes that “[t]he cultural adaptation to printing involved more than confronting an information explosion in which more books were published and available. It required acceptance of new grammars, new modes of discourse, new styles of expression, new appearances and designs, and new assumptions about information” (p. 144). In order to take full advantage of printed books, people developed new literacy skills, namely, reading and writing. Our educational system continues to concentrate heavily on those skills.¹⁰⁴ Katsh thinks that digital lawyers will need to acquire new visual literacy skills in order to exploit fully the opportunities that multimedia digital technologies will afford.¹⁰⁵

Katsh perceives some “cracks” in the law’s bias against visual information (p. 158). He points to the increased use of electronic recordings of images and sounds, sometimes known as “paratexts,”¹⁰⁶ in court proceedings. Katsh views print as a distancing medium that “operates as a subtle but highly significant force in the process of making the judicial process appear to be objective, neutral and impersonal” (p. 164). He praises the use of visual information in legal materials because visual information is more compelling than print information.¹⁰⁷

Katsh is correct that digital technology will enable lawyers to include more pictures, sounds, and video material in their documents. Multimedia is already being used to some degree in the presentation of forensic evidence in criminal cases and in computer-graphics simulations of accidents and the like in tort cases.¹⁰⁸ Hypertext briefs may include visual information, such as excerpts from videotaped depositions, which will have a different impact on decisionmakers than purely textual briefs do. Thus, Katsh may be

104. Katsh points out that reading and writing tend to be taught as though they were one skill, even though they are quite distinct. One requires consumption and the other creation. In contrast, we receive very little education in visual literacy skills, and we treat the viewing of art as a completely different kind of skill from the making of it. See p. 153.

105. If Katsh is correct on this point, law schools will need to offer multimedia courses.

106. For a discussion of paratexts, see generally Collins & Skover, *supra* note 77.

107. See pp. 159-62. The compelling nature of visual information, such as bloody gloves in a murder trial, sometimes causes courts to limit its use at trial. The prejudicial effect of such evidence may outweigh its probative value. The power of visual information does not arise from its inherent superiority as a form of information; rather it arises from the operations of human perception.

108. See, e.g., Henry H. Perritt, Jr., *Video Depositions, Transcripts and Trials*, 43 EMORY L.J. 1071 (1994).

right that digital technologies will change lawyering practices, in particular, the way lawyers organize and present information.

Yet, Katsh underestimates the extent to which text will continue to play a prominent role in legal work. Text has many advantages: It is cheaper to construct than other information types. It requires far less computer memory, processing power, and bandwidth than digital pictures or video. Text is also easier to search and index than electronic pictures or video. The precision and recall rates for locating exact words in electronic databases approach one hundred percent. Because of this, a researcher's ability to find relevant documents by using a number of search words is quite impressive.¹⁰⁹ Pictures and video, by contrast, are very difficult to search, unless someone has handcrafted descriptive labels for the pictorial information. Some progress has been made in the development of algorithms for searching the contents of digital pictures.¹¹⁰ Nevertheless, the precision and recall functions of the search engines for visual information are poor as compared with searches of text. Someone who wanted to find a particular speech at a trial would do far better to search an electronic file of the trial transcript rather than an electronic file of the videotape.

Text will remain the primary form of legal communication for other reasons as well. Much of the prowess lawyers develop over time lies in an ability to abstract away from the messy complexity of real life and to construct more abstract representations of what happened in a manner that will facilitate resolution of disputes. If law is not as neutral or objective as many lawyers would like to believe, text nonetheless may contribute to a generally beneficial distanced neutrality in law. Text is also extraordinarily compact and well suited to the articulation of general legal principles, whereas visual information is rich in particularities of instances. In his enthusiastic embrace of multimedia, Katsh may have exaggerated the value of visual information in legal materials and underappreciated the abiding value of text. Would we really prefer judges to resolve disputes by constructing multimedia presentations? What precedential value would such an opinion have, and how would one cite it?

Robert Glushko, a hypermedia designer and consultant, warns his clients against "Macbeth multimedia"¹¹¹ — that is, multimedia projects that overuse pictures, sound clips, and video in a way that obstructs rather than clarifies the message. Such presentations are

109. "Precision is the proportion of a retrieved set of documents . . . relevant to a query, while recall is the proportion of documents in the collection . . . relevant to a query" Teresa Pritchard-Schoch, *Natural Language Comes of Age*, ONLINE, May 1993, at 34.

110. Robert Wilensky, Chair of the Computer Science Dept. of the University of California at Berkeley, says that his department has developed "the world's best nude detector." Conversation with Robert Wilensky, in Wailea, Haw. (Jan. 3, 1996).

111. Conversation with Robert Glushko, *supra* note 97.

“full of sound and fury, signifying nothing.”¹¹² For many application domains — including law — text will remain a highly useful, effective, and economically sound form of communication.

D. *Needles and Haystacks*

Katsh also considers the impact of digital technologies on the accessibility of legal information. He predicts that digital technology will enhance public access to legal information. This may reduce the public's need for lawyers and put lawyers in greater competition with other professionals (pp. 83-91). Katsh argues that digital lawyers may need to become proficient in other disciplines or to team up with other professionals in order to maintain a competitive edge (pp. 83-91). This would, of course, fundamentally change the nature of legal practice if it occurred on a large scale.

Katsh believes that digital technologies can lessen two kinds of distance between ordinary people and the law. First, it can lessen physical distance because people can more easily log on to a legal database than trek to law libraries. Second, it lessens “information distance,” that is, the relative difficulty of finding the appropriate needle in the haystack of legal materials. Ordinary people can conduct a search in a legal database without knowing how to use the West key number system, *Shepard's Citations*, or the other complex legal information resources (pp. 57-62, 65-91). Using natural language search technologies, an ordinary person can formulate a question and receive responsive information (pp. 85-86). Those with access to the Internet and the World Wide Web also can access sites that contain legal information (p. 86). For example, people can access U.S. Supreme Court opinions at Cornell's Legal Information Institute site.¹¹³ At the Thomas Web site, they can access bills pending before Congress.¹¹⁴

Katsh is surely right that digital networked environments have enhanced public access to legal information, and that this trend will likely continue. He also may be right that lawyers whose work largely involves finding information in books for their clients may be put out of work as these materials go on-line. Most lawyers, however, need not worry. Digital technologies will not significantly reduce the information distance between ordinary people and the law as much as Katsh predicts. People hire lawyers because they believe the lawyers will know how to extract the right needle from the right haystack of legal information. This ability requires more than knowing how to use the West key number system; it also re-

112. WILLIAM SHAKESPEARE, *MACBETH* act 5, sc. 5.

113. Its Uniform Resource Locator (URL) is <http://www.law.cornell.edu>.

114. Its URL is <http://thomas.loc.gov/>.

quires a set of conceptual, analytic, and judgment skills that lawyers learn through complex pattern-matching exercises in law school and law practice. Few ordinary people possess these skills.

Besides, in some respects, public access to legal information may be more restrictive in the electronic environment than before. The major commercial legal databases restrict the classes of people who can access them (e.g., students of a subscribing law school). In addition, these services charge relatively high prices to individual users. Many print law libraries, by contrast, have long been open to the public for free. And print libraries have live librarians to aid user searches, whereas electronic databases do not.¹¹⁵

Katsh is not alone in hoping that digital technologies will enhance the ability of information consumers to find needles in the haystacks of large databases of information.¹¹⁶ Many computer scientists and software companies are working to develop software that will improve the efficiency of electronic searches. Unfortunately, digital technologies are not just part of the solution — they are also part of the problem. This society has been amassing digital information in such quantities that our haystacks now are almost unimaginably large and getting larger every day.¹¹⁷ Good software tools may help with needle detection in some domains, but in the domain of law, the best needle-detectors will continue to be smart, well-trained lawyers.

CONCLUSION

Boyle and Katsh not only predict imminent paradigm shifts¹¹⁸ in the law of information and in lawyering; they also aim to assist readers to leave behind the disabling concepts of the past and embrace concepts that will enable a better future.

Boyle aims to reconstruct the notion of authorship in order to facilitate more balance in copyright policy. No one who reads Boyle's book can fail to detect the pleasure he takes in a well-turned phrase.¹¹⁹ From this alone, it should be apparent that Boyle does not oppose authors' rights except to the extent that romantic notions about authorship lead to inefficient or unjust legal outcomes, as sometimes occur when we fail to appreciate fully the

115. Katsh discusses at some length why electronic legal databases cannot be considered "libraries." See pp. 65-75.

116. Information retrieval is, as a consequence, one of the key fields of computer science.

117. It is becoming common to speak of "terabytes" of information. See, e.g., Claire Mencke, *The New America*, INVESTOR'S DAILY, Jan. 17, 1996, at A4 (discussing data storage difficulties with terabyte data collections).

118. For a discussion of paradigm shifts, see generally THOMAS S. KUHN, *THE STRUCTURE OF SCIENTIFIC REVOLUTIONS* 174-210 (1970).

119. See, e.g., Boyle, p. 4 ("The human genome project is simply a large scale exercise in cryptography.").

sources from which authors draw or the contributions of audiences (Boyle, pp. 59-60, 164-65). Boyle asserts that author-entitlement theory "has a clear element of existential truth" and that "it seems to *work*" (Boyle, p. 60). He strives to cure the blindnesses that romantic-entitlement theory has inflicted on copyright law. His book is more successful in showing the disabling effects of romantic-entitlement theory than in articulating a new, more enabling notion of authorship. Nevertheless he moves the relevant discourse along. This review suggests that the social-dialogue concept of the author, which depicts authors as contributors to social dialogue, along with their audiences and sources from which they draw, is a plausible candidate for the reconstituted author notion that Boyle's social theory of the information society requires.¹²⁰

Katsh asserts that digital technologies will bring fundamental transformations to the law and law practice, and that today's lawyers ignore these transformations at their peril. A factor that may impede acceptance of his thesis by many lawyers is his unconventional mode of argumentation. Katsh discusses, in diffuse detail, various characteristics of digital technologies that may impact the law. He hopes that the cumulative effect of this discussion will persuade readers of the likelihood of fundamental change, even if there are reasons to question some of his individual points.¹²¹ Mainstream legal analysis tends to regard flaws in any part of an argument as reason to doubt the whole argument. When this review essay suggests that Katsh may exaggerate the transformative effect of hypertexts and digitized visual information for law and lawyering, it signals a skepticism toward Katsh's larger thesis. Yet, if one accepts the McLuhanesque notion that the medium is the message, one also should entertain the notion that the digital medium may bring larger changes to the legal profession than print-oriented lawyers easily can perceive. Katsh deserves credit for writ-

120. See *supra* notes 58-74 and accompanying text.

121. Katsh identifies a number of characteristics of the electronic information environment that may affect law and lawyering: (1) digital information is less permanent and stable than print information; (2) digital information is more decentralized than print information; (3) digital information is more dynamic than print information; (4) digital information is less linear than print information; (5) digital information diminishes distance, in that documents stored in different places seem adjacent to one another; (6) digital information erodes other jurisdictional boundaries; (7) digital information is more difficult to authenticate than print information; (8) digital information can be searched in different ways than print information; (9) control over access and use, rather than the sale and distribution of copies, is the key focus of economic activity for digital information; (10) the digital medium enables the integration of more information types into documents; (11) the digital medium enables more interactive communication than print media; (12) the digital medium enables collaborative work; (13) the digital medium enables information to be networked in ways print does not; (14) the digital medium enables more continuous monitoring of relationships than the print medium; and (15) the digital medium places more value on sharing information than hoarding it. See pp. 50-59, 79-91, 95-107, 204-11.

ing the first book that attempts to chart these larger changes and to equip lawyers to survive the transformation.

Boyle and Katsh rightly perceive a need for books that provide a social theory for the information society and that provide lawyers with insights about changes that digital technology may bring to their profession. Both wrote books they felt were needed, and neither was deterred from their ambitious projects by a fear of failure, though predicting the future is inevitably a perilous intellectual activity. Boyle at one point expresses the hope that even if his ambitious project failed, it would be "a *large* failure rather than a small one" (Boyle, p. 155). This review commends both books for their successes — and for failures that are large enough to make the books well worth reading. Both books advance our understanding of the complex challenges of information policy and digital technology for law and lawyering in the twenty-first century. The poet Rainer Maria Rilke once expressed the value of tackling seemingly unmanageable tasks:

What we choose to fight is so tiny!
 What fights with us is so great!

...

When we win, it's with small things,
 and the triumph itself makes us small.
 What is extraordinary and eternal
 does not *want* to be bent by us.
 I mean the Angel who appeared
 to the wrestlers of the Old Testament[.]

...

Whoever was beaten by this Angel
 (who often simply declined the fight)
 went away proud and strengthened
 and great from that harsh hand,
 that kneaded him as if to change his shape.
 Winning does not tempt that man.
 This is how he grows: by being defeated, decisively,
 by constantly greater beings.¹²²

122. RAINER MARIA RILKE, *The Man Watching*, SELECTED POEMS 105, 105-07 (Robert Bly trans., 1981).