From Key Numbers to Keywords: How Automation Has Transformed the Law*

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The automation of information has far-reaching consequences for the law. Print-based research sources foster a view of the law as a separate domain, hierarchically organized under basic principles. In contrast, computer-assisted legal research erodes the boundaries that separate law from other domains and conveys an image of the law as a relatively unorganized assortment of facts and doctrines.

¶1 Christopher Columbus Langdell, dean of the Harvard Law School from 1870 to 1895, famously said that the law is a science, and the library is its laboratory.[1] The physical library no longer holds the privileged position that it did in Langdell's day, but the grain of truth in his pronouncement is that the law is grounded in a body of information. During the last two decades of the twentieth century, American law underwent a revolution in the management of information. Prior to that time legal research required consultation of a variety of books in a law library, but today automated systems bring full texts of virtually everything one needs for legal research to the desktop computer. The impact of this change has been massive. The landscape of legal research has been utterly transformed as skills that were second nature to lawyers a generation ago are obsolete today and hitherto unknown procedures have become commonplace. Nor is this simply a matter of lawyers being able to do what they used to do, only faster and more conveniently. Instead, the upheaval in the management of legal information has produced a number of fundamental transformations in the process and products of legal research and, indeed, in the structure and practice of the law itself.[2]

¶2 Carol Bast and Ransford Pyle have recently contributed a stimulating article on "Legal Research in the Computer Age" to the *Law Library Journal*.[3] They suggest

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1. GRANT GILMORE, THE AGES OF AMERICAN LAW 42 (1977).
2. Robert C. Berring, *Full-Text Data Bases and Legal Research: Backing into the Future*, 1 HIGH TECH. L.J. 27, 29 (1986); Ethan Katsh, *Law in a Digital World: Computer Networks and Cyberspace*, 38 VILL. L. REV. 403, 405–09 (1993).
3. Carol M. Bast & Ransford C. Pyle, *Legal Research in the Computer Age: A Paradigm Shift?* 93 LAW LIBR. J. 285, 2001 LAW LIBR. J. 13.

that legal research is undergoing a shift from a print-based paradigm to a computer-based one, and that this has a number of far-reaching consequences for the law in general. These are paradigms for what I call "information management": techniques for organizing, storing, retrieving, and using information. Bast and Pyle argue that the old, print-based paradigm is grounded in a combination of the Langdellian law school curriculum and a set of research techniques best exemplified by the West key number system. Its hallmarks are conservatism and an approach to law that considers the facts of any case within a framework of general legal principles.[4] The new paradigm grows out of the computer-assisted legal research services LexisNexis and Westlaw (and now the Internet). It is characterized by more emphasis on facts and less on legal principles.[5] In the new paradigm, keyword searching seems to place more control in the hands of individual researchers because they can customize their own searches rather than being limited to the prepackaged index categories of the key number system. However, Bast and Pyle perceptively argue that this is something of an illusion because certain avenues of online research are subtly encouraged and others discouraged by programmer-created software codes.[6]

¶3 My intention in this article is to further discussion of the consequences of automated information management. The spirit is constructive rather than critical, because I am in agreement with most of what Bast and Pyle say. I aim to extend the analysis by looking in greater detail at some of the areas they addressed as well as pursuing a number of questions that they did not. If my perspective should appear somewhat different from theirs, it is probably because I am an anthropologist and not a lawyer. My findings are based on statistics and more than thirty interviews with practicing attorneys, law faculty, librarians, and appellate court judges, as well as on the secondary-source literature.

¶4 The investigation begins with a brief review of the history of print-based legal research and a discussion of how it fosters a view of the law as a self-contained system of facts and doctrines hierarchically organized under general principles. I then draw a distinction between classification and indexing and argue that print-based research operates in terms of the former while computer-assisted legal research utilizes the latter. The bulk of the essay then demonstrates how this shift has contributed to a lowering of boundaries both within the law and between the law and other disciplines, and to an emerging conception of the law as a collection of facts and doctrines that is organized only loosely, if at all.

Recorded Information and the Law

¶5 Recorded information is simultaneously the necessary food and a potential poison for a system of common law. The toxic element comes from sheer volume.

4. *Id*. at 286–88, ¶¶ 5–13; 296–97, ¶¶ 42–43.
5. *Id*. at 293–94, ¶ 32; 297–98, ¶¶ 45–49.
6. *Id*. at 292, ¶ 27; 301–02, ¶ 61.

Throughout the history of common law the alarm has been repeatedly raised that the growing mass of case records imposes an intolerable burden on practitioners. At first glance this seems curious, because the literature of other professions and academic disciplines has also been accumulating for centuries and yet similar complaints are not heard from them. What is different about the law? Part of the explanation may be that the past is easier to set aside in certain other disciplines than it is in the law. While this proposition obviously would not fit a discipline such as history, medicine and the natural sciences are so intensively occupied with current approaches to current problems that the literature of a century or even a decade ago can be safely ignored. Legal reasoning, on the other hand, proceeds largely by drawing analogies between the present and the past. Given the doctrine of stare decisis, the emphasis in law is on finding earlier cases sufficiently similar to the case at hand to serve as precedent for it. Moreover, lawyers' objectives differ from those of other professionals in a way that emphasizes the past. Scholars in the other academic disciplines aim to develop the best possible solutions to the problems they address. Although certainly no unanimity exists on how to go about doing that, at least a rough consensus often does emerge, including general agreement that certain previous ways of proceeding are obsolete and should be ignored. For their part, lawyers aim to develop the best possible arguments *that benefit their clients.* Thus the two parties to a lawsuit try to cast the situation in different lights and scour the past for precedent pointing in opposite directions. Hence consensus that certain contributions from the past are useful and others are not is less likely to be achieved in the law than in other disciplines.

¶6 In any event, with the passage of time the number of decided cases obviously increases. If they all are considered as potential precedent, the sheer mass of recorded information grows beyond the capacity of any attorney or judge to control, and the edifice of common law threatens to collapse under its own weight. This threat has recurred with almost monotonous regularity throughout the history of the common law. What is not monotonous is the variety and ingenuity of the strategies that have been marshaled at various historical moments to cope with it.

The British Way

¶7 A supply-side strategy is to restrict the growth of the literature. While a number of American court systems aspire to it, this approach has been adopted primarily by the British. They tried to prevent publication of redundant cases with the explicit intent of keeping the body of case law within manageable limits. The goal was to report (publish) only those cases that modify a principle of law, enunciate a new principle, settle a doubtful question, or that are in some other way particularly instructive. This strategy has been only partially successful, for in recent years a vast number of decisions have become available on the Internet and by other means. This stimulated much concern for the fate of the common law. In 1983 the Court of Appeal and the House of Lords "issued important announcements restricting the use of unreported materials which the computer revolution

has suddenly made available to the profession. In particular, the House of Lords . . . has effectively outlawed the citation of unreported cases in argument before it."[7] Interestingly, a lawyer who has clerked for two U.S. Supreme Court justices told me that the Court follows similar procedures if, perhaps, for different reasons. As the court of last resort, it tends to privilege the highly limited universe of its own decisions.

¶8 The strategy of limited reporting has certain unintended consequences. The common law operates by analyzing a new case as similar to previous ones that might serve as precedent for it and following the principle of stare decisis to decide the new case in the same way. But no two cases are ever exactly alike, so there is always a question of just what earlier cases should serve as precedent. Ingenious attorneys may strive to demonstrate how the case at hand is materially different from the cases that conventionally would be taken as precedent, and how it in fact is similar to other cases, thus conducing the court to a decision beneficial to one's client. Limiting the number of cases that can serve as precedent may impart stability to the law, but at the cost of restricting this kind of argument and thus diminishing the law's flexibility.

The American Way

¶9 The opposite approach is to let a thousand flowers bloom; that is, to publish many cases. Given the practice of reasoning by analogy, this provides a wider field in which attorneys and judges may seek the similarities of fact or principle that could serve as precedent for the case before them. This approach has predominated in American law. Its onerous consequences soon became apparent. Noting that more than 150 volumes of law reports had been published between the Revolution and 1821, Judge Story remarked with some consternation that "the danger indeed seems to be, not that we shall want able reports, but that we shall be overwhelmed by their number and variety."[8] A committee on law reporting, formed by the Bar Association of the City of New York in 1873, noted that in the 79 years since 1794 some 590 volumes of law reports had been published in the United States. That amounted to more than half the total of English law report volumes that had been published in a period of 565 years from 1307.[9]

¶10 The phenomenal volume of American reports was due less to a principled intention to arm lawyers with a rich field to mine for potential precedent than to the ambition to make some money. The New York committee wrote "that the number of reports is due to the fact that law reporting has become a distinct business,

7. Roderick Munday, *The Limits of Citation Determined*, 80 LAW SOC'Y GAZETTE 1337 (1983), *cited in* GEORGE S. GROSSMAN, LEGAL RESEARCH: HISTORICAL FOUNDATIONS OF THE ELECTRONIC AGE 35 (1994).

8. *Quoted in* REPORT OF THE COMMITTEE ON LAW REPORTING OF THE ASSOCIATION OF THE BAR OF THE CITY OF NEW YORK (1873) [hereinafter REPORT OF THE COMMITTEE ON LAW REPORTING], *reprinted in* GROSSMAN, *supra* note 7, at 58, 59.

9. REPORT OF THE COMMITTEE ON LAW REPORTING, *supra* note 8, at 59.

conducted by private individuals for their own emolument; that book-making is the interest of those engaged in this traffic, and that their profits depend, not upon the excellence, but upon the number of the volumes they edit; the profession having been found ready to buy whatever the publisher would print."[10] The upshot of this situation was much sloppy reporting and redundancy.

¶11 The committee was of the opinion that case reporting should be officially sanctioned by government and subject to oversight by a supervisory body. But forty years earlier the U.S. Supreme Court had held in *Wheaton v. Peters*[11] that the spirit of American democracy supported the right of anyone freely to disseminate statutes and court decisions. Perhaps bearing that case in mind, the New York committee did not propose outlawing private reporters but limited its recommendation to the establishment of an officially sanctioned, supervised, and funded case reporter. Its quality, they predicted, would be sufficient to drive the profit-driven rivals out of business.[12]

West Reporters and the American Digest System

¶12 As it happened, one private publisher did succeed, without governmental backing, in gaining for its volumes quasi-official status as the place of record for American case law. This was the West Publishing Company of St. Paul, Minnesota. Finding that his publication of Minnesota opinions was not sufficiently profitable, in 1879 founder John West combined them with opinions from five surrounding states to form a series of volumes called the *North Western Reporter*. Over the next eight years West added new sets of volumes covering federal opinions and opinions from the rest of the states, divided into six additional regions. The resulting totality came to be known as the National Reporter System. Three distinctive features characterized the West system. First, it was prompt. Much to the delight of attorneys and judges, West published cases more rapidly than most rival reporters. Second, it was comprehensive. West solicited opinions from all appellate-level judges and published them all, with (*pace* the British) no evaluation as to their importance or contribution to the law. Third, West limited its publication to the full text of judicial opinions, breaking with the centuries-old tradition of including the arguments of counsel.[13]

¶13 The National Reporter System flourished, and over the years West has spared no effort to ensure that it continues to pay off handsomely. The company invites all new judges to become "contributing editors" to its reporters by sending West their opinions. West reciprocates with free copies of some of its publications. Many judges have become accustomed to giving their opinions only to West, and West's reporters and numerous other publications have become necessary holdings

10. *Id.*
11. 33 U.S. (8 Pet.) 591 (1834)
12. REPORT OF THE COMMITTEE ON LAW REPORTING, *supra* note 8, at 65.
13. GROSSMAN, *supra* note 7, at 76–77.

for law schools and law firms throughout the country.[14] The citation system and pagination in West reporters became the standard of the legal profession. According to one assessment, "in fact, this privately held, secretive publisher of court decisions has become, literally, the sum and substance of American jurisprudence."[15]

¶14 Although West did eliminate many rival publishers, this did not ease the situation that constitutes the thread of our story: the increasing difficulty of managing legal information as the case record grows over time. Indeed, by its profit-driven policy of publishing as many appellate decisions as possible, West materially exacerbated the problem. As Grant Gilmore wrote: "The West Publishing Company, whose interest in jurisprudential theory I assume to have been minimal, . . . made a contribution to our legal history which, in its importance, may have dwarfed the contributions of Langdell, Holmes, and all the learned professors on all the great law faculties. After ten or fifteen years of life with the National Reporter System, the American legal profession found itself in a situation of unprecedented difficulty. There were simply too many cases, and each year added its frightening harvest to the appalling glut. A precedent-based, largely non-statutory system could not long continue to operate under such pressures."[16]

¶15 Still, attorneys had several devices at their disposal to help them wade through the flood. These include distillations of important principles and precedent in the form of treatises, encyclopedias, and the *Restatements*. The only one we will discuss here is West's own American Digest System. With its headnotes, its key numbers organized in a taxonomic hierarchy of more than four hundred topics and upwards of 40,000 subtopics, and its cumulative decennial digests, the American Digest System is a comprehensive classification of legal information and a powerful case-finding tool. It eased the burden of coping with the growing mass of published information to the extent that "the systematization involved in the West key-number system may be largely responsible for rendering the common law manageable enough to survive in the United States."[17]

¶16 This is not to suggest that the West system did not have a number of drawbacks that frustrated many attorneys. One of the foremost among these was its rigid conservatism. West was extremely reluctant to add new topics to its classification scheme. "New ideas and theories are classified back into existing categories. New fields like civil rights law or feminist jurisprudence are broken apart and dropped into pre-existing categories. West would add new topics, but only when absolutely compelled to do so by major changes, and only after the passage of many years."[18]

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14. *See* Jill Abramson et al., *Inside the West Empire*, AM. LAW., Oct. 1983, at 90, 90–91.
15. *Id*. at 90.
16. GILMORE, *supra* note 1, at 59.
17. GROSSMAN, *supra* note 7, at 79; *see also* Berring, *supra* note 2, at 25 ("West's influence may have saved the myth of the common law from what looked like its inevitable demise.").
18. Robert C. Berring, *Collapse of the Structure of the Legal Research Universe: The Imperative of Digital Information*, 69 WASH. L. REV. 9, 21 (1994). For additional comments on the "conservative nature of the key number system," see Bast & Pyle, *supra* note 3, at 289, ¶ 15; Berring, *supra* note 2, at 36.

The first addition did not come until 1926, when "automobiles" made it onto the list, and subsequent additions were made slowly and grudgingly.[19] This is understandable in that the whole point of the system is to enable researchers to track an issue in as much depth as possible, and a new topic and its key numbers would be of no help in finding cases older than the date when the topic was added. West did ameliorate this problem by devising tables of correspondences between the newly introduced topic and key numbers and previous ones.[20] Nevertheless, some attorneys whom I interviewed reported that the limited ability of the system to adapt to new circumstances renders it outmoded. Indeed, attorneys working in certain rapidly developing areas of law such as civil rights sometimes have found the West digest system and other traditional research techniques to be more a hindrance than a help.[21]

¶17 Another drawback of the American Digest System is that it was cumbersome to use, particularly as an initial case-finding tool. It enabled the location of many cases but contained no evaluative component to help the researcher separate the important ones from the vast majority that merely mentioned the relevant point of law without making a notable contribution to it. Given the huge number of published cases, wading through all those that a given key number would turn up could be a daunting task. To avoid this problem, most researchers would begin their search by identifying the most salient cases with the help of a tool that did distill the basic legal principles, such as a treatise, legal encyclopedia, or *Restatement*.

¶18 Once one or a few cases directly on point had been identified, the researcher might turn to the key number system to locate others, although not necessarily in the way intended by West. Several of my interviewees said the rationale for why West indexers used the key numbers they did for certain points was not always clear.[22] So a researcher's procedure would often be to find the precise point of interest in a case located through a tool such as a treatise or encyclopedia, and then note the key numbers assigned to that point in the West analysis of the case. The use of the particular key number or numbers for that point of law may or may not make sense to the researcher, but at least West indexers were consistent. Hence one could search using that key number (or numbers) to find other cases that discussed the relevant point.

Classification, Worldview, and "the Law"

¶19 As people become accustomed to thinking and acting in terms of their habitual ways of classifying things, they tend to lose sight of the fact that these are culturally constructed devices for bringing meaning to experience and begin to

19. GROSSMAN, *supra* note 7, at 79.
20. MORRIS L. COHEN, LEGAL RESEARCH IN A NUTSHELL 71–73 (4th ed. 1984).
21. GROSSMAN, *supra* note 7, at 90.
22. *See* COHEN, *supra* note 20, at 73.

assume that they are encapsulations or reflections of some independently existing, intrinsic organization of those things themselves. Now I want to discuss some consequences of this tendency that are attributable to print techniques for managing information. My primary goal in the subsequent sections will be to demonstrate how nearly all of them change under automated techniques.

¶20 Legal information management devices such as the West key number system, treatises, encyclopedias, and the *Restatements* are all designed to bring order and accessibility to the large, unwieldy, and growing body of published case law. Moreover, the order they bring is achieved by hierarchical, taxonomic classification, the hallmark of which is that concrete particulars are organized as representatives of abstract generalizations. The general categories that began as heads of the taxonomic schemes for classifying legal information have been reified into principles thought to preside over "the law," understood as a self-contained, independently existing system. This may be more evident in the law than in other disciplines. Published literature in the humanities and social sciences is taken to present a variety of arguments and points of view, and the notion of absolute truth seldom comes up. But in law, Berring holds, the assumption is that the truth is out there, and with proper research one can discover what it is.[23] That truth is to be found in judicial opinions. The significance of information management techniques for this is that large numbers of different opinions can be linked together to reveal the true law through the use of research devices such as *Shepard's* and the West key number system.[24] The key number system in particular, Berring argues, enjoyed a significance extending far beyond mere case retrieval. "[It] provided a paradigm for thinking about the law itself. Lawyers began to think according to the West categories."[25] The medium is the message: a technique for managing information became a major factor in the development of a particular concept of the nature of the law.

¶21 An important reason for this, in addition to its widespread use for legal research, relates to legal education. The basic first-year law school curriculum, introduced in the latter nineteenth century by Langdell at Harvard and taken up by virtually all American law schools, was designed according to the same basic categories of the law that informed the West digests. Having been immersed in these categories both in their training and in their ongoing legal research, even-

23. Berring, *supra* note 18, at 14.
24. *Id*. at 12–13.
25. Berring, *supra* note 2, at 33. *See also* Barbara Bintliff, *From Creativity to Computerese: Thinking Like a Lawyer in the Computer Age*, 88 Law Libr. J. 338, 343 (1996) ("The digest's organization follows the same pattern as our legal reasoning process, and has almost come to be the physical manifestation of 'thinking like a lawyer.'"). Berring's effusiveness regarding the impact of the West classification system on the structure of American law is not shared by everyone. For a thoughtful rejoinder, see Peter Schanck, *Taking up Barkan's Challenge: Looking at the Judicial Process and Legal Research*, 82 Law Libr. J. 1, 17–19 (1990).

tually lawyers took what were actually organizing decisions of Langdell and the West Publishing Company to be the intrinsic structure of the law.[26] That they are, instead, one way of organizing a particular body of legal information—that associated with American common law—is evident from the fact that lawyers in Louisiana, with its civil law system, are often frustrated by the distortions that result from West's efforts to classify their cases according to its key numbers.[27]

¶22 The information management devices discussed so far are also largely responsible for the widely held assumption that "the law," whether it is taken to exist independently or to be a human construction, represents a field of endeavor wholly separate and distinct from all others. The reason for this is that those devices largely disallow consideration of anything outside "the law." While causality probably moves in both directions, the practice of the common law and the means of organizing and accessing legal information have traditionally been entirely self-referential. In the practice of law, the importance of precedent, stare decisis, and jurisdictional authority result in cases being argued and decided with reference to other cases, with little attention to extra-legal considerations. Collier describes how the case method restricts thought to purely legal channels. "A classic pattern or 'formula' for doctrinal scholarship emerges: (1) state the problem; (2) propose a solution; (3) show how the common law, properly reinterpreted, affords the proposed solution. Here the influence of and connection with Langdellianism must be noted. A central implication of Langdell's case method was that, in the study of law, one need not venture beyond appellate judicial opinions."[28] Similarly, the entire West edifice of published cases, digests, topics, and key numbers circles exclusively within that self-contained realm.

¶23 The entire domain of legal literature is both bounded and hierarchically organized. Primary sources are the law itself. They consist of constitutions, statutes, regulations, and judicial opinions in case law, of which the decisions of higher-level appellate courts carry the most weight. Treatises, encyclopedias, *Restatements*, textbooks, monographs, and journal articles, as commentaries on the law, are secondary sources. Finally, tertiary sources are finding tools that include no substantive discussion of points of law, such as the West digests and key numbers. The hierarchy is reflected in citation practices. Judicial opinions, as primary sources, most commonly cite other primary sources. While they may also cite secondary sources, those carry less weight. It is virtually unheard of for a primary source to cite a tertiary source. Secondary sources such as treatises and law

26. *See* Berring, *supra* note 18, at 22–23; Bast & Pyle, *supra* note 3, at 287, ¶¶ 8–9.
27. Interview with Kent McKeever, Director, Columbia University Law Library, in New York City (Nov. 6, 2001).
28. Charles W. Collier, *The Use and Abuse of Humanistic Theory in Law: Re-examining the Assumptions of Interdisciplinary Legal Scholarship*, 41 DUKE L.J. 191, 200 (1991).

review articles heavily cite primary sources but also freely cite other secondary sources. Secondary sources cite tertiary sources only rarely, and then primarily as instruction for how to use them. Print tertiary sources were devised particularly for locating primary sources. They devote less attention to secondary sources and virtually none at all to other tertiary sources.[29] The entire system is largely self-contained, citations to sources outside the law being relatively rare.

¶24 Another way that legal information—its management and transmission—reflects and contributes to the notion of "the law" as a distinct domain is in legal education. Traditionally, law schools tended to keep aloof from other schools in the university. Law schools usually have their own buildings. The law library is separate from other university libraries and contains almost exclusively legal materials. The segregation of students has been nearly total. Undergraduate programs in law are rare; virtually no one but law students take law courses, who in turn take nothing outside the law school. In my own institution at least, law courses are listed in a separate timetable and the law school even follows a different academic calendar from the rest of the university.

¶25 In all of these ways, the form, organization, access, and transmission of legal information has integrally participated in the formation of "the law" as a distinct realm, inhabited by a distinct and peculiarly organized profession known as "lawyers." Michael Hoeflich and Jasonne O'Brien contend that the law as a profession began in the twelfth century with the development of a body of specialized knowledge, canonical texts, and modes of access to them.[30] As with any profession, its persistence is related to the maintenance of those methods and materials in esoteric form. Thus, within the larger society the law has guarded a domain of private knowledge available only to those who belong to the profession and speak its specialized language. Outsiders who run afoul of the law or stand in need of its peculiar ministrations must be represented by attorneys and frequently have only the barest understanding of what is happening in negotiations or in court. If one stops to think about it, this is a curious phenomenon. Complex commercial transactions aside, the law, after all, is intended to regulate the relations of people with each other. Surely if people know anything, they should know the rules governing how they should get along.

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29. Another indication of the standing of tertiary sources is that the legal research courses that teach how to use them typically have a low prestige in law schools. This may appear curious in the light of our thesis that the techniques and categories used in legal information management have a decisive effect on conceptualizations of the law. Berring argues, however, that explicit courses represented only one way of transmitting research skills. The West classification system was so thoroughly embedded in the law school curriculum (remember the commonalities between the West system and Langdell's first-year curriculum) and the practice of law that it became intrinsic to the overall gestalt of the law, and attorneys absorbed the techniques of legal research with West categories virtually by osmosis. Berring, *supra* note 18, at 22, 25–26.

30. *See generally* Michael J. Hoeflich & Jasonne Grabher O'Brien, The Establishment of Normative Legal Texts: The Beginnings of the Jus Commune (1999) (unpublished manuscript, on file with author).

Enter Automation

¶26 The pressure of increasing quantities of legal literature did not relent. By the early 1960s, American lawyers were again finding that, even with the powerful tools of treatises, key numbers, and the rest at their command, the task of finding relevant cases and secondary sources was becoming an intolerable burden. This time the response was the introduction of electronic databases and artificial intelligence to assist with legal information management.

Lexis and Westlaw

¶27 As West's American Digest System had done nearly a century earlier, the computerized LEXIS (later Lexis and now LexisNexis) and Westlaw research systems arrived on the scene in the 1970s and 1980s with a solution that greatly eased lawyers' prodigious task of manually sifting through the huge and growing numbers of opinions and legal analyses.[31] Sensitive to the increasing burden placed on legal researchers, in the mid-1960s the Ohio State Bar Association formed a group to explore whether the aid of computers could be enlisted. In their search for an appropriate system, the Ohio group became aware of one developed by the Data Corporation to help the Air Force manage its huge files of procurement contracts. The Ohio attorneys reached an agreement with Data Corporation to cooperate in an effort to modify that system to suit the needs of legal research. Initially the project met with mixed success. Then, in 1969, Data Corporation was acquired by Mead Corporation. They soon formed a new subsidiary, Mead Data Central, devoted exclusively to developing the legal research service. Numerous improvements were made, and in early 1973 the service, sporting the new name LEXIS, was introduced for nationwide marketing. Since then the story of LexisNexis has been one of continual growth and improvement.[32]

¶28 The West Publishing Company, accustomed for decades to dominance in the legal publishing market, introduced Westlaw as a competitor service to LEXIS in 1975. The initial product was clumsy, its greatest weakness perhaps being that its database consisted solely of West headnotes. This contrasted dismally with the full-text databases offered by LEXIS. Little by little, however, West corrected its foibles, added new features, and by 1983 or 1984 Westlaw had become an automated research service equal in power to LEXIS.[33]

Classification and Indexing

¶29 Just how momentous has the shift to automation been? Harrington insists that the proper term is "computer-assisted legal research" rather than "computerized

31. GROSSMAN, *supra* note 7, at 90.
32. *See* William G. Harrington, *A Brief History of Computer-Assisted Legal Research*, 77 LAW LIBR. J. 543, 547–53 (1984–85) (providing history of LexisNexis from its beginnings at Data Corporation through its development under Mead Data Central).
33. *Id.* at 553–54.

legal research" because the computer acts as "a handy helper for the lawyer's intellect, not a substitute for it."[34] It is true that automation does not excuse the lawyer's intellect from the research process, but it is not true that the computer simply enables lawyers to do what they have done all along, only faster and more easily. Automated research instills a distinctive kind of understanding of the subject matter, different from that associated with research using print tools. To develop that point, it is necessary to draw a clear distinction between classification and indexing.

¶30 To classify is to organize a body of information according to some conceptual scheme. The body of information can be as small as the contents of a single article or as large as the entire corpus of recorded knowledge. The operative classification scheme may be as unique and focused as the table of contents of a book or as general and widespread as the Dewey Decimal System for library cataloging or the West key number system. In all cases, the distinctive feature of classification is that it reflects ideas about meaningful relationships among the parts in the body of information being classified: that some of them are more general or more specific than others, that certain bits are related closely and others more distantly. A classification is a "top-down" device, where the relationship between particular items is intelligible in terms of general principles.

¶31 In contrast, an index is not even "bottom-up." It has no "up" at all, but is just plain "bottom." It is a finding device that connects a symbol for a topic (usually in the form of one or more words) with whatever information is included on that topic in a database stored in human memory, in print, or electronically. In its pure form, indexing conveys nothing about relationships that may exist among different topics. A prime example is a keyword search in an electronic database, where the input of a word, number, or other graphic sign produces an output of its matches in the database, but indicates nothing about any relation between those matches and other material in the database.

¶32 The distinction between classification and indexing was not introduced earlier in this article because it was not needed. Before automation, the intelligence that constructed and used classifications and indexes was human. It comfortably combines the two functions into a single form: the classified index. The key number system is a case in point, serving both the classification function of organizing information in judicial decisions in accordance with a conceptual scheme and the indexing function of assisting users to locate the information they want. The most general conclusion to be drawn from this is that the taxonomic classifications built into print research tools promote a view of the law as a hierarchically organized system based on general principles.

¶33 With automation, artificial intelligence replaces human intelligence as information processor. Computers are very good at indexing, much more proficient at locating particular bits of information than human beings are. But they are

34. *Id.* at 543.

poor classifiers, incapable of organizing a body of information in a way that establishes meaningful relationships between its parts. Therefore automated research tools do not combine classification and indexing as print tools do, but operate entirely in terms of indexing. Keyword searches create indexes of the subject matter. The addition of Boolean operators and proximity controls enhances the indexing function by combining multiple index terms. Because indexing identifies particulars in isolation, research with automated tools promotes a view of the subject matter as a depthless congeries of facts and doctrines rather than the hierarchically organized system that presents itself in research with print sources. This difference is responsible for the most pervasive transformations that have accompanied the automation of legal information. Some of them are immediately perceived and others are more subtle; taken together they extend far beyond specific research activities to influence legal practice, professional organization, and understandings regarding what the law is.

Some Immediate Consequences

¶34 To begin with the most self-evident consequence of automation, researchers using computers can access more information faster and more conveniently than before. The judges, practicing attorneys, librarians, and faculty members I interviewed were unanimous on this point.

¶35 Automation also introduces a quantum leap in the power of legal research. That is to say, it provides tools that enable researchers to do things that were previously extremely difficult if not impossible. The headnotes on Westlaw, for example, are set up differently than they are in the reporter volumes. For example, headnote 3 in *Watkins v. State*,[35] a Georgia criminal case, has the same squib or summary statement regarding liability for murder in both the print and electronic versions. But the key number heading in the print version looks like this:

3. Homicide  29,

while in Westlaw we see:

[3] KeyCite Notes

 203 Homicide

 203II Murder

 203k29 k. Persons Liable. Most Cited Cases

¶36 All of the numbers and "most cited cases" are hyperlinked. Clicking on the [3] takes one to the paragraph in the opinion that discusses this topic. 203k29 refers to key number 29 under the general topic of Homicide, which is the same as

35. 33 S.E.2d 325 (Ga. 1945).

in the print version. Now, however, the more than four hundred main topics have also been numbered, Homicide being number 203. Clicking on 203k29, or 203II, or 203 enables one to search for other cases with information about persons liable, or for the more inclusive categories of murder and homicide, within jurisdictions and time frames of the researcher's choice, and according to frequency of citation. If desired, information on these topics will also be searched in law reviews and other sources, a function unavailable in the print version. Thus Westlaw is a much more powerful research tool than the print-digest system using key numbers.

¶37 The impact of computer-assisted legal research is particularly visible in law libraries. As noted at the outset of this essay, Langdell was fond of saying that the library is the law's laboratory.[36] Today automation has largely short-circuited the use of the library. A law faculty member told me of his observation that libraries were featured more prominently in the physical layout of law firms five and more years ago than they are today. A librarian said that in the late 1980s and early 1990s the library was the hub of activity in her firm, ranging from animated discussions among attorneys as they conducted their research to the more purely social wine and cheese parties held there. Another librarian undertook a research project that brought her into the libraries of four large law firms in 1990 and again in 1994–95. In 1990 the libraries were full of associates carrying out research in law books, but four or five years later they were virtually deserted. The library director in a large firm told me that she no longer hires clerks to reshelve books because no one takes them down any more. In 1995 the Chicago office of the large firm Baker and McKenzie shocked the law library community by terminating its entire library staff and outsourcing library services. (That experiment, however, was not successful and within a few years the office returned to an in-house staff, albeit a smaller one than had been in place before 1995.)

¶38 The major reason for these changes is that researchers can now find and download full texts of virtually everything they need with their desktop computers. Automated research proceeds much more quickly than the old methods of consulting indexes and pulling volumes of cases and secondary sources off the shelves. With LexisNexis, Westlaw, and the Internet it has become possible to do in minutes what previously required hours of tedious work. As a result, academic and firm libraries are acquiring fewer new print resources and shedding some they already have, and plans for the future include diminished shelf space and reconfigured staffs with fewer unskilled positions for filing and reshelving.

¶39 A similar trend is visible in the American Bar Association standards for the approval of law school libraries. The standards for both 1977 and the present require libraries to have a "core collection," but the present definition of the core collection is both more and less stringent than it was in 1977. It is more stringent in requiring more thorough coverage of legal materials. For example, for state law

36. *See* GILMORE, *supra* note 1.

the 1977 standards required only the code of statutes for the state in which the school was located,[37] while the current standards require annotated codes for each state.[38] On the other hand, it is less stringent in the specification of particular items to be included in the core collection. The 1977 list runs to three pages and specifies items such as the *Restatements,* federal tax court reports, attorney general opinions, *Shepard's Citations,* publications of the American Bar Foundation, and so on.[39] The current list consists only of eight general categories[40] such as court decisions, codes, regulations, and "those tools, such as citators and periodical indexes, necessary to identify primary and secondary legal information and update primary legal information."[41] Both the increased and decreased stringency can be attributed to automation. While in 1977 it entailed extra expense to acquire codes from all the states, today these are readily available on the standard LexisNexis and Westlaw databases. Tertiary sources such as the American Digest System and *Shepard's* are also readily available online, as are alternatives to them that have recently emerged (among other reasons, because of the competition between LexisNexis and Westlaw), so it is hardly necessary to cite them by name.

¶40 The present standards also acknowledge the changed climate of legal information by stating that today no single format—print, electronic, microform, audiovisual—gives sufficient access to the range of legal materials, so a collection consisting of just one format is not likely to be acceptable.[42] It is probably possible, however, to fill nearly the entire core collection as presently defined with electronic materials. The exception would be "significant secondary works necessary to support the programs of the law school,"[43] which would include books and monographs that are not (yet) available in electronic format.

¶41 Despite their indisputable power, or more probably because of it, computers have certain drawbacks. One double-edged sword is speed of communication. The benefits of this are obvious, the costs somewhat less so. With ordinary mail, it was not uncommon to wait for a few days after receiving a letter to ponder one's response. Now, with much communication occurring by e-mail and faxing, clients and opposing attorneys demand immediate replies. This may help the wheels of justice grind faster but possibly less fine, for it adds pressure to act with insufficient consideration.

¶42 Molly Lien argued that, just as television created "sound bite" journalism,

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37. AM. BAR ASS'N, APPROVAL OF LAW SCHOOLS—STANDARDS AND RULES OF PROCEDURE annex 2 (library sched. A), at 31 (1977) [hereinafter ABA STANDARDS 1977].
38. SECTION OF LEGAL EDUC. & ADMISSIONS TO THE BAR, AM. BAR ASS'N, STANDARDS FOR THE APPROVAL OF LAW SCHOOLS 2001–2002, interpretation 606-6(1)–(2), at 46 (2001) [hereinafter ABA STANDARDS 2001–2002].
39. ABA STANDARDS 1977, *supra* note 37, annex 2, at 30–32.
40. ABA STANDARDS 2001–2002, *supra* note 39, interpretation 606-6, at 46.
41. *Id*., interpretation 606-6(8), at 47.
42. *Id*., interpretation 606-3, at 46.
43. *Id*., interpretation 606-6(7), at 46.

automated legal research encourages "law-byte" reasoning.[44] That is, attorneys may become overly dependent on the computer's capacity to find many cases and uncritically amass staggering numbers of citations. Too often they seem to think their job ends there and neglect to develop thoughtful arguments based on careful application of legal principles.[45] Those not well versed in the technique of keyword searching are likely to miss much relevant material. Or they may develop weak and inappropriate arguments on the basis of the first few cases they locate without fully understanding the doctrines and concepts germane to their case.

¶43 It is possible to restrict and refine searches in LexisNexis and Westlaw in a variety of ways, including confining oneself to databases defined by conventional areas of the law, such as family law or labor law. The advantage of this is that it turns up less "garbage," making the search faster and more focused. The disadvantage is that it constrains searching within preestablished categories and thus is less likely to unearth unanticipated possibilities and stimulate novel insights. Some have proposed having the best of both worlds by enlisting automated assistance to design structured research strategies, which might provide faster and more efficient means of locating relevant materials than the often imprecise keyword searching procedures now in use.[46] But what has been achieved so far in this area is not encouraging, and at least one such aid actually sacrifices much of the peculiar power of automated research. Westlaw has recently introduced a tool called KeySearch. The attorney using it selects a topic from a menu or enters a few terms in ordinary language, selects a database, and KeySearch automatically locates a set of pertinent primary or secondary materials. For searches in case law, KeySearch is actually a shell over West's traditional key number system. KeySearch translates the terms selected by the user into index topics in the key number system and then searches for cases that have been indexed with those key numbers, almost exactly as people used to do manually. Hence the technique is bound by preestablished categories and realizes none of the new potentials of keyword searching for breaking free of them. Playing on one of Robert Berring's titles, "Backing into the Future,"[47] the introduction of KeySearch strikes me as an example of advancing into the past.

¶44 In addition to echoing many of the points already made, the individuals I interviewed offered a number of other comparisons between manual and auto-

44. Molly Warner Lien, *Technocentrism and the Soul of the Common Law Lawyer*, 48 AM. U. L. REV. 48, 88–89 (1998).

45. *See* Margaret Maher Krause, *Look Beyond Lexis and Westlaw: Other Computer Applications in the Practice of Law*, 85 LAW LIBR. J. 575, 576 (1993); Bruce M. Selya, *Publish and Perish: The Fate of the Federal Appeals Judge in the Information Age*, OHIO ST. L.J. 405, 408 (1994); Bintliff, *supra* note 25, at 345–46.

46. *See* John Doyle, *Westlaw and the American Digest Classification Scheme*, 84 LAW LIBR. J. 229, 230 (1992); RICHARD SUSSKIND, THE FUTURE OF LAW: FACING THE CHALLENGE OF INFORMATION TECHNOLOGY 112–14 (1996). *See generally* Karen Sparck Jones, *Information Retrieval and Artificial Intelligence*, 114 ARTIFICIAL INTELLIGENCE (1999).

47. Berring, *supra* note 2.

mated research. Several of them said that the context and overall organization of the material being researched is clearer in print than online. There was general agreement that Shepardizing is much more efficient when done electronically, but that it is still easier to do research on statutes and their legislative histories in the books. An academic law librarian expressed concern that archiving is more precarious for information stored electronically than that stored in print. This is especially true of sources that are found only on the Internet, which may simply disappear if their Web sites cease to exist. Finally, two of the most prominent analysts of the automation of legal information, Robert Berring and Ethan Katsh, said in interviews[48] that the changes it has brought about have so far not been as extensive as they anticipated—an issue also addressed by Berring in print.[49] Berring's observation is that most legal practitioners do not do well without structure and thus are not taking full advantage of automation's potential. Katsh pointed to a generation gap that leaves older attorneys uncomfortable with and suspicious of computer-assisted research. Others I interviewed added that sometimes this has moved the senior partners who govern law firms to slow the adoption of new technologies.

Precedent

¶45 Turning now to some of the subtler consequences of automated research, it may threaten one of the cornerstones of common law: the force of precedent. It has been stressed earlier that a recurrent problem in the development of the common law has been the capacity of practitioners to control the accumulating number of cases that might serve as precedent. An important benefit of automation is its power to find cases more easily and quickly than ever before. On the other hand, also because of automation, the number of cases available for consultation is greater now. In the days before automation, for a case to be "reported" or to be "published" meant the same thing. These were the cases that appeared in the published volumes of case law, and they were limited largely to cases that had been decided at the appellate level. The much larger number of cases decided in the trial level courts, as well as many from appellate courts, went unreported—that is, unpublished—and hence they were unavailable as precedent. Today, however, we exist in what Virginia Wise termed the "Alice in Wonderland" situation where the equivalence of "unreported" and "unpublished" has come undone because many unreported trial and appellate court cases are in fact published, at least online.[50] Both Westlaw and LexisNexis include increasing numbers of "unpublished"

48. Interview with Robert C. Berring, Director of the Law Library and Professor of Law, University of California, Berkeley School of Law Library, in Berkeley, Cal. (June 27, 2001); Interview with Ethan Katsh, Professor of Legal Studies, University of Massachusetts at Amherst, and Co-Director of the Center for Information Technology and Dispute Resolution, in Cambridge, Mass. (Nov. 2, 2001).

49. Robert C. Berring, *Legal Information and the Search for Cognitive Authority*, 88 CAL. L. REV. 1673, 1707–08 (2000).

50. Telephone Interview with Virginia Wise, Lecturer, Harvard Law School (Dec. 27, 2001).

cases,[51] and many are also available on various Web sites. The crowning irony is that in 2001 West Group introduced the *Federal Appendix*, which publishes in print format "unpublished" federal court opinions.

¶46 Again, when everyone utilized the West key number system and other pre-automated research techniques, opposing attorneys would tend to develop their arguments on the basis of the same cases, nearly all of which were familiar to judges and experts in that field of law.[52] Automated research, with its open-ended quality and potential to be highly customized, is more likely to turn up a number of novel cases that, it could be argued, should be considered as precedent for the case at hand. Opinions differ as to exactly what the impact of this will be. For Berring, it has the potential to burst the bonds of conservatism and generate a dynamic that will breathe new life into the common law as opposing attorneys base their arguments on different cases and judges will be forced to take novel information into account as they formulate their opinions.[53] If the law were uniformly applied, such a challenge would result in beneficial growth and fine-tuning. But the law is not uniformly applied, and one of the outcomes of automated research, with its power to locate so many cases, is to unearth quite a few that show different judges ruling differently in similar circumstances. This is probably not healthy for the precedent system.[54]

¶47 This point was nuanced during an interview with attorney Jonathan W. Miller who doubts that automated research has significantly affected precedent in those large or important cases where resources are of no object. In such cases, research generally was so extensive before automation that the relevant case law was screened at least as thoroughly as computer-assisted techniques can achieve today. He does agree, however, that in smaller cases where resources and research time are more limited, automated techniques are likely to turn up more potential precedents than manual research.[55] Another practicing attorney added that automation levels the playing field in litigation because it enables small firms to conduct research with a thoroughness that had previously been within the resources of only large firms.

¶48 Judicial inconsistency seems inevitable in any large system of common law. The point to be stressed here is that automated research techniques are well suited to bring inconsistencies to light. With its powerful case-finding capacities, for example, automation makes it possible to do a kind of macroanalysis that tracks the disposition of a large number of cases concerning a particular issue in

51. SUSAN W. BRENNER, PRECEDENT INFLATION 202–06 (1992).
52. Bintliff, *supra* note 25, at 343–44.
53. Berring, *supra* note 2, at 56; Berring, *supra* note 18, at 32–37; *see also* ETHAN M. KATSH, THE ELECTRONIC MEDIA AND THE TRANSFORMATION OF THE LAW 20 (1989) (arguing that automation contributes to an increased rate of change in the law). For a contrary opinion, see Bintliff, *supra* note 25, at 349–50.
54. *See* KATSH, *supra* note 53, at 45; Berring, *supra* note 18, at 16.
55. Interview with Jonathan W. Miller, Attorney, in New York City (Nov. 5, 2001).

many different courts.[56] Canny litigators are expressly attuned to judicial inconsistencies. Automation makes it easier for them to assemble and study previous decisions by the judges before whom they will appear, so that they may craft their arguments to appeal to their biases.[57]

¶49 This points to some far-reaching implications of information management techniques. Earlier research tools and methods managed the increasing volume of legal materials by classifying them in a system of clear categories. I discussed earlier how that was compatible with the notion that the law is consistent and structured according to a relatively few general principles. On the other hand, electronic tools and techniques, likewise designed to cope with the alarming growth of the literature, are not dependant on established categories. Hence they are more conducive to the philosophies of legal realism[58] and critical legal studies—variations on the theme that the application of the law is subject to judicial biases and the hegemony of entrenched political and economic interests rather than abstract principles of justice.[59]

¶50 Legal realism is a product of the 1920s and '30s while critical legal studies hails from the 1980s. Important differences separate them, the realists being more pragmatic and the "crits" more radical and ideological.[60] Without going deeper into the complex question of their relationship, it is fair to say that both realists and crits reject a view of the law as a perfectly consistent, independently existing system of principles discoverable by scientific techniques.[61] Among the things that the crits criticize are legal categories, which obscure the uniqueness of cases, lead jurists to treat unequal situations as equal, and promulgate a veneer of organization that hides an underlying incoherency and indeterminacy of legal doctrine. Crits also take a dim view of the application of precedent. Instead of searching first for precedent and being guided by it, they argue, judges decide on other grounds and then seek out precedent to justify conclusions they have already reached.[62]

¶51 It is not necessary to espouse the entire agenda of critical legal studies to recognize how automated research procedures are consistent with their disenchantment with legal categories and precedent. As for categories, I have already

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56. *See, e.g.*, Sidney A. Shapiro & Richard E. Levy, *Judicial Incentives and Indeterminacy in Substantive Review of Administrative Decisions*, 44 DUKE L.J. 1051, 1067 (1995).
57. Berring, *supra* note 2, at 56.
58. *Id*.
59. *But see* Lien, *supra* note 44, at 90 (claiming that automated research is congenial to "extreme positivists").
60. John Hasnas, *Back to the Future: From Critical Legal Studies Forward to Legal Realism, or How Not to Miss the Point of the Indeterminacy Argument*, 45 DUKE L.J. 84, 95–105, 107–08 (1995).
61. *Id*. at 85.
62. *See* Steven M. Barkan, *Deconstructing Legal Research: A Law Librarian's Commentary on Critical Legal Studies*, 79 LAW LIBR. J. 617, 618–31 (1987). Peter Schanck has criticized Barkan's article for going too far, but on this point the distance between them does not appear very great. *See* Schanck, *supra* note 25, at 10–11.

discussed how the built-in classification schemes of the key number system and other print sources present the law as a hierarchy governed by general principles while the highly specific indexing procedures characteristic of automated research convey the image of the law as a relatively unorganized assortment of facts and doctrines. And for precedent, if judges are inclined to unearth it to support their foregone conclusions, they are much aided in this endeavor by the ease of finding large numbers of cases electronically. As Lien phrased the latter point, computer-assisted research encourages people "to focus on particular sources that support a viewpoint, rather than examine issues from a broader perspective."[63]

¶52 Interestingly, however, if automation weakens precedent in one way, it has enabled a new version of precedent to develop in another. Automation's enhanced storage capabilities and ease of access have led many large law firms to establish internal databases consisting of the memos their attorneys prepare regarding the cases that they have contemplated taking. When deciding whether to take new cases and planning how to proceed with them, members consult the database to learn how the firm evaluated similar cases in the past. Attorneys and librarians I interviewed from large firms stressed that one of the benefits is economic, for reviewing research that the firm has already done is faster than researching an issue from scratch, and this translates into lower bills to clients. In essence this practice perpetuates the traditional common law reliance on precedent, now transferred, however, to the plane of the individual law firm.

¶53 This situation provides some insight into the nature of precedent. According to Katsh, "A system of precedent is unnecessary when there are very few cases that are accessible; it will be unworkable when there are too many cases."[64] The lower limit seems to be determined in principle. Precedent is based on similarity, so there must be enough cases for similarities and differences between them to be clearly recognized. Exactly how many cases that is I would not venture to guess, but it is smaller than the total number of cases considered over a several-year period by a single large law firm, but probably larger than the number of cases considered by a small- or medium-sized firm. In principle there seems to be no upper limit. If the law were applied consistently, any number of cases could be subsumed under a system of precedent. But the law is not applied consistently, and similar cases have been decided differently. The adversarial nature of the law encourages the quest for these differences, because when standard precedent favors the other side, enterprising attorneys will seek alternative cases that support their clients. Automated research makes it easier to find them. When cases can be summoned as precedent for all sides of many issues, the confidence people place in the wisdom of allowing previous decisions to stand could be seriously compromised.

63. Lien, *supra* note 44, at 61.
64. KATSH, *supra* note 53, at 44.

Facts and Principles

¶54 Several authors have suggested that research in print sources inclines one toward legal principles while keyword searching is more apt to generate groups of cases based on similarities of facts.[65] If this is a general trend, its implications are immense for it suggests a reorientation of the fundamental organization of the law from underlying, general principles to surface-level factual similarities. This is not a simple distinction, and several different ways of thinking about it exist. Bintliff argues that automated techniques are not well suited to doctrine-oriented research because they rely on the occurrence of particular words, and the same legal rules or principles are often stated in different words.[66] One academic lawyer I interviewed was critical of computer-assisted techniques because their fact-based tendency blinds researchers to important cases that develop the same legal principles but with different factual circumstances. Another applauded the fact-oriented bias of automation for its capacity to generate novel arguments that reconsider principles in a fresh light. For Molly Lien the dominant issue is not so much principle versus fact as it is deep complexity versus surface simplicity. She is highly critical of computerized research for disposing attorneys to look for factual similarities and apply rules woodenly rather than probing the more subtle elements of metaphor, rhetoric, and emotion that lead to the most creative arguments and serve the best interests of justice.[67] Gilmore criticized the Langdellians for "bloodless abstraction": disregarding facts in their efforts to establish perfectly general legal principles and doctrines. He locates a shift to an obsession with facts and diminished concern with doctrine in a time far earlier than automation, beginning with treatises such as *Corbin on Contracts* and characterizing most American legal scholarship since World War I.[68] Schwartz agrees with an early beginning for a fact-oriented approach, linking it with Brandeis briefs.[69] Cohen suggests that it is more efficient to search for cases by facts than by doctrine, even when using pre-automated research techniques.[70] One academic lawyer I interviewed, who agrees that automated searching is conducive to a fact-based approach, said this makes the law more accessible to laypersons and therefore undermines the legal profession's monopoly on esoteric information. Two others agreed that print tools are better suited to doctrine-based research but held that automated techniques are equally effective when searching via facts or doctrines. The main difference one of

65. Daniel P. Dabney, *The Curse of Thamus: An Analysis of Full-Text Legal Document Retrieval*, 78 LAW LIBR. J. 5, 9 (1986); ERWIN C. SURRENCY, HISTORY OF AMERICAN LAW PUBLISHING 127 (1990); Patti Ogden, *Mastering the Lawless Science of Our Law: A Story of Legal Citation Indexes*, 85 LAW LIBR. J. 1, 45 (1993); Schanck, *supra* note 25, at 18–19; Bintliff, *supra* note 25, at 339–40; Bast & Pyle, *supra* note 3, at 297–98, ¶¶ 43–48.
66. Bintliff, *supra* note 25, at 346.
67. Lien, *supra* note 44, at 90–93, 101.
68. GILMORE, *supra* note 1, at 60, 80.
69. BERNARD SCHWARTZ, MAIN CURRENTS IN AMERICAN LEGAL THOUGHT 413–16 (1993).
70. COHEN, *supra* note 20, at 74–78.

them saw is that academic lawyers are prone to focus more on doctrinal research and practitioners on the facts. None of the appellate judges I interviewed was particularly impressed by the fact/principle distinction itself, two of them saying that a good case must be constructed with both.

¶55 Given this diversity of opinion, it is possible that the real issue here is something other than the distinction between facts and principles. I suggest that the salient question has to do with the effect of knowledge management tools on the kind of generalizations that are made and the length to which they are taken, regardless of whether one is searching for similar facts or applications of a doctrine. The classifications that are intrinsic to print-based research tools such as treatises, the *Restatements*, and the West key number system convey an image of the law as taxonomically structured in terms of a relatively few general principles. This inclines the researcher to pursue those principles as far as possible. On the other hand, keyword searches in electronic databases are a kind of indexing conducted with terms selected by individual users according to their needs of the moment. Whether the search is for a fact or a doctrine, it spits out either/or results: items are returned or they are not on the basis of matches with the search query. This procedure conveys a sense of the law's organization as shallow and loose, and that is no stimulus to seek high-level principles.

¶56 When one gets some distance on this situation, particular classification schemes begin to look more like artifacts of specific research tactics than glimpses of some inherent structure of the law. This in turn raises the question of whether there is or can be any "correct" classification of the law; even, indeed, whether the law has any intrinsic organization at all.[71] That question, itself an artifact of automated information management, erodes the boundaries between compartments defined by any such classification, both within the law and between the law and things previously thought to be outside it. In other words, if (as argued earlier) print information management techniques contribute to a concept of the law as internally differentiated and insulated from other professions, automated techniques work in the opposite direction.

A Changing Hierarchy of Sources

¶57 One example of lowering boundaries between categories within the law is a relaxation of the hierarchical distinctions among primary, secondary, and tertiary source materials. An important aspect of this is access to secondary sources. When legal information existed exclusively in print, the materials that were indexed were mainly primary sources. There was nothing comparable to the key number system for accessing law journal articles, treatises, and other secondary sources. That has changed drastically with automation. Now Westlaw and LexisNexis allow retrieval and global keyword searching of the full text of articles in hundreds of law jour-

71. KATSH, *supra* note 53, at 222.

nals as well as the major encyclopedias, treatises, the *Restatements*, and other secondary sources. West's KeySearch tool can be applied to secondary as well as primary sources. Moreover, the citations that law journal articles and other secondary sources make to primary and many secondary sources are hyperlinked, enabling rapid movement from one to another. Access to secondary sources, while far superior to what it was in the days before automation, is still not as complete as to primary ones. Online journal coverage by LexisNexis and Westlaw thus far goes back only to the early 1980s. A new subscription service, Hein-On-Line, is making the entire runs of many legal periodicals available online. Its text search capabilities, however, are more limited than LexisNexis and Westlaw, supporting searches only for keywords and phrases but not complex queries with Boolean operators.[72]

¶58 Mixed opinions exist regarding the significance of this. One academic lawyer I interviewed stressed the value of Westlaw and LexisNexis for accessing law review articles. Her opinion is that these constitute the best avenue for researching any matter of the law, including what the courts have said on a particular issue, because the authors have investigated the question extensively. This means that, for her, the value of secondary sources equals or even exceeds that of primary ones as research tools. A recent law graduate who clerked for a circuit court judge echoed this opinion. It is not unanimous, however, for another appellate court researcher expressed the opinion that what is published in law reviews tends to be of little value, produced largely from the academic imperative of publish-or-perish. Thus he refers to secondary sources in his research only when a search of primary sources is unsatisfactory.

¶59 Finally, the status of tertiary sources has risen considerably. The development of computer-assisted research has led people to realize that how information is managed has a significant impact on what is found and how it is understood. As a result, numerous secondary sources—such as the articles and books cited here by Berring, Katsh, Dabney, Bintliff, Schauer and Wise, Bast and Pyle, and others—have been devoted to the analysis of the poorly recognized but far-reaching impact of automated tertiary sources on the structure and practice of the law. It is also likely that the new attention to automated tertiary sources has encouraged deeper thinking about the significance of preautomated tertiary sources (common-placing, key numbers, etc.) in the history of law by authors such as Berring, Hoeflich, and Grossman. The present work, of course, is yet another analysis of the significance of tertiary sources.

Persuasive Authority across Jurisdictions

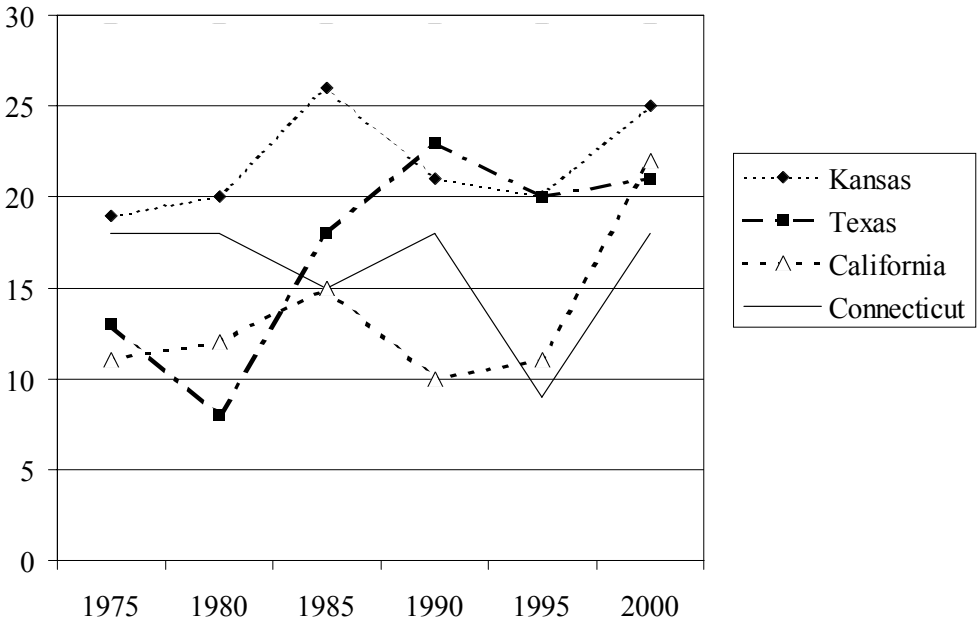
¶60 Another place within the law where boundaries are becoming more permeable is between jurisdictions. Several persons I interviewed—two appellate court judges, a state supreme court researcher, and two law faculty members—said that

72. HEIN-ON-LINE, *at* http://heinonline.org/HeinDocs/Search.htm (last visited Aug. 18, 2002).

one effect of the ease of finding cases with automated techniques is that high courts consult persuasive authority from other jurisdictions more than they used to. This claim is susceptible to empirical testing. We examined citation patterns to state courts in all of the civil cases for which the supreme courts of California, Texas, Kansas, and Connecticut rendered opinions at five-year intervals between 1975 and 2000 to determine whether citations to other states increased relative to citations to the home state as automated research procedures became more common (see figure 1). Of these, only Texas manifests a clear pattern, with the percentage of citations to other states definitely increasing after 1985. For California, the jump to 22% in 2000 is probably aberrant, because citations to other states in 1999 (13%) and 2001 (17%) are closer to earlier years in the survey.[73] Although Texas supports the hypothesis, data from the other states are inconclusive. A larger sample is needed to test the hypothesis more thoroughly.

Figure 1

Supreme Court Citations to Other States, as a Percentage of Citations to All State Courts



73. The frequency of citations to other states relative to California citations seems to have persisted for some time, for Merryman found it to be 14% in 1950, 13% in 1960, and 8% in 1970. John Henry Merryman, *Toward a Theory of Citations: An Empirical Study of the Citation Practice of the California Supreme Court in 1950, 1960, and 1970*, 50 S. CAL. L. REV. 381 (1977).

Delegalization of Law

¶61 Beyond possible changes in the internal organization of the law lies the related question of whether changes are also occurring in the relation between the law and matters outside the law. The evidence suggests that here too the boundary is lowering. Although it has long been claimed that lawyers need nonlegal information to develop the best cases,[74] automation has definitely made that need easier to satisfy. As Vreeland and Dempsey observe, "technology feeds the trend toward interdisciplinary studies, as the electronic revolution blurs traditional disciplinary boundaries. . . . The apparent proximity that online systems create makes it more difficult to justify turning a blind eye to 'outside' materials."[75] Three directors of firm libraries whom I interviewed said that automation has significantly changed the kind of work they do. Whereas formerly they would assist with straightforward elements of legal research such as retrieving cases requested by attorneys, now the attorneys use automated tools to do that themselves, and they seek firm librarians' assistance with more complex questions involving research in nonlegal sources. A practicing attorney said that while there may not be more specifically nonlegal information in the briefs and arguments he produces, there is no question that such information materially contributes to the context within which he formulates them.

¶62 Judges too are referring more frequently to nonlegal sources. Writing for the Court in *Kumho Tire Company, Ltd. v. Carmichael*, Justice Breyer included an illustration from and cited to the decidedly nonlegal book, *How to Buy and Care for Tires*.[76] For Schauer and Wise this is one instance of the "delegalization of law" that is occurring as nonlegal information infiltrates the law and threatens its "limited domain."[77] Schauer and Wise examined all citations in U.S. Supreme Court opinions at five-year intervals from 1960 to 1990, and then for each year from 1990 to 1998.[78] While the trajectory is by no means smooth, they found a definite increase in the proportion of citations to nonlegal material. Samplings from the Supreme Court of New Jersey and other courts showed a similar pattern. Their analysis centers on the ease of electronic searching. "In previously barely

74. *See* Steven M. Barkan, *Response to Schanck*, 82 LAW LIBR. J. 23, 33–35 (1990).
75. Robert C. Vreeland & Bert J. Dempsey, *Toward a Truly Seamless Web: Bringing Order to Law on the Internet*, 88 LAW LIBR. J. 469, 473–74 (1996).
76. 526 U.S. 137, 143 illus (1999) (citing ALEX MARKOVICH, HOW TO BUY AND CARE FOR TIRES 4 (1994)).
77. Frederick Schauer & Virginia J. Wise, *Nonlegal Information and the Delegalization of Law*, 29 J. LEGAL STUD. 495, 495, 515 (2000) [hereinafter Schauer & Wise, *Nonlegal Information*]; Frederick Schauer & Virginia J. Wise, *Legal Positivism as Legal Information*, 82 CORNELL L. REV. 1080, 1081–82, 1096 (1997) [hereinafter Schauer & Wise, *Legal Positivism*].
78. Schauer & Wise, *Nonlegal Information*, *supra* note 77; *see also* John J. Hasko, *Persuasion in the Court: Nonlegal Materials in U.S. Supreme Court Opinions*, 94 LAW LIBR. J. 427, 430–31, 2002 LAW LIBR. J. 27, ¶ 10.

imagined ways the universe of nonlegal information is now easily and cheaply available to lawyers, judges, and other legal decision makers. What once would have required a two-hour journey now requires only the click of a mouse, and this may well provide the most persuasive explanation of the phenomenon we have identified."[79] This explanation is bolstered by the fact that one source of nonlegal citations they found to show a definite increase is wide-circulation newspapers,[80] for easily searchable full texts of such newspapers have been available for years on NEXIS, a database packaged with LexisNexis, and now they are also carried on the Internet.

¶63 Commercial interests continue to have an influence on the dissemination of legal information today,[81] just as they did when John West was building his publishing empire over a century ago. Now, however, they may contribute to the delegalization of law. The West Publishing Company, with its automated system Westlaw, has recently been acquired by Thomson, Ltd. "We might hypothesize, therefore, that the very boundary between law and nonlaw that the previously law-specific West Publishing Company had a strong interest in protecting is a boundary that Thomson, which now owns West, has an equally strong interest in tearing down. If lawyers and judges could be encouraged to become consumers of Thomson's nonlaw products, for example, and if Thomson's nonlaw customers could be encouraged to become consumers of Thomson's newly acquired law products, the most obvious winner appears to be Thomson itself."[82] A similar argument could be made for Mead Data Central, publisher of LexisNexis, which has been acquired by Reed-Elsevier, a firm that is also active in publishing nonlegal materials.[83]

¶64 Another leading jurist who has also commented upon the diminished autonomy of the law[84] is Richard Posner, himself a prime representative of the interdisciplinary law and economics school. In a less than flattering portrait, Bernard Schwartz notes that Judge Posner's opinions sometimes break new ground, disregarding precedent and established rules of law in favor of economic analysis. His willingness to consider matters beyond the law as narrowly defined once moved one of his circuit court colleagues to protest that "we should confine our discussion to the legal principles applicable to the case at hand."[85] Posner straddles academic and court law, having served as a member of the University of Chicago law faculty for twelve years before being appointed to the U.S. Court of Appeals for the Seventh Circuit in 1981. His clerks, two of whom I have inter-

79. *Id*. at 513.
80. *Id*. at 503.
81. *See* Bast & Pyle, *supra* note 3, at 300, ¶ 58.
82. Schauer & Wise, *Nonlegal Information*, *supra* note 77, at 511–12.
83. Schauer & Wise, *Legal Positivism*, *supra* note 77, at 1107.
84. Richard A. Posner, *The Decline of Law as an Autonomous Discipline 1962–1987*, 100 HARV. L. REV. 761, 769 (1987).
85. SCHWARTZ, *supra* note 69, 574–75.

viewed, are as often set to work on research projects outside the traditional confines of the law as within them.

Academic Law

¶65 Bernard Schwartz wrote: "As this century draws to a close, the cutting edge of jurisprudence is in the academy rather than the forum. It is the 'academic scribbler,' more than the judge, who is setting the themes for the developing law."[86] One of those themes is the boundary-dissolving effect of the automation of information, which is more potent on the academic side of the law than in professional practice and litigation.

¶66 One kind of evidence for this is that there is a great deal more "academic scribbling" going on now than there was twenty or thirty years ago. Professor Albert Brecht of the University of Southern California Law Library has emphasized that, beginning in the 1970s, a major tilt toward research and publication occurred among law school faculty. This trend has continued to increase ever since, and he is convinced that an important impetus for it is automation, which opens the door to new kinds of academic analysis.[87] A greater empirical emphasis is visible in the work of legal scholars as automation makes it easier to gather data, according to Columbia Clinical Law Professor Mary Zulack.[88] For example, in their discussion of indeterminate doctrines for judicial review of administrative decisions, Shapiro and Levy utilized computer searches to analyze citation patterns in 56 Supreme Court cases and 118 circuit court cases.[89] Prior to automation such a question would more likely have been addressed with a doctrinal analysis relying on a few cases.

¶67 Clear evidence of increased research activity by academic lawyers is visible in developments in the world of law journals. Previously the typical law school published just one journal: its law review. The emphasis on research and publication in academic law in recent years has produced a veritable flood of new journals, and now many law schools publish several of them. For example, in 1977 a sample of sixteen law schools from different geographical regions and ranked tiers[90] published twenty-eight journals between them, most of them standard law reviews. At the present time those same schools publish a total of seventy-seven journals. Obviously this development has greatly increased the total amount of published legal scholarship. Moreover, a leaky boundary between the law and

86. *Id*. at 566.
87. Telephone Interview with Albert O. Brecht, Associate Dean, Chief Information Officer, and John Stauffer Professor of Law, University of Southern California Law Library (July 6, 2001).
88. Interview with Mary Zulack, Clinical Professor, Columbia Law School, in New York City (Nov. 5, 2001).
89. Shapiro & Levy, *supra* note 56, at 1067.
90. The law schools in our survey are Brooklyn, California Berkeley, Chicago Kent, Dickinson, Iowa, Maryland, Mercer, Miami, Oregon, South Dakota, Texas, Toledo, Tulane, University of Washington, Washington University (St. Louis), and Yale.

other fields is evident from the fact that many of the new journals are explicitly interdisciplinary in focus, such as *Ecology Law Quarterly, Texas Hispanic Journal of Law and Policy, Journal of Southern Legal History,* and *Law and Sexuality*.

¶68 Interdisciplinary tendencies have been visible for some time in the kind of research and writing done by academic lawyers.[91] We hypothesized that automation has been a contributing factor to the extension of legal research beyond the law as traditionally defined. Broader outlooks are to be expected in the new law journals with interdisciplinary foci, but it is also apparent even in the flagship law reviews. We compared citations in the lead article for eight issues of eight law reviews[92] for the period between 1974 and 1977 and again for 1999–2001, for a total of 127 articles. We limited ourselves to citations to periodical literature and Web sites and tabulated them according to the following categories: law journal, nonlaw journal, newspaper or magazine, and Internet site.[93] The hypothesis was that with increased availability of online bibliographic resources, relevant materials outside the standard law literature become easier to find. Therefore the proportion of citations to sources other than law journals at present would be greater than it was twenty-five years ago. The data support the hypothesis (see figure 2). Of all citations to periodical literature, the proportion to legal periodicals has declined from 75% to 64%. Somewhat surprisingly, citations to nonlegal journals also declined slightly, but citations to newspapers and magazines increased and Internet sites emerged as a new citation source.

¶69 An increased emphasis on interdisciplinary studies is also evident in the structure of legal education. We compared the sixteen law schools discussed above with reference to journals published, this time in terms of the academic degrees held by their regular faculty in 1977 and at the present. The total number of faculty in those schools increased from 540 to 777 in that period. A greater interdisciplinary focus is clear: the percentage of regular faculty holding doctoral degrees in fields other than law nearly tripled, from 5% to 13% (see figure 3).

¶70 Again, in 1977 fourteen[94] of those same schools offered a total of twenty-nine formal interdisciplinary programs leading to a law degree plus a masters

91. *See* Philip C. Kissam, *The Decline of Law School Professionalism*, 134 U. PA. L. REV. 251, 297–99, 318–19 (1986).

92. The law reviews, selected for diversity of law school rank and geography, were the *Arizona State Law Journal, Baylor Law Review*, *Boston University Law Review, Connecticut Law Review*, *Florida State Law Review*, *Michigan Law Review*, the *Pepperdine Law Review*, and the *Stanford Law Review*. One article from the earlier period was discarded because it cited an inordinately large number of newspaper articles. Had it been included, that one article would have accounted for 75% of all newspaper citations in the sixty-four articles reviewed for the 1974–1977 period.

93. Classifying sources in one or another of these categories is straightforward. Interdisciplinary journals that include the words "law" or "legal" in the title, such as *Law and Society Review* or the *Journal of Law, Economy and Organization*, were classified as law journals. Citations to books were not included because, enlightening as that might have been, too much subjectivity is required in deciding whether certain titles should be counted as law or nonlaw.

94. Yale and the University of Iowa are not included in this comparison because although both encourage joint degrees, their published information does not give specifics about particular interdisciplinary programs.

Figure 2

Law Review Citations

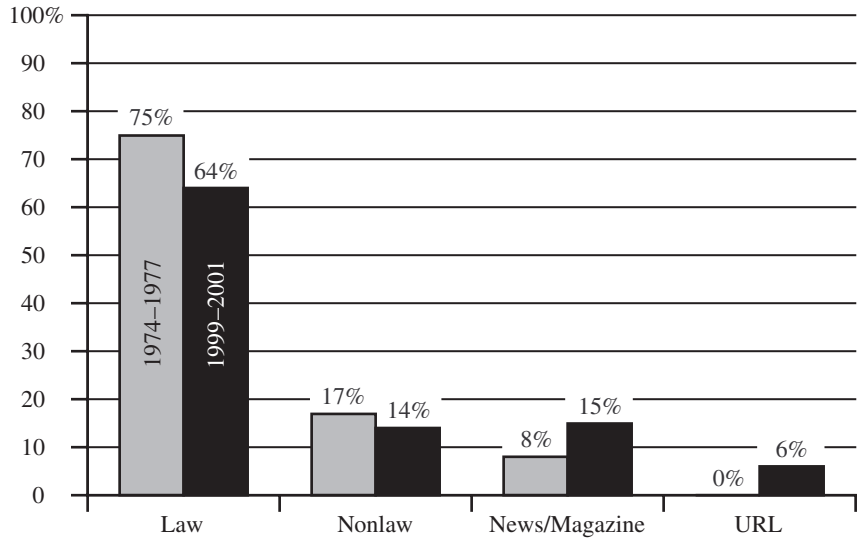
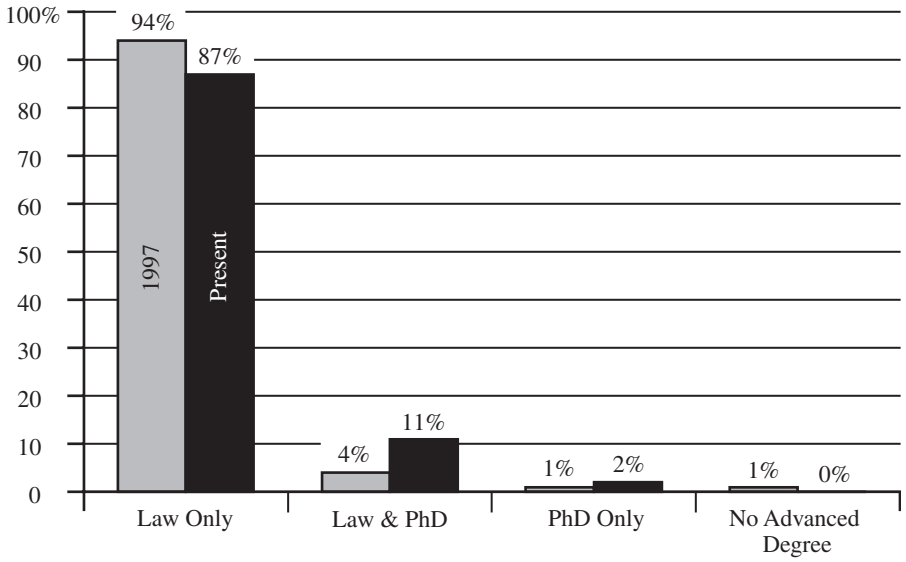


Figure 3

Law Faculty Degrees



degree in another discipline. Today that number has more than doubled, to seventy.

¶71 As for why interdisciplinary interests have grown, Posner suggests that by the 1950s the law had become rather cut and dried and academic lawyers were becoming restless to do something new and different. Exploring the relation between the law and other disciplines (such as his own work in law and economics) breathed new vitality into legal scholarship. Posner anticipates additional cross-fertilization between the law on the one hand and the sciences and humanities on the other, such as lawyers drawing upon the humanities to enhance their ability to interpret texts—a much needed skill in constitutional and statutory law.[95] My suggestion is that an added impetus to interdisciplinary studies has been the increased convenience of getting materials brought about by automation. I would add that if the automation of information has made it easier for legal scholars to consider extra-legal sources in their research, movement in the other direction is probably even greater. Automation began earlier and has proceeded further in law than in many other disciplines, where, for example, online versions of full-text journal articles are still uncommon. The easy accessibility of legal information is a strong enticement for nonlawyers (such as myself) to extend their research into the law.

The Internet

¶72 Thus far our discussion has focused primarily on LexisNexis and Westlaw. But the impact of automation is far wider because of the Internet, which carries vast amounts of information on virtually every topic. Within the legal profession, a law faculty member told me, the Internet makes it easier for attorneys to find empirical evidence to bolster their arguments on topics such as discrimination and equal protection. Judges are beginning to cite Internet sources in their opinions,[96] and our own survey, discussed above, reveals that Internet citations now account for 6% of the citations in law review articles.[97] The U.S. Supreme Court and many other courts now publish their decisions on the Internet the same day they are handed down.

¶73 Daily developments in specialized fields such as securities law are easy to monitor on the Internet, and regulations and other information from state and federal agencies are readily available there. An academic lawyer with research specialization in administrative law told me that automation has made the materials

95. Posner, *supra* note 84, at 772–73, 777.

96. *See* Lawrence Duncan MacLachlan, *Gandy Dancers on the Web: How the Internet Has Raised the Bar on Lawyers' Professional Responsibility to Research and Know the Law*, 13 GEO. J. LEGAL ETHICS 607, 645 n.234 (2000).

97. In a recent study, Mary Rumsey found that law review articles containing at least one Web citation increased from .57% in 1995 to 23% in 2000, and that the average number of Web citations in such articles increased from 1.9 to 10.45 per article over the same period. Mary Rumsey, *Runaway Train: Problems of Permanence, Accessibility, and Stability in the Use of Web Sources in Law Review Citations*, 94 LAW LIBR. J. 27, 32–33, 2002 LAW LIBR. J. 2, ¶ 19.

he consults much easier to access. Formerly it was often necessary to consult documents in the agency offices. Now administrative agencies have Web sites, their policy documents are online, and they can be retrieved immediately from virtually anywhere. He consults the electronic version of the *Federal Register* every day and finds the capacity to define his own searches in the *Register* by means of keywords to be a great improvement over reliance on prefabricated index categories. Using "push technology," he leaves his keyword search query in the system and whenever something appears in the *Register* that matches it, he is automatically notified by e-mail.

¶74 E-mail itself is another important aspect of automation. It is rare for law faculties to have more than one or two individuals with the same specialization. E-mail enables the establishment of networks of scholars with the same interests, located in many different places. They can easily circulate manuscripts, ask questions, make suggestions, and exchange citations. An academic lawyer who participates in such a network said he views e-mail as not just a faster means of regular mail or an alternative to the telephone. In his view it is a distinctive mode of communication in its own right.

Implications for the Legal Profession

¶75 The Internet, of course, is available to virtually anyone free of charge. As a result, laypersons are gaining more familiarity with the law as their access to legal materials improves. One upshot of this, mentioned in an interview, is that many distaff visions of what the law is or should be are now promulgated by a wide variety of groups, including supremacists of one sort or another, militias, survivalists, and religious sects. Another is that individuals who face a legal issue often turn to the Internet to learn more about their situation, and they may become quite knowledgeable in that particular area of the law. Depending on how well they contextualize that knowledge and realize their limitations, this can either help or hinder their attorneys. More knowledgeable clients also pose a threat to attorneys of marginal competence. A similar situation notoriously exists in medicine, where the patients accumulate information about their diagnosed conditions on the Internet and sometimes second-guess their physicians accordingly.

¶76 The Internet may threaten the legal profession. Hoeflich and O'Brien hold that the legal profession developed in the twelfth and thirteenth centuries as a select body of persons with specialized knowledge of how to access and interpret esoteric texts.[98] It long continued thus, but now that automation has greatly loosened the grip of the professionals on legal information and self-help sources are available for many routine legal procedures, the previously privileged domain has become less secure. As Katsh phrased it, when informational distance narrows between professionals and clients, the authority of the professional tends to

98. *See generally* Hoeflich & O'Brien, *supra* note 30.

diminish.[99] This, however, was qualified in interviews with two practicing attorneys. One acknowledged that people may use self-help tools for relatively straightforward procedures such as wills for small estates or simple contracts, and he thinks that pro se representation is increasing for small claims. However, he continued, unless the rules change to allow professionals other than lawyers to practice at the bar, it is inconceivable that corporations or wealthy individuals will dispense with the services of experienced attorneys in complex situations with very large sums of money or other weighty considerations in the balance. The other attorney said that the danger does not lie in the public becoming enlightened about the basic principles regarding fairness and wrongdoing involved in breach of contract, personal injury, and criminal issues, for clients understand these already. The citadel of esoteric knowledge is built instead around the procedures that must be followed to achieve their aims. The threat to the profession lies in the possibility that the Internet will educate the public in these matters.

¶77 Two provocative essays have hazarded predictions about how automation might affect the legal profession in the future. One, by Ethan Katsh, foresees large firms becoming even larger and more diversified, extending beyond the law to "incorporate the labor of other professionals and . . . supplement its legal services with management consulting, investment counseling, lobbying, and so forth."[100] The other prediction, from Robin Widdison, is that, within twenty-five years, technology will obviate the need for library and office infrastructure that large firms now provide and the profession will fragment into a predominance of sole practitioners. For complex cases requiring a variety of skills, these practitioners will join with others to form ad hoc firms that combine, on a temporary basis, the expertise required to deal with the particular situations.[101]

¶78 In an interview, Katsh supported his view with the arguments (1) that developments in technology contribute to the growth of large firms by making communications between offices in different cities around the world easy and instantaneous, and (2) that large firms are best equipped to assemble the variety of expertise needed to cope with increasingly complex legal issues.[102] One individual I interviewed perceives increasing cooperation between lawyers from different firms and so is more persuaded by Widdison's image of the future, but most of the others echoed Katsh's arguments. Librarians and attorneys from large firms confirmed that their intranets are increasingly effective for keeping staff from different offices in close communication. Large firms tend to be organized in terms of practice groups, many of which combine attorneys with complementary skills.

99. Katsh, *supra* note 2, at 451–42; *see also* Ethan Katsh, *Digital Lawyers: Orienting the Legal Profession to Cyberspace*, 55 U. PITT. L. REV. 1141, 1155–59 (1994) [hereinafter Katsh, *Digital Lawyers*].

100. Katsh, *Digital Lawyers*, *supra* note 99, at 1166.

101. Robin Widdison, *Electronic Law Practice: An Exercise in Legal Futurology*, 60 MOD. L. REV. 143, 151–52 (1997).

102. Interview with Ethan Katsh, *supra* note 48.

Some are permanent (such as employment law and other standard practice areas), while others form to deal with specific issues (such as the Y2K practice groups that sprang up in many firms in the late 1990s to address the anticipated crisis associated with computer date changes). Akin Gump, for example, formed a practice group in the wake of the terrorist attack of September 11, 2001, that brings together specialist attorneys in insurance, trading with the enemy, funds transfers, and other fields pertinent to terrorism,[103] and they have another that focuses on business dealings with countries of the former Soviet Union.[104] Large firms also form ac hoc teams with diverse skills to deal with particular cases.

¶79 Such cooperative groups are easier to form within large firms than between small firms or solo practitioners because it avoids the problem of sharing proprietary information with potential competitors. The import of that problem is clear from the fate of Counsel Connect. This was an e-mail discussion list set up in the mid-1990s to encourage lawyers to share information and advice. It ultimately became defunct, one academic lawyer opined in an interview, largely because participants were unwilling to post information that they thought might jeopardize their own or their clients' interests.

¶80 Katsh's and Widdison's predictions, apparently diametrically opposed, may actually both be apt but with reference to different kinds of firms. Large firms tend to defend large, corporate clients, which have trade and other secrets to protect. They are likely to develop in the direction predicted by Katsh. But solo practitioners and small firms tend to represent individual plantiffs, most of whom do not have proprietary information that needs guarding. For them, the benefits foreseen by Widdison may well lead to greater collaboration. However that may be, Katsh and Widdison actually agree on one fundamental point. Both implicitly assume a recent trend away from specialization, if not necessarily at the level of the individual, then certainly at the level of the collaborative team. The trend reverses a centuries-long pattern and is visible not only in law, but in scholarly professions generally. As the volume of information increased with the passage of time and inventions such as printing, it became increasingly difficult for any individual to control it all. The response was for people to specialize in only part of the body of information. Specialization was closely allied with the organization of information into categories, for the categories defined the material in which the specialists would specialize. Specialists in various areas formed what Stanley Fish has called "interpretive communities": relatively enduring groups of people marked by a tendency to think about the same things in the same way.[105] As knowledge increased, more and more interpretive communities developed, each con-

103. *See* AKIN, GUMP, STRAUSS, HAUER & FELD, L.L.P., GLOBAL SECURITY, *at* http://www.akingump.com/practice.cfm?practice_id=85 (last visited Aug. 3, 2002) (describing practice area).

104. *See* AKIN, GUMP, STRAUSS, HAUER & FELD, L.L.P., RUSSIAN FEDERATION AND OTHER REPUBLICS OF THE FORMER SOVIET UNION, *at* http://www.akingump.com/practice.cfm?practice_id=98 (last visited Aug. 3, 2002) (describing practice area).

105. STANLEY FISH, IS THERE A TEXT IN THIS CLASS? 14 (1980).

cerned with progressively narrower slices of it. Although at a cost of diminished communication between interpretive communities, it was an entirely understandable and effective way to deal with the growth of information.

¶81 As I have argued, automation represents yet another quantum leap in the volume of accessible information. It might easily have been anticipated that this would produce yet a further advance in specialization. But actually something quite different has been happening. Instead of the knowledge-based professions segmenting themselves into still narrower specializations, a fluid form of networking is emerging. As part of the set of developments analyzed by actor-network theory, scholarly activity is becoming driven less by predefined knowledge content than by ad hoc problems or questions.[106] Instead of career-long specializations in Polynesian ethnology or criminal procedure, professionals increasingly cross conventional disciplinary and subdisciplinary boundaries as they cope with their current research or practice problem.

¶82 For many scholars, this defines their individual activities. Those dealing with contemporary questions of ethics, for example, draw not only upon traditional ethics in philosophy but also, depending on the particular issue they are addressing, on recent developments in biotechnology, genetics, business practices, globalization, and so on. Other scholars remain more closely tethered to their particular specializations, but they often join in collaborative research with specialists in fields different from their own. In both cases, as scholars address a sequence of research problems in the course of their careers, they establish short-term associations with bodies of literature and other scholars most helpful to their current projects. What Ethan Katsh said with reference to the law is at least as apt for scholars in other disciplines: "Speed and convenience may be the attraction for new computer users and the justification for purchasing hardware and software, but most users at some point find themselves using information differently, possessing information that they would not have had previously, asking questions they might not have asked previously and working with people they might not have had contact with before."[107] Thus with the aleatory trajectories that increasingly govern contemporary practice and scholarship in the law and elsewhere, the longstanding trend toward increasing specialization is being reversed.

¶83 How can this be explained? It is, I suggest, yet another result of the diminishing significance of the taxonomic organization of information. Professional specialization and hierarchical classification are two sides of the same coin: the categories define both the divisions of knowledge and specialized attention to

106. *See* Michel Callon, *Society in the Making: The Study of Technology as a Tool for Sociological Analysis*, *in* THE SOCIAL CONSTRUCTION OF TECHNOLOGICAL SYSTEMS 83, 99–100 (Wiebe E. Bijker & Thomas J. Hughes eds., 1987); Michel Callon, *Actor-Network Theory—The Market Test*, *in* ACTOR NETWORK THEORY AND AFTER 181, 183 (John Law & John Hassard eds., 1999); John Law, *After ANT: Complexity, Naming and Topology*, *in* ACTOR NETWORK THEORY AND AFTER, *supra* note 106, at 1, 4–7.

107. Katsh, *supra* note 2, at 443.

them. When information is managed in terms of categories in a classification scheme, it is natural for professional specializations to grow up around those same categories. But automated information management operates according to indexing rather than classification. Because that does not rely on preestablished categories, a basis for the establishment of professional specializations is removed.

Indexing, Worldview, and "the Law"

¶84 I have argued that research in print sources is conducive to a view of the law as a hierarchical system in which particular circumstances can be subsumed under a relatively small number of general principles, while automated research pulls in the opposite direction. In this concluding section I want to develop that point further. To do so, it is important to be clear on some fundamental differences in information management before and after automation. Printed text is stored in just one way: the order in which the words appear on the page.[108] Printed text is processed by human intelligence, be it the author or the reader. In both cases processing also follows the order of the words on the page. That word order conveys the intrinsic organization of the text, as determined by the author and often summarized in a table of contents. With automation, on the other hand, information is stored in electronic databases, and artificial intelligence is required to process it into a form that is intelligible to human intelligence. Electronic databases do not store—and artificial intelligence does not process—information in only one way. Consider the "deleted messages" database in an e-mail program. The messages in it can be instantly reorganized according to time received, subject, or name of sender. It would be nonsensical to say that any one of these is the true or proper organization for this body of information; each is as valid as another. Thus, as a beginning, it is fair to say that textually stored information is intrinsically organized, while electronically stored information is not.

¶85 While it is extremely important, the difference should not be overemphasized. Digitalized information brought up on a computer screen looks very much like a text, and it can be and often is read like one. Furthermore, it would be going too far to conclude that because printed text is stored in only one way, it can be accessed only in that way. Readers can ignore the intrinsic organization of the text as established by the author and use it for their own purposes by consulting the index. In effect, the index contains a number of alternative organizations of the text,[109] although without, of course, the degree of coherence of the intrinsic organization represented by the table of contents.

¶86 Using an index is similar to using a computer to search a digitally stored

108. Berring, *supra* note 18, at 28–29.

109. Jay David Bolter, Writing Space: The Computer, Hypertext, and the History of Writing 22 (1991).

text by means of keywords. But the differences are extremely important. First, only a few printed texts can be accessed by means of an index because the great majority of them do not have indexes. By contrast, *any* digitalized text can be searched for keywords. Second, while an index provides many more possible organizations of a printed text than the table of contents, it is still limited to the topics that have been selected by the indexer. On the other hand, in a keyword search it is the user who defines the topics and, especially with skillful use of Boolean operators, the search can be tailored to the user's interest with great precision. As John Henry Merryman prophetically wrote in 1977, "One of the most attractive features of the LEXIS system . . . is that it liberates the researcher from [pre-established] indexes and opens up an enormous range of possible avenues of access to the literature."[110] In effect, with every keyword search the user creates a new index of the text. Therefore the capacity to use a text for purposes other than the author's or indexer's is much greater with keyword searching than with an index. Roberta Shaffer stressed this aspect when asked what appealed to her about online research. "Being liberated," she replied. "Having the choice between looking at something using someone else's taxonomy, like an indexer or a West Key Number system, versus letting your own mind create the taxonomies. With the books, you don't have the freedom to think of it the way *you* think of it. You're constrained by how somebody else chose to present it."[111] For those who do approach it in this way, the intrinsic organization of the text pales in significance relative to the variety of contingent organizations into which different readers reframe it.[112]

¶87 Finally, consider a search not for terms within a single text, but for a plurality of texts relevant to one's interest. I have in mind using a search engine to find Web sites that deal with a given topic, or a tool such as LexisNexis or Westlaw to find cases or journal articles pertinent to a certain point of law. There is no intrinsic organization or order to the way in which the millions of such items are stored in electronic databases. What sites, cases, or articles emerge depends entirely on the user's search strategy. Even when search engines rank the relevance of the various hits, it is an ad hoc evaluation made with reference to the specific search query rather than a reflection of some permanent, underlying, hierarchical structure of Internet sites. It is not even sensible to speak of a "topic" or "point of law" as having any enduring presence, because what passes as a topic or a point of law, when sorted electronically, expands, contracts, and is reconfigured according to any number of diverse criteria used to define different searches.

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110. Merryman, *supra* note 73, at 426. *See also* GEOFFREY C. BOWKER & SUSAN LEIGH STAR, SORTING THINGS OUT: CLASSIFICATION AND ITS CONSEQUENCES 292 (1999) ("In opposition to the old hierarchical databases, where relations between classes had to be decided once and for all at the time of original creation, many databases today incorporate object-oriented views of data whereby different attributes can be selected and combined on the fly for different purposes.").

111. *Quoted in* T.R. HALVORSON, LAW OF THE SUPER SEARCHERS 114–15 (2000).

112. *See* Katsh, *Digital Lawyers*, *supra* note 99, at 1151; KATSH, *supra* note 53, at 221–22; Bintliff, *supra* note 25, at 345.

¶88 Paradoxically, although information accessed electronically may have enhanced meaning for individual users because it is tailored more specifically to their particular purposes, it is less meaningful as a basis for collective consciousness and professional specialization in social groups precisely because of its individualistic quality. Worldview is a social phenomenon, a feature of what were referred to earlier as communities of interpretation. As already discussed, a close relationship exists between worldview and classification systems because people have a tendency to imagine that the world really is organized the way their socially established classifications say it is. It is widely assumed, for example, that living things really are divided into categories and related to each other in precisely the way that Linnaean taxonomy says they are. In the law, people often think that the categories of criminal and civil law are given in the nature of things, as well as distinctions within them such as between misdemeanors and felonies or between contracts and torts.

¶89 With the customized indexing characteristic of electronic access in contemporary information management, this way of thinking is breaking down. It was natural enough to imagine the world as organized in a certain way when it was presented in that way by the only classification system available. But now, accessing and processing information electronically enables people to organize that information according to their own purposes rather than having to accept it in some preestablished form. Because different people have different purposes, and because those purposes change, multiple alternative ways of organizing the information become apparent. In this circumstance, it becomes increasingly improbable to think that the information in question has some permanent, intrinsic organization. And as that happens, one is less likely to imagine that the part of the world to which that information refers is organized in an absolute, eternal way. It is somewhat like anthropologists' openness to some form of relativism: taking seriously their exposure to the diversity of cultural constructions of reality, it becomes difficult to believe that one of them is true and all others that deviate from it are false. In the same way, categories of worldview built on some particular classification of information become less cogent when that classification is recognized as one of many possible alternatives.

¶90 There is more. Automation does not simply reveal multiple ways of organizing information. The kind of organization associated with automation is also different. Relying on indexing rather than classification, it presents information in relatively isolated bits rather than in taxonomic structures. This implies that reality has no deep structure, that it is not knowable in terms of a few grand truths. Bast and Pyle identify certain consequences of computer indexing as postmodern.[113] Interestingly, two signature propositions of postmodernism have to do with indeterminacy and depthlessness. Postmodernism rejects both absolutism and

113. Bast & Pyle, *supra* note 3, at 302, ¶ 65.

"grand narratives," deconstructing many received truths as historically and culturally variable presuppositions and refusing to seek for deeper meaning beneath surface manifestations. It is no coincidence, I think, that disillusion with the notion that we can know eternal verities about a determinate, highly organized, and deeply structured reality comes on the scene simultaneously with the rapid expansion of automated information management.