

Essay

THE IMPACT OF COMPUTERS ON THE LEGAL PROFESSION: EVOLUTION OR REVOLUTION?

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“When the first personal computer appeared in a law office, the practice of law underwent a profound change.”[†]

“The professional lives of lawyers (not to mention their personal lives) have been fundamentally and forever altered by the introduction of a new medium—the Internet.”[‡]

“For many, it is difficult to imagine practicing law for even one day without using the Internet in some form.”^{††}

“[M]y expectations of IT and the Internet are that they will fundamentally, irreversibly, and comprehensively change legal practice, the administration of justice, and the way in which non-lawyers handle their legal and quasi-legal affairs. . . . I anticipate, in the somewhat regrettable jargon, a complete shift in legal paradigm.”^{‡‡}

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[†] Douglas S. Schnell, Note, *Don't Just Hit Send: Unsolicited E-Mail and the Attorney-Client Relationship*, 17 HARV. J.L. & TECH. 533, 534 (2004).

[‡] Robert J. Howe, *The Impact of the Internet on the Practice of Law: Death Spiral or Never-Ending Work?*, 8 VA. J.L. & TECH. 5, ¶ 1 (2003), http://www.vjolt.net/vol8/issue2/v8i2_a05-Howe.pdf.

^{††} Altom M. Maglio, *The Changing Relationship of Law and Technology—The Judicial System's Survival Is Dependent on Technology*, 10 J. TECH. L. & POL'Y xiii, xiii (2005).

^{‡‡} RICHARD SUSSKIND, *TRANSFORMING THE LAW* viii–ix (2000).

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I. INTRODUCTION

Computer enthusiasts like to claim that they have changed the world, and it is hard to deny that computers have had a significant impact. Take some examples from the recent popular press, which tell us that: computer-based matchmaking can replace hit-or-miss human dating;¹ events in Estonia suggest that “cyberwar” may be a new threat;² energy shortages may be accelerated by the growing consumption of electricity by computers;³ technology allows people to move to resort cities and maintain their big-city professional lives, leading to a “transformation of rural communities”;⁴ restaurant reservations have moved to a new level because of computerization;⁵ and cell phones are used for musical performances.⁶

¹ See John Tierney, *Hitting It Off, Thanks to Algorithms of Love*, N.Y. TIMES, Jan. 29, 2008, at F1 (reporting that one online dating service forbids customers to search for their own dates, instead using its own computer-based analysis to link couples, and noting the dating service’s claim that its matchmaking was responsible for two percent of the marriages in America last year).

² See John Schwartz, *When Computers Attack*, N.Y. TIMES, June 24, 2007, § 4, at 1 (reporting that the jamming of governmental computers in Estonia, after the Estonian government planned to remove Soviet-era war memorials, was initially viewed as the dawn of a new age in conflict employing the potentially crippling effects of computer attack).

³ See *Going Green*, ECONOMIST, Mar. 3, 2007, at 71 (reporting growing concern about the environmental impact of computer operations, which may account for as much as four percent of American electricity consumption).

⁴ John Leland, *Off to Resorts, and Carrying Their Careers*, N.Y. TIMES, Aug. 13, 2007, at A1 (reporting that many people, including lawyers, can operate full-time from such locations as Jackson, Wyoming or Steamboat Springs, Colorado).

⁵ See Katie Hafner, *Reservations on Demand*, N.Y. TIMES, June 18, 2007, at C1 (reporting that computerized reservation systems enable restaurants to store and utilize myriad details about the dining preferences of customers).

As a singularly information-dependent profession, the field of law could hardly escape the impact of the Information Age. As they do with so many other things, the computer enthusiasts regard this impact as revolutionary. My focus in this Essay is on how to evaluate that claim. To do so, one must be both selective and somewhat general. “The analysis of society and technology has been a central issue in sociology since its beginning,”⁷ and it is beyond the scope of this Essay to revisit or recreate such a long-standing undertaking. Thus, examining the range of impacts of computer technology on the legal profession necessarily requires selectivity, which prevents deep examination of many topics.

Subject to these constraints, I survey an array of topics and consider the impact computers have had on them. I begin with a brief reflection on how one decides what aspects of activity computers affect and also recognize that computers’ impact on human behavior in America is pervasive. As a result, it is necessary to focus on certain impacts, principally those dealing with communication and information storage and retrieval. Using that focus, I turn to areas in the legal profession in which the advent of the Information Age has had an effect: law schools, law office operations, computerized court operations, electronic discovery, and criminal procedure.

The question, then, is whether we should regard these present and potential changes as evolutionary or revolutionary. Certainly technology has been important to the legal profession for a long time. From the time of *Bartleby the Scrivener*⁸ to the twenty-first century, technological change has profoundly altered how lawyers work and, to some extent, what they do. Computer technology is simply the most recent addition to this long-term process, and an argument that it is revolutionary calls for some external comparisons. This Essay offers three: the transformation of modern large law firms, the effect of the telephone on society, and the effect of computers on the medical profession. The initial conclusion is that it is too soon to tell whether the effect of computers on the legal profession is evolutionary or revolutionary. The most radical of consequences predicted for the legal profession certainly have not yet occurred, but it is also difficult to be sure whether they will occur. The cumulative effect of other changes enabled by the computer may bring about changes that are indeed revolutionary.

⁶ See Amol Sharma, *Playing Cellphones on Stage Has Ring of Respectability*, WALL ST. J., May 29, 2007, at A1 (describing Manhattan musical performance in which Bora Yoon used a Samsung phone to perform her “mobile-phone composition” entitled “Plinko”).

⁷ RICH LING, *THE MOBILE CONNECTION: THE CELL PHONE’S IMPACT ON SOCIETY* 174 (2004).

⁸ HERMAN MELVILLE, *BARTLEBY, THE SCRIVENER* (Dodo Press 2006) (1853).

II. A PREFATORY NOTE: WHAT DOESN'T DEPEND ON COMPUTERS NOWADAYS?

One reason young people believe nothing was possible before the Information Age is that almost everything they do is now dependent on computers. Cars and telephones work because of computers. Schools rely on computers to collect and store information about students. Entertainments of all sorts market their tickets using computers even if they don't directly rely on computers for the performances themselves. But to a significant extent, this reliance replaces precomputer activities that were relatively similar. Computers just do the same things more rapidly and at a lower cost.

Surveying this broad swath of activities affected by computers, I conclude that it is not possible to isolate all aspects of lawyers' work that have changed because of the computer. Instead, I will focus on a selective catalogue that emphasizes the communication, information-storage, information-analysis, and information-dissemination capacities of computers. While these features are certainly the ones that have had the largest impact on society as a whole, the emphasis here will be on the way in which they affect lawyers.

III. WAYS IN WHICH THE COMPUTER AFFECTS THE LEGAL PROFESSION

Undoubtedly, it could be said that computers affect almost all regular activities of lawyers. The following array of examples is intended to be an illustrative rather than an exhaustive chronicle of those impacts.

A. *Law School*

Law school is where the legal profession begins for the twenty-first century aspiring lawyer. How much does it differ from the law school of earlier generations? Some changes are obvious at a glance. Faculty can now communicate with students more often and readily via the Internet. Various entertaining computer-based methods are available to enliven classes. Internet searches presumably afford students a greater opportunity to cruise through information about other law schools (such as old exams of visiting Professor X). These changes are relatively superficial, however.

There are potentially more important changes, for better or for worse, to the law student's and professor's daily experiences. Already there is surely less reliance on books, at least for research,⁹ although it is less clear

⁹ I have a colleague who laments this change and finds that many students think that citing a blog provides sufficient authority for an assertion about a legal issue. She is right to deplore that attitude. *But see* Beth Simone Noveck, *Wikipedia and the Future of Legal Education*, 57 J. LEGAL EDUC. 3, 5–8 (2007) (urging support for students' desire to use wiki online materials because wikis are "ideally suited to the deliberative and collaborative development of knowledge").

that electronic versions have superseded hard copy casebooks.¹⁰ But while many legal research tasks are now done online, there may be a viable argument that for some purposes books are actually faster and more effective.¹¹ Use of laptops is another pervasive impact. As one who reads essay answers for examinations, it seems to me they are a major improvement in the exam room. But other aspects of laptops are less benign. Laptops have become the principal note-taking method for students, with potentially adverse effects in thoughtfulness and selectivity in note-taking, and also possibly bothering other students. There may be a good reason why many law school classrooms lack windows. Yet while students of the past could not stare out windows, those of today can stare at WindowsTM and a multitude of things unrelated to what goes on in class.

Considerably more radical law school reliance on computers can be imagined. One of my colleagues has so imagined, proposing an unbundling of what he regards as the five functions of law schools.¹² He urges that law schools actually “bundle” together a variety of distinct services¹³ that could be offered separately, in large measure by computers, to produce a dispersed law school experience at much less cost to students. To date, however, agencies that credential law schools have been unreceptive to such alternative arrangements.¹⁴ Although there have been some attempts to shift to online legal education—the Concord Law School is a notable example—this attempt has not significantly affected the actual operations of most law schools. Moreover, the centrality of computers to this sort of effort may be debatable. This same colleague published an article more than thirty years ago—at a time when the computer’s effect and utility were much less im-

¹⁰ *But cf.* Matthew Bodie, *The Future of the Casebook: An Argument for an Open-Source Approach*, 57 J. LEGAL EDUC. 10, 14–19, 34–35 (2007) (urging that new electronic substitutes for the traditional casebook be employed).

¹¹ For example, even the adept probably need more time to orient themselves in a long decision by skipping from screen to screen than by flipping pages in a reporter.

¹² See William K.S. Wang, *The Restructuring of Legal Education Along Functional Lines*, 17 J. CONTEMP. LEGAL ISSUES 331 (2008).

¹³ These services are:

(1) *Imparting knowledge*: One major function, mainly during a live class with a professor, is to impart knowledge. This activity ordinarily focuses on a book as well as in-class activities.

(2) *Counseling and placement*: This function includes advising on selection of courses and assistance in finding a job using the legal training obtained at the school.

(3) *Credentialing*: This service includes both examining and grading individual courses and awarding a degree for completion of a full course of study.

(4) *Coercion*: This function pressures a student to do assigned work, partly by in-class calling on students and partly by giving low grades to those who perform poorly.

(5) *Club membership*: This function relies on the selective nature of law schools to provide an atmosphere that includes interaction with a similarly select group and the lifelong desirability of association with the school’s prestige. *Id.*

¹⁴ See Section of Legal Educ. & Admissions to the Bar, ABA, Standards for Approval of Law Schools, Standard 306(d) (2007) (limiting credit for online education to four hours per semester and twelve hours total).

portant—urging the unbundling of all higher education.¹⁵ It does not appear that undergraduate educational unbundling has occurred. Likewise, an online revolution in law school operations has yet to occur.

Looking to the future, the growth of outsourcing law firms' work to other countries¹⁶ may prompt changes in curriculum. To the extent that outsourcing will come to include routine functions now assigned to recently hired associates, law schools might have to consider modifying their curricula so graduates are better equipped to undertake more challenging tasks immediately. For the present, however, it does not seem that such outsourcing of work has caught on.

The most pronounced effect on the professional activities of law schools may be on the faculty. The Internet and word processing have opened up a much wider world of sharing drafts and collaborating, particularly with those in other disciplines. The Social Science Research Network¹⁷ enables legal academics to establish working relationships more easily with other legal academics and to make contacts with the larger academy. Numerous legal academics have set up blogs, which have become a riveting focus of interest for a great many. Some might even urge that postings on such blogs are legal scholarship comparable to more traditional publications in law reviews and other professional journals.¹⁸ Some of those traditional law reviews also provide online publication for materials not included in the hard-copy journal.¹⁹ Although the uncharitable might suggest that much of this computer-enabled activity is less valuable (and likely to be less enduring) than the enthusiasts believe, such technological advances have surely invaded the ordinary day of the average law professor in a way that is striking, if not revolutionary.

In sum, computers have certainly altered the experience of law students and the activities of law professors, although they have not caused nearly as much change as they might. As a result, the current law school experience resembles the precomputer experience far more than it differs.

¹⁵ See William K.S. Wang, *The Unbundling of Higher Education*, 1975 DUKE L.J. 53, 54.

¹⁶ See *infra* text accompanying notes 29–31 (describing the outsourcing of “back office” and other law firm operations to remote locations).

¹⁷ See Social Science Research Network (SSRN) Home Page, <http://www.ssrn.com> (last visited July 25, 2008).

¹⁸ For a discussion, see *NLJ Roundtable: Blogs and Scholars*, NAT'L L.J., Oct. 8, 2007, at 22 (reporting comments at a roundtable discussion sponsored by the National Law Journal and the Association of American Law Schools on “Blogging, Scholarship, and the Bench and Bar”). One professor suggested that if a law school wanted to encourage its faculty to engage in blogging “the best way to encourage faculty would be for it to count, and by count I mean help people get tenure.” *Id.* (comments of Professor Paul Butler).

¹⁹ For example, the *Northwestern University Law Review* offers *Colloquy* pieces online that are not included in the hard-copy journal. See *Northwestern University Law Review Colloquy*, <http://colloquy.law.northwestern.edu> (last visited July 25, 2008).

B. Law Office Operations

One need only think of word processing to appreciate the importance of computers to the operation of law offices. But word processing, along with the use of Westlaw and Lexis, has been going on in law offices for more than thirty years, and the pervasive importance of computers for legal practice extends far beyond word processing and research activities. This impact has proven sufficiently important to be the focus of books²⁰ and specialized journals.²¹ These publications offer advice and inspiration (and, one cannot avoid surmising, pervasive advertising) about the ways in which law firms can employ information technology. Because larger firms seem to have embraced such technology earlier in time,²² articles tend to emphasize how more modest offices can do the same thing. For example, a lawyer from a Denver firm described a two-month trial that two of the firm's attorneys had handled in Los Angeles. "With an Internet connection and some printers, they were able to work as if they were in Denver," he rhapsodized; "I think it drove home the point that IT eliminated the physical boundaries for the attorneys."²³

Certainly change has occurred rapidly on this front. Ten years ago, it was big news that the San Francisco firm Orrick, Herrington & Sutcliffe (Orrick) had a website and that the site was getting 5000 hits a week.²⁴ By 2006, an estimated four million people per month used the Internet to search for law-related services, and the number was expected to hit seven million per month by the end of 2007.²⁵ Compared to 1996, law firms "are now armed with full arsenals of on-the-road productivity devices."²⁶ "Firms are thinking not just about remote access, but about universal access as well. It is not enough that attorneys are able to communicate around the

²⁰ See, e.g., THOMAS J. O'CONNOR, *THE AUTOMATED LAW FIRM: A COMPLETE GUIDE TO SOFTWARE AND SYSTEMS* (4th ed. 2000). This book is supplemented annually and was first published in 1994.

²¹ *Law Office Computing*, for example, began publication in 1990. The magazine's mission statement champions its "specific, legal technology focus." Law Office Computing—Mission Statement, http://www.lawofficecomputing.com/EDC/about_us/mission_statement.php (last visited Apr. 11, 2008).

²² See, e.g., Gurmark Singh et al., *An Empirical Study of the Use of IT by Small and Large Legal Firms in the UK*, 2002(1) J. INFO. L. & TECH., http://www2.warwick.ac.uk/fac/soc/law/elj/jilt/2002_1/singh ("The large companies—being led by the top 30 law firms—are advanced in their understanding of the IT issues, and are therefore in a position to compete strategically." (citation omitted)).

²³ Stephen M. Taylor, *Techsetters: Rothgerber, Johnson & Lyons*, LAW OFF. COMPUTING, Dec./Jan. 2006, at 10, 11.

²⁴ See *This Week in Recorder History: Stories from the Week of July 9–15*, RECORDER (S.F.), July 9, 2007, at 4.

²⁵ See Geri L. Dreiling, *Choosing Up Sides*, A.B.A. J., May 2007, at 28 (citing research from the Pew Internet and American Life Project, in the context of discussing state responses to online legal-match markets).

²⁶ Michael Aneiro, *Tech @10*, AMLAW TECH, Sept. 2005, at 24.

clock; they now want complete and fully secure office capabilities.”²⁷ More dramatic use of technology is possible. Five years ago, Orrick announced that it would move much of its back-office support staff from the San Francisco Bay Area to Charleston, West Virginia, and it claims that since then, it has saved \$20 million from this move.²⁸ Baker & McKenzie has relocated much of its back-office operation to Manila.²⁹ The London-based law firm Clifford Chance has relocated significant parts of its back-office operations to India.³⁰ Beyond that, legal outsourcing to India and other places is expected to expand enormously.³¹ Law firms are even using online video clips to attract associates.³²

Collectively, these developments have substantially changed the way lawyers and other law firm employees go about their jobs. These developments mirror those in the corporate workplace, where there is growing concern about the impact of a 24/7 existence for employees.³³ But it is not clear that all, or even most, law firms are embracing the full potential of computerized communication. Some law firms resist offshoring because they emphasize the significance of having an “integrated service.”³⁴ Email, in particular, has produced headaches for law firms. In part, this is due to problems of confidentiality.³⁵ Beyond confidentiality, the problem of volume has become increasingly acute.³⁶ However, these are not problems specific to corporate law firms. Consider the Ninth Circuit’s comments in a 2005 case about whether responses to an online questionnaire from a law

²⁷ Marcy Burstiner, *Making It Better: Big Firms Are Spending More to Upgrade Their Technology and Expand Their IT Staffs, the Annual AmLaw Tech Survey Shows*, AM. LAW., Nov. 2006, at 55.

²⁸ See Zusha Elinson, *Spinning the Globe*, RECORDER (S.F.), May 23, 2007, at 1.

²⁹ *Id.*

³⁰ See Richard Lloyd, *Home Away From Home*, AM. LAW., Sept. 2007, at 75 (“Clifford Chance’s new Gurgaon facility makes it the first global firm to locate part of its support business in India.”).

³¹ See Arin Greenwood, *Manhattan Work at Mumbai Prices*, A.B.A. J., Oct. 2007, at 36 (reporting that India now has about 100 legal outsourcing companies employing 600 to 800 Indian attorneys, that some of them provide legal work directly to American corporate clients, and that there is an expectation that revenues for these Indian providers of legal services will reach \$4 billion by 2015); Vesna Jaksic, *Guidelines for Outsourcing Grow*, NAT’L L.J., Apr. 30, 2007, at 5 (“A 2005 study by Forrester Research . . . predicted that the value of legal outsourcing work to India could rise from \$80 million to \$4 billion by 2015.”).

³² See Karen Donovan, *Law Firms Go a Bit Hollywood to Recruit the YouTube Generation*, N.Y. TIMES, Sept. 28, 2007, at C6; Sheri Qualters, *Law Firms Post Online Video Clips to Attract Associates*, RECORDER (S.F.), Jan. 23, 2007, at 3.

³³ See, e.g., Frank C. Morris, Jr., *On Call 24/7*, RECORDER (S.F.), Mar. 7, 2007, at 4 (describing concerns about claims by employees for overtime pay or compensation for stress due to the prevalence of wireless devices).

³⁴ See Elinson, *supra* note 28.

³⁵ See David Hricik & Amy Falkingham, *Lawyers Still Worry Too Much About Transmitting E-Mail Over the Internet*, 10 J. TECH. L. & POL’Y 265, 299–300 (2005) (arguing that concerns about client confidentiality are overblown in view of methods of protecting against interception).

³⁶ See Jason Krause, *Eek Is for E-Mail*, A.B.A. J., May 2007, at 62 (reporting that the “sheer volume of e-mail” is a more pressing problem for lawyers than confidentiality).

firm seeking information from “potential class members” should be regarded as attorney-client communications:

What is “new” about the case is attorneys trolling for clients on the internet and obtaining there the kind of detailed information from large numbers of people that used to be provided only when a potential client physically came into the lawyer’s office. Two things had to happen to bring this about: the change in law in the 1970s that permitted attorney advertising, and the sufficiently widespread use of the internet, within the past five or ten years, that makes internet advertising worthwhile.³⁷

Ethics panels across the country have wrestled with problems of this sort, with outcomes often depending on whether sufficient disclaimers are posted.³⁸

At present it is not possible to predict the overall effect of these changes. Part of the pressure for law firms to change comes from clients, who increasingly insist that law firms adopt certain types of IT arrangements, including e-billing and corporate client access to the law firm’s information systems.³⁹ Although this sort of outcome might have been foreseeable, other effects might be surprising. For example, the adoption of e-billing not only permits corporate clients to keep tabs on overstaffing and determine whether partners are doing work more appropriate for associates, but it also permits them to police firms’ adherence to other client objectives. One is diversity; at least some clients use e-billing data to monitor the diversity of the attorneys assigned to work on their matters.⁴⁰ Already, then, computers have had some effects in law firm activities that might not have been foreseen; predicting further effects is perilous.

C. *Computers and Court Operations*

As law office operations have changed markedly due to computers, so have the operations of courts. As in law offices, word processing is crucial to courts. But electronic filing is probably the major development computers have had on court operations. Electronic filing has become effectively universal in U.S. federal courts.⁴¹ More than thirty-one million cases are on the federal filing system, and more than 320,000 attorneys and others

³⁷ *Barton v. U.S. Dist. Court*, 410 F.3d 1104, 1109 (9th Cir. 2005) (footnote omitted).

³⁸ See Kathryn A. Thompson, *The Too Much Information Age*, A.B.A. J., July 2007, at 28 (describing the problem of “lawyers who find themselves in possession of information they would really rather not have” and the varying responses to three examples of this problem).

³⁹ See Anthony Paonita, *All Aboard: As Law Departments Get More Tech-Savvy, They’re Insisting that Firms Come Along for the Ride*, AM. LAW., Mar. 2007, at 77 (describing client pressures).

⁴⁰ *Id.* at 78 (describing Pitney Bowes Inc.’s use of e-billing data and quoting the company’s manager of legal operations, who explained, “It’s not enough just to recruit diverse attorneys We want them to use diverse teams on our matters.”).

⁴¹ See U.S. Courts, Case Management/Electronic Case Files, http://www.uscourts.gov/cmecf/cmecf_about.html (last visited Oct. 20, 2006).

have filed documents in federal court over the Internet.⁴² By way of contrast, a 2006 report about filing in the New York state courts said that during the previous year some 86,000 cases were eligible for electronic filing in that system, but only a small fraction were actually e-filed.⁴³ In some California state courts, however, online filing is becoming mandatory.⁴⁴ In the same vein, there is some indication that private judging systems are beginning to embrace electronic filing as well.⁴⁵

From the lawyer's perspective, the immediate impact of this change is the (slightly) more flexible deadline for submitting documents to courts. As one lawyer put it, "I love e-filing. It makes it so easy."⁴⁶ Another explained that "the 5 p.m. deadline for hard-copy filing in the clerk's office is automatically extended to midnight."⁴⁷ As a law firm support staff employee explained, the impact of e-filing meant a major shift in the responsibilities of law firm support staff: "Because all attorneys push any deadline, we accepted the fact that our office hours had to be increased by seven hours."⁴⁸ But (as with any brinkmanship on court deadlines) relying too heavily on electronic filing can produce disastrous results. In one case a lawyer argued that because her last-minute filing was foiled by a slow electronic connection, it should be treated as having been accomplished at the time she logged on to file a bankruptcy petition rather than when the filing was actually completed considerably later.⁴⁹ The court rejected the argument, and as

⁴² *See id.*

⁴³ Jonathan Lippman, *E-Filing: Time to Ride the Paperless Wave*, N.Y.L.J., Jan. 23, 2006, at 11; *see also* Pam Smith, *Asbestos Cases Forsake Paper Filings for Silicon*, RECORDER (S.F.), Aug. 29, 2006, at 2 (reporting that the San Francisco Superior Court had inaugurated an electronic filing requirement for asbestos personal injury cases).

⁴⁴ *See* Don J. DeBenedictis, *Let Your Fingers Do the Walking*, S.F. DAILY J., Mar. 26, 2007, at 1 (reporting that the complex litigation division of the Orange County Superior Court has begun to require e-filing).

⁴⁵ For example, the September 2006 issue of *California Lawyer* carried an advertisement on page seven from the American Arbitration Association, a private provider of arbitration services:

OUR ONLINE FILING IS AS EASY AS AAA. Innovation and convenience. That's what you get with the new AAAWebFile. Simply log onto our website and select "File a Case Online"—in no time, your case is underway. With AAAWebFile, you get 24/7 access to many timesaving services, like the ability to check the status of your case and share vital information with parties involved.

⁴⁶ DeBenedictis, *supra* note 44.

⁴⁷ *Id.*

⁴⁸ Betsy Reynolds, *Anticipating the Courts' Moves: Manatt Phelps Sets Up E-Filing Protocols*, LAW TECH. NEWS, July 2004, at 31.

⁴⁹ *See* John Caher, *Slow Computer Found Not to Excuse Late Filing in Bankruptcy Proceeding*, N.Y.L.J., July 26, 2005, at 1 (describing case in which delays in e-filing prevented the automatic stay in bankruptcy from applying to the sale of the debtor-petitioner's house). In another case, a judge rejected a last-minute effort to stop an execution because it was filed after the court's 5 p.m. closing time. Ralph Blumenthal, *Texas Judge Draws Outcry for Allowing an Execution*, N.Y. TIMES, Oct. 25, 2007, at A18. The story explains that "[t]he judge . . . has said she did not know that Mr. Richard's defense lawyers in Houston were having computer problems when they asked the court for 20 more minutes to deliver their final state appeal to Austin hours before the scheduled execution on Sept. 25." *Id.* It is unclear whether

a result, the filing was too late to stop the foreclosure sale of the client's home.⁵⁰

From courts' perspectives, e-filing offers the promise of saving space on storage—not an insignificant consideration in a time of shrinking court budgets.⁵¹ It can also eliminate or greatly reduce the likelihood that court files will turn up “lost” when needed, even protecting against permanent destruction of court files because backup services are available to reconstruct files in the event of a catastrophe.⁵² For example, after the dislocation of the court system in New Orleans caused by the aftermath of Hurricane Katrina, e-filing enabled lawyers to get up and running more rapidly than otherwise would have been the case.⁵³

The advent of e-filing has also meant that material filed in court can be accessed online by the public.⁵⁴ Historically, American court files have always been technically open to the public. Although this public access is not unique,⁵⁵ it is different from the systems in some other countries.⁵⁶ In the-

the computer failure was solely about transmitting the documents, but the lawyers for the condemned man had asked for an additional twenty minutes to deliver hard copy documents to the court.

Some lawyers have found court tutorials on e-filing inadequate. In the Central District of California, for example, a lawyer has prepared a twenty-six page guide for e-filing to assist lawyers in avoiding mishaps. See Robert Iafolla, *Litigator Writes Unofficial Use Manual for E-Filing*, S.F. DAILY J., Jan. 30, 2008, at 1.

Failures of communication also run the other way. In *Kuhn v. Sulzer Orthopedics, Inc.*, 498 F.3d 365 (6th Cir. 2007), counsel did not receive notice of entry of the court's order denying a motion, and thus did not file a notice of appeal in the allowed time. Although the criteria for reopening the time to appeal under rule 4(a)(6) of the Federal Rules of Appellate Procedure were satisfied, the district court refused to do so because the problem resulted from counsel's failure to register his email address to receive notice of the court's rulings by email. *Id.* at 370. Noting that “here all [the attorney] had to do was register his email address with the district court's [case management and electronic case filing] system to receive the court's orders,” the appellate court affirmed. *Id.* at 371.

⁵⁰ Caher, *supra* note 49 (“Problems occurring in counsel's office, such as a poor internet connection or a hardware problem will not excuse a debtor's untimely filing It is incumbent on the debtor to show that the clerk's office was subject to a [computer] system failure.” (quoting *In re Sands*, 328 B.R. 614, 619 (Bankr. N.D.N.Y. 2005)); cf. *King v. Berindoague*, 928 A.2d 693, 698 (D.C. 2007) (holding that a jury demand should have been deemed timely filed even though it was rejected due to a courthouse computer malfunction, stating that the “[a]ppellants certainly cannot be held responsible for the inoperable state of the computers in the clerk's office”).

⁵¹ See DeBenedictis, *supra* note 44 (reporting that the Orange County Superior Court saves \$150,000 a year in storage space by requiring electronic filing for its complex litigation court).

⁵² See, e.g., Lippman, *supra* note 43 (“For the courts, e-filing benefits include storage savings, reduced processing time, and the opportunity to protect court files from loss or destruction.”).

⁵³ See John Bringardner, *Swimming in Files: PACER's E-Filing Programs Are Helping New Orleans Lawyers Rebound*, LAW TECH. NEWS, Apr. 2006, at 44.

⁵⁴ The following discussion is drawn from Richard L. Marcus, *A Modest Proposal: Recognizing (at Last) that the Federal Rules Do Not Declare that Discovery Is Presumptively Public*, 81 CHI.-KENT L. REV. 331, 337–39 (2006) (discussing the trend towards putting e-filed court records online and the privacy concerns implicated by the trend, especially in sensitive cases such as bankruptcy and divorce).

⁵⁵ Japan evidently has a relatively open attitude toward court records:

As a general matter the court records of a case in Japan are public records just as the trial itself is a public event. Any person may seek to review the records of a case. However, parties to the case

ory, anyone could look up anything in court records, but as a practical matter public access was limited. One could only look at the records by going to the courthouse, and then only one case at a time. Online access has changed that by making it possible for anyone with access to the Internet to access court records at any time and to search the records in a way unavailable even to those who did visit the courthouse.

This enhanced access has not been a uniform blessing. As one observer put it in 2000, “the potential ability to access and download electronic court filings via the Internet would make finding and disseminating sensitive personal information about litigants about as easy as flipping on a light switch and more convenient and less costly than physical retrieval at the court house.”⁵⁷ In Cincinnati, for example, the decision by the clerk of the state court to put the county court records online produced a very vigorous reaction:

Divorce lawyers say clients are furious that neighbors are combing through the details of their cases (and are even brazen enough to discuss them with them). A teenager was confronted by his father about a speeding ticket. A man complained to [the court clerk’s] office because his friends discovered his history of domestic violence.

“We didn’t realize we were walking into a privacy hornet’s nest until after we were under way,” said [the court clerk], who has received e-mail from people threatening to vote against him in the next election. The legal systems capture the grimmer aspects of American life, ones that many people prefer to keep hidden.⁵⁸

Congress has reached a somewhat similar conclusion. Federal court records, like state court records, can be accessible online. The E-Government Act of 2002 generally supports access to court records by providing that district courts “shall make any document that is filed electronically publicly available online,” and that the court “may convert any document that is filed in paper form to electronic form,” provided that the

may, by motion, seek an order limiting the disclosure of the record or portions thereof that would disclose a trade secret or would violate the privacy rights of a party.

CARL F. GOODMAN, *JUSTICE AND CIVIL PROCEDURE IN JAPAN* 341–42 (2004).

⁵⁶ Compare the following description of German access practices:

Case records in civil cases in Germany are not open to the public either before or after judgment. The parties and their counsel are entitled to free access to the official records of their cases, but others may look at case records only with the consent of the parties involved or by order of the chief judge of the court upon a showing of some legitimate interest in so doing.

PETER L. MURRAY & ROLF STÜRNER, *GERMAN CIVIL JUSTICE* 182 (2004).

⁵⁷ Carolyn Elefant, *How Much Privacy Do Litigants Deserve in E-Filing?*, *LEGAL TIMES*, Oct. 9, 2000, at 29; see also Andy Seldon, *The Hidden Hazards of E-Filing: Sophisticated Searches of Public Records Can Spur Identity Fraud*, *LAW TECH. NEWS*, Aug. 2003, at 16.

⁵⁸ Jennifer 8. Lee, *Dirty Laundry, Online for All to See*, *N.Y. TIMES*, Sept. 5, 2002, at G1. See generally Natalie Gomez-Velez, *Internet Access to Court Records—Balancing Public Access and Privacy*, 51 *LOY. L. REV.* 365, 398–413 (2005) (discussing the difficulty in balancing the need to protect “private, sensitive information” and the judicial transparency function of open information).

converted document is then made available online.⁵⁹ At the same time, however, this Act also directs that rules be adopted “to protect privacy and security concerns relating to electronic filing of documents and the public availability under this subsection of documents filed electronically.”⁶⁰ This directive has led to the promulgation of proposed rules including new Federal Rule of Civil Procedure 5.2.⁶¹ Yet, as a district court recently noted, the emergence of computer-based searches of court records means that “the privacy that litigants once enjoyed as a practical matter has been diminished greatly.”⁶²

In the federal court system, the bankruptcy courts may be the most frequent repository of sensitive personal information because petitioners often have to reveal details about their assets and debts. In state courts, it may be that marital disputes most often present the most fertile field for such difficulties because such a range of personal and financial details might be pertinent and therefore revealed in court filings. As argued by the clerk in the Cincinnati court, family court transcripts should not be public because “[s]ome of those things read like bawdy novels.”⁶³ Thus, given the disclosure required to pursue divorce through the public courts, some wealthy petitioners in California simply make use of private judges for their divorces in order to maintain confidentiality.⁶⁴

The potentially “revolutionary” effect of electronic filing, then, is the increased access it affords to court files and the expanded potential for intrusions on litigants’ private lives. Overall, the effects of computer technology on increasing efficiency in access to court records has produced problems as well as benefits. As a practical matter, this may be quite dramatic, but at the level of theory, it is really no change at all because court records have always theoretically been open to the public.

A more revolutionary result of computer use could occur if it were used more aggressively for hearings or trials.⁶⁵ As the business world has come to substitute videoconferences for face-to-face activities, so might courts. Gradually, some courts are adopting technology as a substitute for

⁵⁹ E-Government Act of 2002, Pub. L. No. 107-347, § 205(c)(1), 116 Stat. 2899, 2914.

⁶⁰ *See id.* § 205(c)(3).

⁶¹ *See* FED. R. CIV. P. 5.2 (providing for the redaction of certain personal information from materials filed in court and authorizing filing under seal pursuant to a court order to protect additional information).

⁶² *Doe v. City of New York*, 201 F.R.D. 100, 101 (S.D.N.Y. 2001). The judge made the observation in connection with denying the plaintiff’s motion for leave to proceed by a pseudonym so that computerized searches of the court’s records using her name would not turn up her suit. *Id.* at 102–03.

⁶³ *See Lee, supra* note 58.

⁶⁴ *See Julie O’Shea, Private Judges Keep Divorce Quiet*, RECORDER (S.F.), June 13, 2005, at 1. Divorce proceedings are subject to higher protections in other countries. In Germany, for example, proceedings in family cases are usually closed to the public. MURRAY & STÜRNER, *supra* note 56, at 186.

⁶⁵ In significant part, the following analysis draws on Richard L. Marcus, *Beyond E-Discovery: Toward Brave New World or 1984?*, 25 REV. LITIG. 633 (2006).

personal appearances, at least for some kinds of activities. For example, at least five U.S. courts of appeals use videoconferencing to conduct oral arguments.⁶⁶ What of the trial itself? In the mid-twentieth century, the view was that “[t]he heart of the judicial process is the trial in court. All that precedes the trial is but preparation. All that follows is but correction of error, if error there be.”⁶⁷ Should the trial remain untouched by technological development?

Nearly a decade ago, Dean Carrington examined the possible future for trial in the age of “virtual civil litigation.”⁶⁸ He concluded that “[t]he traditional trial is becoming obsolete.”⁶⁹ Carrington assumed that the role of the jury should remain sacrosanct and that the jury should therefore be assembled in the courthouse to observe the “trial.”⁷⁰ But he saw no reason for the “trial” itself to be dependent on live testimony in the courtroom. To the contrary, as witnesses were likely to be dispersed over wider and wider areas, it would become more and more important to replace live testimony with recorded testimony, perhaps itself the product of discovery conducted by videoconference.⁷¹ That way, all the evidence could be recorded in advance, and all evidentiary issues could also be resolved in advance.⁷² In this brave new world, “trial counsel become co-producers of a multi-media presentation,”⁷³ and “trial advocacy will more closely resemble the work of the Hollywood film producer and less that of the Hollywood actor.”⁷⁴ The jurors, having been summoned to the courthouse, would there watch the movie. But before that happened, the court could rule on any motions for judgment as a matter of law. Appellate review of all pretrial rulings (including motions in limine) could also be accomplished before the “trial” because there would be no need to await some development at trial before addressing such rulings. There would thus never be a need for a motion for a new trial.

One can certainly object to the introduction of appeal before trial. Pre-trial appeals would seemingly require a vast expansion of appellate capacity and would significantly delay the beginning of trial. It might even be that

⁶⁶ See *Advantages of Videoconferencing Grow with Use*, THIRD BRANCH, Aug. 2006, at 7 (reporting on a Federal Judicial Center study on the use of videoconferencing).

⁶⁷ Sidney Post Simpson, *The Problem of Trial*, in DAVID DUDLEY FIELD: CENTENARY ESSAYS: CELEBRATING ONE HUNDRED YEARS OF LEGAL REFORM 141, 142 (Alison Reppy ed., 1949).

⁶⁸ Paul D. Carrington, *Virtual Civil Litigation: A Visit to John Bunyan's Celestial City*, 98 COLUM. L. REV. 1516 (1998).

⁶⁹ *Id.* at 1524.

⁷⁰ *Id.* at 1528–29.

⁷¹ *Id.* at 1525–26.

⁷² *Id.* at 1526.

⁷³ *Id.*

⁷⁴ *Id.* at 1524.

providing the appellate court with the video version of the trial would actually delay appellate review, whenever that happened.⁷⁵

New technology could change the trial in other ways. Why not have the witnesses give “live” testimony by video hookup during the “trial” rather than relying on a pre-recorded video? Why require the jurors to come to the courthouse to see that presentation; couldn’t they view it online from home? And couldn’t the jurors deliberate online in a jury chatroom?

Technology has played a very limited role in these sorts of innovations. Digital technology has become important in trials in recent decades because it permits simulations or re-creations of events involved in lawsuits to an extent not previously possible.⁷⁶ Revising trial techniques as suggested by Dean Carrington,⁷⁷ however, would involve much more aggressive use of digital technology. Some judges have suggested that such a step should be taken. Fifteen years ago, Judge Schwarzer suggested using videotapes for testimony because “jurors are accustomed to acquiring information from the television screen and thus react favorably to video presentations.”⁷⁸ Nearly a decade before that, a district judge in Chicago noted that “[i]f all testimony is by videotape deposition, the ‘trial’ concept would embrace simply the playing of the videotapes (subject to evidentiary objections) sandwiched between opening and closing statements.”⁷⁹ Another decade earlier—in the early 1970s—the state courts in one county in Ohio embraced just such a method.⁸⁰

Meanwhile, courts have experimented with other innovations to speed up trials. In the early 1970s, an Oregon federal district judge endorsed having the direct testimony of witnesses submitted in advance,⁸¹ and a district judge from the District of Columbia wrote an article in 1983 urging that all

⁷⁵ One commentator has observed that people can usually read a transcript of trial proceedings five times as fast as they can watch a video of them, making that aspect of appellate review much more time-intensive. See Henry H. Perritt, Jr., *Changing Litigation with Science and Technology: Video Depositions, Transcripts and Trials*, 43 EMORY L.J. 1071, 1087–88 (1994).

⁷⁶ Some see the introduction of these techniques as a momentous development. One law professor, for example, says that “[t]he use of electronic visuals is as significant as the introduction of cross-examination in the 1870s and formal discovery in the 1930s. This will be the greatest change in advocacy in the career of anybody alive or about to be conceived.” Lisa Brennan, *Pitching the Gen-X Jury: As Jurors Get Younger, Law Schools Are Thinking More Like MTV*, NAT’L L.J., June 7, 2004, at 1 (quoting Professor Stephen Lubet of Northwestern University School of Law); see also Henry Gottlieb, *Plaintiffs’ Lawyers Have High-Tech Advantage in Courtroom*, RECORDER (S.F.), Feb. 28, 2006, at 2 (reporting that plaintiffs’ lawyers are more likely to use a “\$1,500-a-day technical director hired to spike the presentation with computer-generated graphics”).

⁷⁷ See *supra* notes 68–74 and accompanying text.

⁷⁸ William W. Schwarzer, *Reforming Jury Trials*, 132 F.R.D. 575, 588 (1991).

⁷⁹ *Lucien v. McLennard*, 95 F.R.D. 525, 526 n.2 (N.D. Ill. 1982).

⁸⁰ For an argument in favor of this technique by the judge who pioneered it in Ohio, see James L. McCrystal & Ann B. Maschari, *Will Electronic Technology Take the Witness Stand?*, 11 U. TOL. L. REV. 239 (1980).

⁸¹ See Gus J. Solomon, *Techniques for Shortening Trials*, 65 F.R.D. 485, 489 (1975).

direct testimony in civil cases be submitted in written form.⁸² Carrying the idea of trying a case based on written submissions a bit further, it has been suggested that a court could determine from a summary judgment motion that an ordinary trial would add nothing of value and urge the parties to agree to a “trial without witnesses” rather than summary judgment.⁸³

As should be apparent, innovation in trial methods is not inherently dependent on digital technology. Despite the enthusiastic endorsement of judges who developed these new techniques, they have yet to carry the day with most judges. Thus, even though Ohio state courts introduced video trials in the early 1970s, the Ohio Supreme Court ruled in 1992 that a trial court could not ordinarily require unwilling litigants to have such a trial, noting that “videotape trials have not gained widespread use, and are all but confined to Erie County.”⁸⁴ Similarly, the requirement of direct testimony in writing does not seem to have swept the land. The California Supreme Court, for example, recently overturned a local rule of one county’s superior court that required all evidence in divorce cases to be submitted in writing.⁸⁵ Somewhat similarly, “the federal rules have not changed the long-established principle that testimony by deposition is less desirable than oral testimony and should ordinarily be used as a substitute only if the witness is not available to testify in person.”⁸⁶

As we approach the day when computer technology could revolutionize trials, we should consider that a generation’s worth of experimenting with trial methods somewhat resembling those suggested by Dean Carrington has not substantially transformed the current trial. However much one might be tempted to ascribe this situation to the legal profession’s innate aversion to change, it seems worth reflecting on aspects of the traditional trial that are worth preserving. As Professor Laycock has said, “[t]he great common law contribution to modern procedure is the jury trial.”⁸⁷ As a federal district judge has recently added, “[f]or Americans after the Revolution, as well as before, the right to trial by jury was probably the most valued of

⁸² Charles R. Richey, *A Modern Management Technique for Trial Courts to Improve the Quality of Justice: Requiring Direct Testimony to Be Submitted in Written Form Prior to Trial*, 72 GEO. L.J. 73 (1983); see also *Kuntz v. Sea Eagle Diving Adventures Corp.*, 199 F.R.D. 665, 666–68 (D. Haw. 2001) (denying the plaintiff’s motion that he be allowed to present direct evidence orally instead of in writing).

⁸³ William W. Schwarzer, Alan Hirsch & David J. Barrans, *The Analysis and Decision of Summary Judgment Motions*, 139 F.R.D. 441, 474 (1992); see also *Acuff-Rose Music, Inc. v. Jostens, Inc.*, 155 F.3d 140, 142–43 (2d Cir. 1998) (upholding use of this approach if the parties forgo their right to a full trial).

⁸⁴ *Fantozzi v. Sandusky Cement Prod. Co.*, 597 N.E.2d 474, 480 (Ohio 1992).

⁸⁵ *Elkins v. Superior Court*, 163 P.3d 160, 168 (Cal. 2007).

⁸⁶ 8A CHARLES ALAN WRIGHT, ARTHUR R. MILLER & RICHARD L. MARCUS, *FEDERAL PRACTICE AND PROCEDURE* § 2142 (2d ed. 1994).

⁸⁷ Douglas Laycock, *The Triumph of Equity*, 56 LAW & CONTEMP. PROBS. 53, 66 (1993).

all civil rights.”⁸⁸ Experimenting with radically new trial techniques is serious business, and computers have not yet moved us much in that direction.

D. *Electronic Discovery*

Where society goes, litigators are likely to follow, at least if they can find evidence that will help them win their cases. As a result, the huge upsurge in electronic communications technology has given birth to a new phenomenon—e-discovery, the process of obtaining information from computer-based sources.

One might see these developments as producing a revolution in a segment of the legal profession. Certainly there are plenty of statements to that effect. In 2001, Professor Redish warned that “the technological explosion simultaneously has given rise to an entirely new set of difficulties that threaten to destroy the discovery process and significantly skew the delicate balance of values the procedural system serves.”⁸⁹ More recently, others have asserted that it has produced a “discovery revolution,”⁹⁰ and “a near-tectonic shift in the landscape of civil litigation, with electronic discovery literally transforming the practice of law.”⁹¹ Another writer argues that “[e]lectronic discovery therefore represents one of the most momentous developments in the everyday life of the modern lawyer.”⁹² Insurers are introducing “electronic discovery insurance” to deal with the special challenges of this new form of discovery.⁹³ A number of full-length books are devoted to the subject.⁹⁴ E-discovery has also prompted attention from the general press,⁹⁵ and it has combined with other computer-based developments to produce distinctive consequences.⁹⁶

⁸⁸ Donald M. Middlebrooks, *Reviving Thomas Jefferson’s Jury: Sparf and Hansen v. United States Reconsidered*, 46 AM. J. LEGAL HIST. 353, 387 (2004).

⁸⁹ Martin H. Redish, *Electronic Discovery and the Litigation Matrix*, 51 DUKE L.J. 561, 565 (2001).

⁹⁰ GEORGE L. PAUL & BRUCE H. NEARON, *THE DISCOVERY REVOLUTION: E-DISCOVERY AMENDMENTS TO THE FEDERAL RULES OF CIVIL PROCEDURE 9–12* (2006).

⁹¹ Charles R. Ragan & Lori Ann Wagner, *Competence and Credibility in E-Discovery*, TRIAL, Apr. 2007, at 40.

⁹² James Gibson, *A Topic Both Timely and Timeless*, 10 RICH. J.L. & TECH. 49, ¶4 (2004), <http://law.richmond.edu/jolt/v10i5/article49.pdf>.

⁹³ See Edwin M. Larkin, *Insurers Are Getting in on the Act*, NAT’L L.J., Aug. 20, 2007, at S1 (“Liability insurers are . . . beginning to address the costs of electronic discovery in their insurance products.”).

⁹⁴ See, e.g., ADAM I. COHEN & DAVID J. LENDER, *ELECTRONIC DISCOVERY: LAW AND PRACTICE* (2005); JOAN E. FELDMAN, *ESSENTIALS OF ELECTRONIC DISCOVERY* (2003); SHELDON E. FRIEDMAN, *THE LITIGATOR’S GUIDE TO ELECTRONIC EVIDENCE AND TECHNOLOGY* (2006); ALAN M. GAHTAN, *ELECTRONIC EVIDENCE* (1999); MICHAEL R. OVERLY, *OVERLY ON ELECTRONIC EVIDENCE IN CALIFORNIA* (1999).

⁹⁵ *See Of Bytes and Briefs*, ECONOMIST, May 19, 2007, at 34 (describing the intrusiveness and burdensomeness of e-discovery).

⁹⁶ For example, the *ABA Journal* recently reported that the advent of MySpace and similar social networking websites has produced a new source for discovery. Stephanie Francis Ward, *MySpace Dis-*

E-discovery is distinct from hard-copy discovery from at least two perspectives. First, it involves and accommodates a much larger quantity of information than previously was subject to review and production. Examples of potential discovery burdens can be staggering.⁹⁷ In 2003, the *ABA Journal* reported that “some major cases now involve one terabyte of information, which, if printed to paper, would fill the Sears Tower four times.”⁹⁸ Coupled with these increases in quantity are changes in method. In 2003 we were told that “the document production of 2003 bears little resemblance to that of the 1980s or 1990s. . . . [T]echnology has changed forever the way lawyers produce their clients’ documents.”⁹⁹ That same year, a provider of e-discovery services forecast that “[w]ithin three years, I’m sure almost all evidence collected in discovery will be electronic-based.”¹⁰⁰ Certainly, these developments have produced a business opportunity. A decade ago, vendors of e-discovery services were virtually unknown, but one expert forecast that the 2007 revenue of such vendors nationwide would reach \$2.6 billion.¹⁰¹

In the face of these reports, it may seem curious that one would doubt the revolutionary implications of computers. Yet, as one called upon to deal with these issues from the perspective of the federal rulemakers,¹⁰² I continue to resist the most aggressive characterizations of changes in discovery resulting from the introduction of the computer.¹⁰³ One reason is

covery, A.B.A. J., Jan. 2007, at 34. This article appears to describe searches of such social networking sites that do not depend on use of formal discovery tools. *Id.*

⁹⁷ Consider the following description:

In the author’s own experience, a complex litigation between two large corporate parties can generate the equivalent of more than one hundred million pages of discovery documents, requiring over twenty terabytes of server storage space. Assuming a review rate of one box of paper documents per weekday, per reviewer, a one hundred million page volume corresponds to over thirty person-years of review for each party. In ecological terms, each side would require approximately 6,250 trees just to print one copy of each of the documents it produced and of each of the documents it received.

Robert Douglas Brownstone, *Collaborative Navigation of the Stormy e-Discovery Seas*, 10 RICH. J.L. & TECH. 53, ¶ 21 (2004), <http://law.richmond.edu/jolt/v10i5/article53.pdf>.

⁹⁸ Jason Krause, *What a Concept!*, A.B.A. J., Aug. 2003, at 60.

⁹⁹ David Horrigan, *Producing Those Documents*, NAT’L L.J., Mar. 17, 2003, at C3.

¹⁰⁰ Ellen Byron, *Computer Forensics Sleuths Help Find Fraud*, WALL ST. J., Mar. 18, 2003, at B1. Despite this prediction, it seems that nonelectronic discovery and evidence remain important.

¹⁰¹ See Socha Consulting LLC, 2007 Socha-Gelbmann 5th Annual Electronic Discovery Survey, <http://www.sochaconsulting.com/2007surveyresults.php> (last visited July 24, 2008). The forecast for 2008 revenues is \$3.32 billion and \$4.077 billion for 2009. *Id.*; see also Leigh Jones, *The Surging Evolution of E-Discovery*, NAT’L L.J., Aug. 2, 2004, at 1 (projecting \$1.8 billion e-discovery costs for 2004).

¹⁰² Since 1996, I have served as Special Reporter of the Advisory Committee on Civil Rules, and in that capacity I was involved in the development of the amendments to those rules designed to deal with e-discovery that went into effect on December 1, 2006. In this Essay, I speak for myself alone and not for the Advisory Committee or any of its members.

¹⁰³ The following discussion draws on Richard L. Marcus, *Confronting the Future: Coping with Discovery of Electronic Materials*, 62 LAW & CONTEMP. PROBS. 253, 258–69 (2001).

that there seems to be something of a continuing arms race regarding the ability of technology to overcome what technology has wrought. As with methods of resisting spam, so with e-discovery—those who market technology for e-discovery claim that they can overcome any difficulties that result from the volume and related challenges of e-discovery. Moreover, there can be offsetting functional benefits to using electronically stored information. A generation ago the Supreme Court recognized that computerized document retrieval is generally less burdensome than hard-copy techniques.¹⁰⁴ More recently, courts have given effect to this insight by ordering discovery responses from electronically stored information but not hard-copy materials.¹⁰⁵

Nonetheless, the volume and related¹⁰⁶ challenges of e-discovery differed sufficiently so as to call for changes in the Federal Rules to address these distinctive features. Those 2006 amendments were the first time that a new technology had produced such changes; none were made due to the introduction of the photocopier, for example. Yet these changes seem evolutionary, not revolutionary, in that they build on recent changes applicable to discovery in general. Thus, the amended rules now add discussion of e-discovery issues to the discovery plan,¹⁰⁷ implement the “proportionality” principles by excusing production of electronically stored information that is not reasonably accessible,¹⁰⁸ explicitly authorize parties seeking discovery to specify the form in which they want electronically stored information produced and provide default rules for production where the form is not specified in the request,¹⁰⁹ and proscribe sanctions for the loss of electroni-

¹⁰⁴ See *Oppenheimer Fund, Inc. v. Sanders*, 437 U.S. 340, 362 (1978) (“[T]here is no reason to think that the same information could be extracted any less expensively if the records were kept in less modern forms. Indeed, one might expect the reverse to be true, for otherwise computers would not have gained such widespread use in the storing and handling of information.”).

¹⁰⁵ See, e.g., *Hayes v. Compass Group USA, Inc.*, 202 F.R.D. 363, 366 (D. Conn. 2001) (requiring the defendant to produce all computerized information on age discrimination cases or grievances, but not that it search through its hard copy files for similar information). Judge William Schwarzer recognized this sort of difference:

Discovery that otherwise might be impermissibly burdensome, such as requiring detailed identification of all known documents referring to relevant issues, may not be burdensome if the computerized system is able to generate the identifications.

WILLIAM W SCHWARZER ET AL., *CIVIL DISCOVERY AND MANDATORY DISCLOSURE: A GUIDE TO EFFECTIVE PRACTICE* 1–23 (2d ed. 1994).

¹⁰⁶ Here I am referring to problems of accessibility and “legacy” data (stored on systems not presently in use or available).

¹⁰⁷ See FED. R. CIV. P. 26(f)(3)(C) (requiring that the discovery plan cover “any issues about disclosure or discovery of electronically stored information”).

¹⁰⁸ See FED. R. CIV. P. 26(b)(2)(B) (“A party need not provide discovery of electronically stored information from sources that the party identifies as not reasonably accessible because of undue burden or cost.”).

¹⁰⁹ See FED. R. CIV. P. 34(b)(1)(C), (b)(2)(E)(ii).

cally stored information that results from a party's good faith routine operation of an electronic information system.¹¹⁰

Although the inclusion of rule provisions tailored to a new technology is notable, these are not revolutionary changes. To the contrary, they largely build on a longstanding effort to constrain discovery by recalibrating the discovery architecture already in the Federal Rules.¹¹¹ Furthermore, at least some of the ballyhoo about the revolutionary nature of this new form of discovery results from the fact that many of those who trumpet revolution also have a stake in the marketing of such services. There obviously is a great deal of money to be made in handling e-discovery, which partly explains the recurrent "Don't try this yourself" message that stresses how revolutionary e-discovery is. Already there is at least one law firm founded to provide e-discovery services,¹¹² and a number of law firms have e-discovery practice groups. At a minimum, there is room to suggest that adaptations of the longstanding American discovery model will handle this new form of discovery, just as the model handled other discovery developments including the advent of the photocopier. That is an evolutionary perspective.

There is a second perspective from which e-discovery is distinctive, one that could be regarded as more qualitative than quantitative. Because the use of computer-based communication and information-storage techniques is so widespread, there is an astonishing amount of information potentially available from computerized sources. Although governmental efforts to cull that information might be more unnerving,¹¹³ the range of information available for private litigants can be surprising. Concerns about the privacy of medical records suggest a general public unease about how much sensitive information is now stored electronically. The advent of email has preserved (perhaps for all time) a huge volume of irreverent, joking, thoughtless, and potentially embarrassing information.

Whether this information should be plumbed in discovery is debatable, as is whether privacy should be respected more vigorously than discovery now requires.¹¹⁴ Large corporations reportedly are very concerned about the penchant of some employees to "mouth off" in email in ways that could hurt the company in litigation or otherwise.¹¹⁵ Whether such email com-

¹¹⁰ See FED. R. CIV. P. 37(e).

¹¹¹ For discussion of this trend, see Richard L. Marcus, *Discovery Containment Redux*, 39 B.C. L. REV. 747, 753-68 (1998).

¹¹² This firm is Redgrave Daley Ragan & Wagner LLP, with offices in San Francisco; Washington, D.C.; Minneapolis; and Kansas City, Missouri. Two of its partners are authors of an article quoted above. See Ragan & Wagner, *supra* note 91.

¹¹³ On this point, see *infra* notes 121-132 and accompanying text (regarding the impact of computer technology on the protections of the Fourth Amendment).

¹¹⁴ See *Coca-Cola Bottling Co. of Shreveport v. Coca-Cola Co.*, 107 F.R.D. 288, 290 (D. Del. 1985) ("Except for a few privileged matters, nothing is sacred in civil litigation . . .").

¹¹⁵ Nicholas Varchaver, *The Perils of E-mail*, FORTUNE, Feb. 17, 2003, at 96.

ments offer important evidence is open to debate, but it is likely that privacy interests could affect a lot of private litigants not presently focused on e-discovery. In particular, divorce litigation involves a growing focus on e-discovery, both to produce evidence of infidelity and to ferret out hidden financial assets.¹¹⁶ Similarly, to shed light on the true nature and extent of their injuries, discovery requests might ask that personal injury plaintiffs disclose all email communications with friends and relatives about the incident giving rise to their suit. Instant messaging could compound the use of such discovery to obtain information from ordinary people involved in lawsuits.

Concern about the intrusiveness of e-discovery may explain some of the stridency surrounding e-discovery. For example, a recent newspaper article by a staff attorney from the Electronic Frontier Foundation discussed a decision by a federal judge in Los Angeles requiring that TorrentSpy, a popular search engine, alter the operation of its search engine to retain logged information about users.¹¹⁷ The plaintiffs were motion picture studios who claimed that TorrentSpy enabled users to improperly obtain copyrighted materials. The judge ruled that because information identifying users is momentarily stored in random access memory and could be saved and produced, it should be retained so that plaintiffs could learn more about the activities of those using the defendant's program.¹¹⁸ Objecting strongly to this ruling, the author argued that it "threatens to radically increase the burdens that companies face in federal lawsuits, potentially forcing them to create and store an avalanche of data," and that it might also chill Internet speech by "making it impossible for a company to implement and stand behind strong privacy practices that further anonymous speech."¹¹⁹ As a matter of discovery, it seems straightforward to say that a judge has the power to insist that parties retain previously discarded electronically stored information due to its importance to the litigation. Whether a party that had not previously been retaining the information could be sanctioned for failure to do so could be debated.¹²⁰ But much as the objection is styled as protecting

¹¹⁶ See John Simerman, *Lawyers Dig Into FasTrak Data*, OAKLAND TRIB., June 5, 2007, at 1 (describing the discovery of data about spouses' travels from the records of computerized bridge toll devices); Brad Stone, *Tell-All PCs and Phones Transforming Divorce*, N.Y. TIMES, Sept. 15, 2007, at A1 (quoting a divorce lawyer who says that information from computerized communications devices "has completely changed our field").

¹¹⁷ See Corynne McSherry, *New E-Discovery Rules Could Unduly Burden Business, Threaten Privacy*, S.F. DAILY J., Aug. 31, 2007, at 4. The case is *Columbia Pictures, Inc. v. Bunell*, 245 F.R.D. 443 (C.D. Cal. 2007).

¹¹⁸ *Columbia Pictures*, 245 F.R.D. at 448.

¹¹⁹ McSherry, *supra* note 117.

¹²⁰ See FED. R. CIV. P. 37(e), which precludes sanctions for the loss of electronically stored information that cannot be produced due to the "routine operation" of a party's electronic information system in "good faith." The "good faith" component recognizes that sometimes a party will need to alter the routine operation of its information system to retain information potentially discoverable in the case. See FED. R. CIV. P. 26(f) advisory committee's note to 2006 amendments.

against burdens on companies that must respond to discovery, the main motivations for the author's barrage of objections are likely a desire to protect against disclosure of the identities of those using this service and perhaps also a belief that there should be free access to copy such things as movies. That is not truly a computer discovery issue, but rather an objection to the use of discovery to obtain information relevant to claims disfavored by the critic.

The e-discovery experience thus shows both that technology can have major impacts and also that it can be incorporated within the existing legal structure. Although e-discovery issues were sufficiently distinctive to prompt amendments to the Federal Rules of Civil Procedure, those amendments built directly on provisions included to deal more generally with discovery. Meanwhile, the rhetoric of revolution has been adopted by some—as in regard to the *TorrentSpy* case—whose real concerns seem elsewhere.

E. A New Criminal Procedure?

Concerns about government probing suggest another area in which computers might drastically alter what lawyers do—Fourth Amendment protections against unreasonable searches and seizures. Television has made the use of computers in crime investigation common knowledge with such shows as *CSI*; indeed, it may seem that nowadays computers are the *only* tools of crime detection. Certainly computers have facilitated the development of extremely important methods of crime detection, DNA comparisons being an example. Even cell phone data have become commonplace in trials: “Examining cell phone data is a technique that has moved from being a masterful surprise in trials to being a standard tool in the investigative arsenal of the police and prosecutors, with records routinely provided by cell phone companies in response to subpoenas.”¹²¹ Other forms of technology have also changed criminal procedure. For example, one journalist suggested that the use of facial recognition software and digitized drivers license photos is “revolutionizing American law enforcement” by assisting in the location of suspects.¹²²

Obviously new sources of evidence are important in criminal trials, as in other trials. Technological developments have long made a difference in fighting crime. For example, photographs and tape recordings played important roles in crime detection and criminal trials in the past, as did wire-

¹²¹ Anemona Hartocollis, *When the Trill of a Cellphone Brings the Clang of Prison Doors*, N.Y. TIMES, July 16, 2007, at B1.

¹²² Adam Liptak, *Driver's License Emerges as Crime-Fighting Tool, but Privacy Advocates Worry*, N.Y. TIMES, Feb. 17, 2007, at A10. In the same vein, in San Francisco the police have begun using a gadget that can scan the license plates on a street full of cars and instantly alert police to which vehicles have been reported stolen. See Demian Bulwa, *High-Tech Help for Police: Gadget Scans License Plates*, S.F. CHRON., Oct. 13, 2007, at A1 (reporting that this device assisted police in apprehending a suspect in a recent abduction).

tapping. Thus, whether the advent of computerized crime-detection techniques really presents a difference is unclear. Certainly the use of computers to monitor citizens' activities and to identify and prosecute criminal suspects has become a worldwide phenomenon.¹²³ Perhaps these developments mandate a new approach to the "reasonable expectation of privacy" that is a hallmark of Fourth Amendment law.

Professor Kerr believes that "new methods of collecting digital evidence should and must lead to reforms in the law of criminal procedure to regulate digital evidence collection."¹²⁴ In part, this is because computers have permitted "a new type of search."¹²⁵ A starting point is to appreciate that various computer technologies do permit monitoring of people's activities to an extent that formerly was not practical. Thus, for example, a decision to use GPS technology to monitor a possible suspect's behavior without first obtaining a search warrant may call for a new form of analysis. At least certain technologies intrude on areas protected by the Fourth Amendment,¹²⁶ but the more general possibility of routine observation of *everyone* in "public" areas raises nervous reminders of *1984*.¹²⁷ Courts have begun to deal with such issues.¹²⁸

A somewhat different question is presented with regard to government access to computers and to computerized information created by people. One view is that "[m]any people, especially students, have an unreasonable

¹²³ See, e.g., Kam C. Wong, *The Discovery of Computer Crime in Hong Kong: A Case Study of the Crime Creation Process*, 2005(1) J. INFO. L. & TECH., http://www2.warwick.ac.uk/fac/soc/law/elj/jilt/2005_1/wong/; Keith Bradsher, *China Enacting High-Tech Plan to Track People*, N.Y. TIMES, Aug. 12, 2007, at A1 (describing the installation of 20,000 police surveillance cameras along streets in Shenzhen, China). Crossborder efforts at computer sleuthing have raised dicey legal issues. See Nicolai Seitz, *Transborder Search: A New Perspective in Law Enforcement?*, 7 YALE J.L. & TECH. 23 (2004) (describing the efforts of German police to hack a New York server to obtain an email message without official authorization when they feared the suspect would delete the message). For a report on American developments by a former FBI Director, see William S. Sessions, *Evil Eye*, AM. LAW., Nov. 2007, at 75 (relating that a number of U.S. cities are planning to introduce "London-style" surveillance systems and reflecting on the invasion of privacy that could result).

¹²⁴ Orin S. Kerr, *Digital Evidence and the New Criminal Procedure*, 105 COLUM. L. REV. 279, 280 (2005).

¹²⁵ Orin S. Kerr, *Searches and Seizures in a Digital World*, 119 HARV. L. REV. 531, 537 (2005).

¹²⁶ See, e.g., *Kyllo v. United States*, 533 U.S. 27 (2001) (holding that police use of a thermal imager to observe the interior of a home constituted a search).

¹²⁷ See GEORGE ORWELL, *NINETEEN EIGHTY-FOUR* (1949) (positing a world in which technology enables the state to monitor the activities of everyone at all times).

¹²⁸ See, e.g., *United States v. Garcia*, 474 F.3d 994 (7th Cir. 2007) (holding that attaching a GPS device to the car of a suspect to monitor his activities did not constitute a search or seizure because it enabled observation of activities in "public," but reserving issue whether mass surveillance would be treated the same); see also Renée McDonald Hutchins, *Tied Up in Knots? GPS Technology and the Fourth Amendment*, 55 UCLA L. REV. 409 (2007) (arguing that Fourth Amendment doctrine is sufficient to provide protections with regard to the use of GPS technology).

expectation of privacy” with regard to online data.¹²⁹ But issues have arisen with password-protected computers themselves; some courts hold that the means by which police circumvent such passwords do not transgress Fourth Amendment limitations.¹³⁰ Because of the manner in which electronic information is stored, search techniques such as mirror imaging of a hard drive can give police access to an abundance of information. Consequently, “limiting a search to a particular computer is something like limiting a search to a city block; ten years from now, it will be more like limiting a search to the entire city.”¹³¹ For example, when investigating possible drug use by baseball player Barry Bonds, federal agents obtained computerized information for the drug testing of all professional baseball players because it was included on the same computer as Bonds’s information.¹³²

This concern about electronic probing and surveillance may overstate the importance of computers to Fourth Amendment doctrine, however. The Fourth Amendment has been adapted to other technological developments, and some say that traditional Fourth Amendment analysis will be sufficiently flexible to cope with the advent of computers as well.¹³³

¹²⁹ See Elizabeth Millards, *Online Background Checks*, A.B.A. J., Jan. 2007, at 37 (quoting the founder of CollegeRecruiter.com about students’ expectation that information they post on various sites such as Facebook and MySpace cannot be accessed by potential employers and college admissions officials).

¹³⁰ See, e.g., *United States v. Andrus*, 483 F.3d 711 (10th Cir. 2007) (finding that the defendant’s elderly father—who lived with the defendant—had the apparent authority to give permission to search the defendant’s computer and that the police downloaded all of the information on the computer without regard to whether it was password protected); *United States v. Buckner*, 473 F.3d 551 (4th Cir. 2007) (involving a case in which the court held that a wife suspected of online fraud had the apparent, though not actual, authority to consent to a search of the computer she shared with her husband and the search turned up child pornography material leading to the prosecution of the husband).

¹³¹ Kerr, *supra* note 124, at 303; see also Adam Liptak, *If Your Hard Drive Could Testify* . . . , N.Y. TIMES, Jan. 7, 2008, at A12 (predicting the reversal of a decision by a U.S. district judge, who suppressed a customs search of a laptop on the grounds that “[e]lectronic storage devices function as an extension of our own memory” and “[t]hey are capable of storing our thoughts, ranging from the most whimsical to the most profound”).

¹³² See *United States v. Comprehensive Drug Testing, Inc.*, 513 F.3d 1085 (9th Cir. 2008). The majority held that the search was not illegal, but Judge Thomas was unnerved and dissented:

One of the three extremely able district judges who rejected the government’s arguments summarized it best, stating: “What happened to the Fourth Amendment? Was it repealed somehow?”

.....
The stakes in this case are high. The government claims the right to seize and retain—without warrant or even a suspicion of criminal activity—any patient’s confidential medical record . . . contained in a computer directory so long as it has a legitimate warrant or subpoena for any other individual patient’s record that may be stored on the same computer. The government attempted to justify this novel theory on a breathtaking expansion of the “plain view” doctrine, which clearly has no application to intermingled private electronic data.

Id. at 1116–17 (Thomas, J., concurring in part and dissenting in part).

¹³³ See Thomas K. Clancy, *The Fourth Amendment Aspects of Computer Searches and Seizures: A Perspective and a Primer*, 75 MISS. L.J. 193, 195–201 (2005); see also David J.S. Ziff, Note, *Fourth*

IV. CONTRASTING “REVOLUTIONARY” DEVELOPMENTS

If one wants to decide whether computers are causing a revolution in the legal profession, it seems useful to have some comparisons. This Part offers three: the dramatic changes in private law practice, the social impact of a different technology—the telephone—and the impact of computers on the medical profession.

A. A Different Legal Profession Metamorphosis: A Revolution in Law Firm Operations?

From almost every quarter of the legal profession, one hears that in the last generation we have witnessed a striking transformation in the operation of commercial law firms. Academics have focused on this change, most notably in 1991 when Professors Galanter and Palay chronicled these changes¹³⁴ and two years later when Dean Kronman published *The Lost Lawyer*,¹³⁵ bemoaning the predicament of American lawyers, which he attributed largely to this transformation. Meanwhile, Professor Heinz and his associates have provided two detailed looks at the Chicago bar that somewhat bracket the period of great change.¹³⁶ The legal popular press has provided abundant additional fodder, as well as itself acting as something of a catalyst to the very changes that occupy the academics.

Because the issues of technological change regarding commercial law practice are so familiar, there is no particular need to detail them. Since around 1970, American law firms have become enormously larger and more complicated. Firms with multicity offices have almost become the norm. The incomes of law firm partners are now well known where they were formerly secret. Those incomes have, in many instances, become stratospheric. Perhaps not coincidentally, the sharing of incomes among “equity partners” of law firms has become more disparate, with a four-to-one ratio between the highest and lowest compensated at the low end of a range that goes as high as twenty-to-one. Law firm partners—particularly “rainmakers”—have become very mobile. A generation ago, joining a law firm was a lifetime decision; now it seems that many lawyers change firms a couple of times a decade. Firms pursue profit-maximizing strategies that include “de-equitizing” partners and pressuring them to leave. That phenomenon has reached the point where loss of partners, long thought in the

Amendment Limitations on the Execution of Computer Searches Conducted Pursuant to a Warrant, 105 COLUM. L. REV. 841 (2005) (arguing that existing Fourth Amendment doctrine is sufficient).

¹³⁴ MARC GALANTER & THOMAS PALAY, *TOURNAMENT OF LAWYERS: THE TRANSFORMATION OF THE BIG LAW FIRM* (1991).

¹³⁵ ANTHONY T. KRONMAN, *THE LOST LAWYER: FAILING IDEALS OF THE LEGAL PROFESSION* (1993).

¹³⁶ See JOHN P. HEINZ ET AL., *URBAN LAWYERS: THE NEW SOCIAL STRUCTURE OF THE BAR* (2005); JOHN P. HEINZ & EDWARD O. LAUMANN, *CHICAGO LAWYERS: THE SOCIAL STRUCTURE OF THE BAR* (1982).

past to be a sign of difficulty for the firm, now may be regarded as a sign of health.¹³⁷ In early 2007, for example, Chicago-based Mayer, Brown, Rowe & Maw de-equitized about ten percent of its partners.¹³⁸ New stratification may also be emerging at the associate level. Prompted in part by e-discovery, the Chicago firm of McDermott Will & Emery is reportedly introducing “contract associates,” who will not be on the partnership track and will perform lower-end tasks at lower billing rates.¹³⁹

These developments have produced considerable uncertainty where formerly there was security. *The American Lawyer* reports that “Am Law 100 partners become less like owners of their firms and more like employees who can be dismissed at management’s will.”¹⁴⁰ The Chicago-based firm Sidley Austin was sued by the Equal Employment Opportunity Commission, which claimed that partners should be regarded as employees and protected by the Age Discrimination in Employment Act.¹⁴¹ As these developments suggest, the management of law firms has come to rest increasingly in the hands of a small number of partners, often known as the Executive Committee. Lawyers who function as firm leaders often cease practicing law. For example, the well-known chair of Orrick, Herrington & Sutcliffe, a San Francisco law firm, hasn’t practiced law since 1992.¹⁴² For such leaders, returning to the practice of law is often difficult,¹⁴³ and in handling their own activities, law firms come to resemble the corporations they represent.

Law firms’ interactions with each other have also changed markedly. Not only is hiring of individual lateral partners now commonplace, but sometimes entire departments leave one firm for another. Moreover, law firm mergers, virtually unknown until a decade or so ago, are now extremely common. As a result of both internal growth and mergers, the number of law firms with more than one thousand lawyers (a number that

¹³⁷ See Elizabeth Goldberg, *The Departed*, AM. LAW., May 2007, at 145 (contrasting bankers’ view in the past that high rates of partner departures were a “red flag” of firm difficulties with a new view that it may be a sign of vitality); see also Nathan Koppel, *Partnership Is No Longer a Tenured Position*, WALL ST. J., July 6, 2007, at B1 (“Once rare, quiet and restricted to the most competitive firms, ‘de-equitization’ has become one of the most popular buzz words in law-firm management.”).

¹³⁸ See Koppel, *supra* note 137.

¹³⁹ Kellie Schmitt, *McDermott Plans to Fill Cheap Seats*, RECORDER (S.F.), Nov. 1, 2007, at 1 (“[E]lectronic discovery has dramatically increased the amount of basic work that usually goes to those high-priced associates.”).

¹⁴⁰ Goldberg, *supra* note 137, at 146.

¹⁴¹ See Julie Triedman, *Seven-Year Itch*, AM. LAW., Nov. 2007, at 20 (describing EEOC litigation and the eventual settlement by the firm for \$27.5 million).

¹⁴² Nathan Koppel, *Law Firms Try New Idea: Manager-Focused CEO*, WALL ST. J., Jan. 22, 2007, at B3.

¹⁴³ See Zusha Elinson, *Back in the Groove*, RECORDER (S.F.), Aug. 6, 2007, at 1 (“As firms grow, management positions like chairman or managing partner for operations become full-time jobs, and that hard-earned book of business is almost guaranteed to go by the wayside. Returning to practice means re-establishing connections and finding a way back.”).

looked inconceivable in the 1970s) has risen significantly. Lawyers at these firms have become more specialized in their services, and their professional fate may turn more than ever on the vitality of the legal specialty in which they find themselves. Clients, meanwhile, have curtailed or severed their former long-term relationships with one or a few law firms, choosing instead to bolster their in-house legal staffs and play the field when seeking outside representation. Like corporations, law firms—even longstanding ones like Coudert Brothers and Brobeck, Phleger & Harrison—can fail and collapse.

All seem to agree that the transformation of commercial law practice has been very dramatic.¹⁴⁴ Many also agree that these changes have been undesirable. Dean Kronman denounces the disappearance of the lawyer-statesman who served as a sage adviser of clients and acted with independent moral force, now replaced by legal practitioners who put their highly-technical knowledge to work at the client's bidding with no independent moral judgment.¹⁴⁵ Today's lawyer is lost, in Dean Kronman's view, due to lacking the stature of the lawyer-statesmen of the past.¹⁴⁶ He describes the revolutionary changes in law firms since 1970 and urges that these developments have contributed to the malaise he sees in the legal profession.¹⁴⁷ Two other major factors have been at work as well. First, the "anti-prudentialist" bias in legal scholarship has been hostile to the prudentialist ideal central to the former glory of sage leadership from the bar. This hostility has created a tension between the training of lawyers and scholarly activity that is "far greater than it has been in the past."¹⁴⁸ Second, the bureaucratization of the judiciary has reinforced other trends. All in all, the lot of the lawyer has become nasty, brutish, and perhaps (even if he gets to be a partner) short, even though it may be in some ways more egalitarian.¹⁴⁹

In significant ways, technology was an enabling force behind these developments. As Galanter and Palay report, "[t]he emergence of the big firm is associated with the introduction of new office technologies."¹⁵⁰ The first such big change was the displacement of clerks such as Bartleby the Scrivener by the typewriter, stenography, and the telephone. The telephone, in

¹⁴⁴ See, e.g., HEINZ ET AL., *supra* note 136, at 9 (reporting that between 1975 and 1995, the hierarchies from the late nineteenth century were abandoned).

¹⁴⁵ See KRONMAN, *supra* note 135, at 11–52.

¹⁴⁶ See *id.*

¹⁴⁷ See *id.* at 271–314.

¹⁴⁸ *Id.* at 265.

¹⁴⁹ *Id.* at 291 ("The culture of America's large law firms is today more open and equitable than ever before, but at the same time it is less hospitable to the ideal of the lawyer-statesman. It is a freer culture than its predecessor, but also a less elevated one, a meaner culture, less able to sustain a belief in the value of the virtues that the ideal of the lawyer-statesman represents.").

¹⁵⁰ GALANTER & PALAY, *supra* note 134, at 7.

particular, “completely revolutionized” the methods of transacting legal business.¹⁵¹ Thereafter, they add,

The technology of the law firm remained essentially unchanged until the 1960s. Since then, a rapid succession of new technologies—photoreproduction, computerization, on-line data services, overnight delivery services, electronic mail, and fax machines—have multiplied the amount of information that can be assembled and manipulated by legal actors¹⁵²

Videoconferencing and other communications technology are central to multi-city (and sometimes multinational) law firms. “Virtual” partners’ meetings would not be possible without it. But much of the technology could be employed by much smaller law offices;¹⁵³ by itself technology would not necessarily have produced the current reality.

Dean Kronman’s lament about byproducts of these developments is reflected widely in comparisons between the current reality of big-firm practice and the former glory of big-firm practice. Whether this changing reality represents a revolution can at least be debated. Almost all would likely regard the lawyer-statesman—I imagine somebody like former Secretary of State Cyrus Vance—as an attractive image and goal. But whether pursuit of the lawyer-statesman ideal really existed to an important extent until the 1960s is not clear. For more than a century, there have been criticisms of American lawyers as having become “adjuncts of the great corporations.”¹⁵⁴ Indeed, there is something to be said for encouraging lawyers to attend to client desires. One objection to some lawyers who represent ordinary people is that they behave too independently of their clients’ interests.¹⁵⁵ Moreover, “[t]he superior social position of business lawyers may permit them to exercise considerable professional autonomy even though their clients typically have bargaining power.”¹⁵⁶

It is also possible to debate whether this transformation has affected the entire bar. Often, objections to American legal practice are criticized as fo-

¹⁵¹ *Id.*

¹⁵² *Id.* at 42.

¹⁵³ See, e.g., HEINZ ET AL., *supra* note 136, at 285 (“Although access to electronic communication technology is now essential to an efficient and effective law practice, that technology is not so expensive that large numbers of lawyers must share it in order to make it a sensible investment. . . . The 1995 Chicago survey found that 89 percent of solo practitioners and 98 percent of respondents in firms with two to four lawyers had access to computers”). Recall also that a staple of law firm computing magazines is the ability of smaller firms to use computer technology. See *supra* text accompanying notes 20–23.

¹⁵⁴ See HEINZ ET AL., *supra* note 136, at 180 (quoting Louis Brandeis, writing in 1905); see also *id.* at 256 (noting that John Dos Passos, Sr. wrote in 1907 that the great age of the American bar was just before the Civil War).

¹⁵⁵ See, e.g., Deborah R. Hensler, *Resolving Mass Toxic Torts: Myths and Realities*, 1989 U. ILL. L. REV. 89, 92–97 (describing research showing that most tort plaintiffs find that they have very limited control over “their” lawyers).

¹⁵⁶ HEINZ ET AL., *supra* note 136, at 115.

cusing only on the “top” of the profession and disregarding the remainder.¹⁵⁷ One might question the generalization from on high that developments at very large law firms reflect developments in the bar generally. The work of Professor Heinz and his colleagues shows a growing gap between large-firm business lawyers and others in various professional activities.¹⁵⁸ Lawyers representing individuals may make less money, but they may also continue to pursue the “lawyer-statesman” role endorsed by Kronman. Big-firm lawyers, in short, are not the only lawyers; thus, maybe we should not be overly preoccupied with their malaise. We should not entirely overlook this malaise, however. Many firms have gotten so big that they gobble up a much larger proportion of all lawyers, at least at some point in their careers. The percentage of law school graduates who got their first jobs with a large law firm more than doubled between 1975 and 1995,¹⁵⁹ and large law firms may be hiring more than a quarter of all law school graduates in the near future.¹⁶⁰ Such a proportion cannot easily be disregarded, particularly given the high importance of commercial law firms in the overall profession.

In sum, much as there has been a stark transformation in the operation of large commercial law firms, it may be the continuation of a process begun a century ago, rendering any changes more evolutionary than revolutionary.

B. A Different Technology: A Revolution Due to the Telephone?

Along with the automobile, the telephone facilitated or prompted broad changes in American society during the twentieth century. For example, a central theme of the 1952 book *The Big Change* by the popular historian Frederick Lewis Allen was the impact of such technological developments on social interaction.¹⁶¹ The telephone could conquer distance in a way that not even the telegraph could match. The automobile could conquer it even more literally, although not so immediately.¹⁶² Because the Internet is largely a medium of communication, and because the communicative im-

¹⁵⁷ See, e.g., Marc Galanter, *Reading the Landscape of Disputes: What We Know and Don't Know (and Think We Know) About Our Allegedly Contentious and Litigious Society*, 31 UCLA L. REV. 4, 61–62 (1983) (arguing that concern about a “litigation explosion” has emanated from a narrow elite of federal judges, law professors, and large-firm practitioners).

¹⁵⁸ HEINZ ET AL., *supra* note 136, at 98–139.

¹⁵⁹ *Id.* at 142 (revealing that in 1975, 17% of lawyers got their first job with a firm of more than ten lawyers, while in 1995, 39% of lawyers did so).

¹⁶⁰ Aric Press, *Good Times: For Associates, but Not for Firms Who Need More of Them*, RECORDER (S.F.), Aug. 3, 2007, at 1 (“According to our survey of summer associate hires, Am Law 200 firms expect to bring on roughly 10,000 associates next fall. That astonishing number equals about one-quarter of all the students who will graduate from U.S. law schools next year.”).

¹⁶¹ See FREDERICK LEWIS ALLEN, *THE BIG CHANGE: AMERICA TRANSFORMS ITSELF, 1900–1950* (1952).

¹⁶² *Id.* at 121 (referring to how the automobile “progressively transformed American communities and daily living habits and ideas throughout the half century”).

fact of the computer seems the most important one for the legal profession, a focus on how the telephone affected society at large provides a useful contrast.

Early theorists forecast a massive impact by the telephone as it was incorporated into everyday life.¹⁶³ Because the telephone could provide instantaneous and direct communication, it threatened to undermine the social conventions of a time that was more modest and gradual about social approaches. The whole notion of a “cold call” introduced the possibility of social contacts that were unknown in an age of leaving calling cards, creating a potential loss of privacy and an increase in anxiety from the intrusive ring of the telephone. For the first time, a man might be in direct spoken contact with a married woman not his wife or relative, and without the direct participation of her husband.¹⁶⁴

Sixteen years ago, Professor Claude Fischer published a careful evaluation of the actual impact of the telephone during the period from its introduction in the early twentieth century to 1940, and he concluded that “[c]ommentators in the past made many broad predictions about the effects of the telephone and related technologies. . . . One implication of the failure of such predictions is that basic social patterns are not easily altered by new technologies, that they are resilient even to widespread innovations.”¹⁶⁵ This analysis caused Fischer to criticize “[f]uturistic scenarios [that] project radically new ways of life inspired by recent developments in electronic technologies.”¹⁶⁶

This is not to say, of course, that the telephone had no social implications. Rather, the implications were not the ones that the early entrepreneurs of the telephone industry expected. AT&T initially focused on business customers, but these customers were not particularly interested in the new medium, in part because they valued the written record created by use of the telegraph (a preference that resounds in an age of email).¹⁶⁷ The telephone industry at first derided the use of phones for social purposes,¹⁶⁸ but demand emerged from rural customers who were otherwise cut off from the outside world.¹⁶⁹ Despite widespread predictions that use of phones would undermine localism, Fischer found limited evidence that this result actually occurred. Instead, some early users saw phones as a way “to recapture an ideal past” by restoring close-knit village contacts.¹⁷⁰ The most that

¹⁶³ See CLAUDE S. FISCHER, *AMERICA CALLING: THE SOCIAL HISTORY OF THE TELEPHONE TO 1940*, at 222–54 (1992).

¹⁶⁴ See *id.*

¹⁶⁵ *Id.* at 260.

¹⁶⁶ *Id.* at 259.

¹⁶⁷ *Id.* at 41–42.

¹⁶⁸ *Id.* at 78–80.

¹⁶⁹ *Id.* at 99.

¹⁷⁰ *Id.* at 224.

Fischer could conclude was that “[t]elephoning probably changed visiting practices moderately during the first half of [the twentieth] century.”¹⁷¹ Thus, the telephone did not create what Fischer would view as a social revolution, and he surmises that the automobile was probably more important in establishing the phenomena we characterize as “modern life.”¹⁷²

In 2004, the sociologist Rich Ling built on Fischer’s work with an analysis of the effect of the mobile telephone, which of course is the computer-empowered twenty-first-century version of the twentieth-century telephone. In some analogous ways, he found that it was having dramatic effects. As the telephone had transformed life in rural Colorado in the 1940s, “access to telephony has the potential to revolutionize the lives of the local villagers” in Bangladesh in the twenty-first century.¹⁷³ However, Ling foresees no pervasive social transformation. True, the mobile phone “represents a sea change” in providing instantaneous individualized contact in a way that land lines do not.¹⁷⁴ Thus, it can be used politically—as in organizing antiglobalization demonstrations—in a manner that was not possible with land lines.¹⁷⁵ In Ling’s view, then, it also “represents the completion of the automobile revolution” in terms of personal mobility.¹⁷⁶

Ling concludes, however, that even the mobile telephone does not justify the sort of “wild-eyed speculation” about the Internet in which some have indulged.¹⁷⁷ Compare this with Harvard sociologist Robert Putnam, who wrote in 2000 that the rising importance of the Internet threatened to undermine the sorts of community contacts that mattered so much in America in the mid-twentieth century.¹⁷⁸ But the Golden Age of social interaction that Putnam mourned had already been undermined by the growth of television and the suburbanization of America long before the Internet arrived.¹⁷⁹ Because technology can help build social capital as well as supplant it, the Internet can foster social interaction that did not exist before. Although this social interaction may come at the expense of exposure to those with divergent views,¹⁸⁰ it is nonetheless a form of social capital. Cell

¹⁷¹ *Id.* at 239.

¹⁷² *Id.* at 267.

¹⁷³ LING, *supra* note 7, at 3.

¹⁷⁴ *Id.* at 186.

¹⁷⁵ See *Cats, Mice, and Handsets*, *ECONOMIST*, Dec. 1, 2007, at 74, 74 (“[F]or pioneers of mobile telephony and texts as tools of protest and dissent, simply summoning people to demonstrations—a technique first deployed in the Philippines as long ago as 2001—is old hat.”).

¹⁷⁶ LING, *supra* note 7, at 176.

¹⁷⁷ *Id.* at 175.

¹⁷⁸ See ROBERT D. PUTNAM, *BOWLING ALONE: THE COLLAPSE AND REVIVAL OF AMERICAN COMMUNITY* (2000) (describing the decline of a variety of social and community-based institutions—such as the bowling club—that could be supplanted in an age in which the Internet facilitated individual interaction in cyberspace).

¹⁷⁹ See LING, *supra* note 7, at 179.

¹⁸⁰ See CASS SUNSTEIN, *REPUBLIC.COM* (2001) (bemoaning the extent to which the Internet permits people to avoid divergent views).

phones can play a similar supportive role: in Ling's view, in the next fifty years, the mobile phone's main impact will be on people's ability to coordinate activities,¹⁸¹ and it will therefore contribute to the maintenance and managing of social interactions, but only as a "middle-range technology."¹⁸²

In sum, we can see the telephone—even the mobile telephone—as producing dramatic, but not really revolutionary, changes in society. Although its effects on society could also be regarded as more significant than those wrought thus far by the computer, each technology has seemed to operate more as a facilitator rather than as a stimulus for social change in society at large. Both the telephone and the computer seem to have played a similar role in relation to changes in the legal profession.

C. *A Different Profession: A Revolution for Doctors?*

Our difficulty in determining how dramatically computers have affected legal practice suggests that making a similar evaluation of computers' impact on another profession will be more difficult. At the outset, it might seem that medicine is much more dependent than law on direct face-to-face interaction between the professional and the customer. One might be able to diagnose a client's legal problems without ever seeing the client in the flesh (and corporations are hard to see in the flesh), but diagnosing a patient's medical problems without seeing that person in the flesh seems much riskier. Although lawyers increasingly provide services to clients who are not human beings, doctors invariably are providing their professional services to human beings. This difference seemingly represents a constraint on aggressive use of technological substitutes for interpersonal interaction.

It is surprising, then, to find that technology was facilitating just that sort of activity a century ago, as Professor Fischer's study of the telephone revealed:

Telephone consultations [between doctors and patients] increased after the turn of the [twentieth] century; doctors could now advise patients at a distance and screen would-be visits. . . . Some experts worried that telephone consultations led patients to postpone needed examinations and to demand over-the-phone care. Others were concerned about the safety of such advice and the possibility of garbled drug prescriptions. Some doctors also worried about whether and how they might charge fees for care rendered over the telephone. Little direct evidence supports a claim made in 1924 that telephones had lowered urban death rates, but it seems that doctors and middle-class patients had fully integrated the telephone into medical care by that time.¹⁸³

¹⁸¹ LING, *supra* note 7, at 176.

¹⁸² *Id.* at 184.

¹⁸³ FISCHER, *supra* note 163, at 176; cf. Michael A. McCann, *Message Deleted? Resolving Physician-Patient E-Mail Through Contract Law*, 5 YALE J.L. & TECH. 103, 104 (2002) (asserting that the

Compared to the primitive telecommunications capacities of the 1920s, of course, currently technology affords a greatly improved environment for tending to patients at a distance. Online interaction could replace face-to-face interaction in at least some situations, and some reports extol its values to patients in remote locations.¹⁸⁴ A decade ago, California adopted the Telemedicine Act of 1996 to regulate such treatment through the interactive means permitted by computer.¹⁸⁵ Nonetheless, as recently as 2002, it was asserted that less than one-third of American doctors would communicate with patients by email,¹⁸⁶ and a 2006 study found limited use of email by physicians in Florida.¹⁸⁷ The Internet can also serve as an aid to puzzled doctors trying to make a difficult diagnosis by providing them with a sounding board through online professional networking.¹⁸⁸ In addition, we are told that “e-prescribing” is “on the verge of an explosion.”¹⁸⁹ There are perils associated with the online practice of medicine, however. A Colorado doctor is being prosecuted in California for unauthorized practice of medicine after he provided an online antidepressant prescription for a California teenager he had never met and the “patient” later committed suicide.¹⁹⁰ Despite the seemingly “personal” nature of medical care, then, computer-based communications are having a distinct impact.

In other ways, computers might be expected to have a greater impact on medicine than law. Although online access to legal materials and computer-based search techniques greatly facilitate the use of caselaw and statutory materials, much of the “diagnostic” and “prescriptive” activity of a lawyer depends on the lawyer’s analysis and manipulation of the material

doctor-patient relation “has remained largely intact over the past 2500 years” but that “[r]ecent advancements in technology . . . may test its rigidity”).

¹⁸⁴ See, e.g., Erin Allday, *Online Visits a Boon for Far-Off Patients*, S.F. CHRON., May 27, 2007, at B1 (describing online consultations between patients and doctors and asserting that “doctors and hospitals increasingly rely on online technology to meet patient needs outside their traditional coverage area”).

¹⁸⁵ See CAL. BUS. & PROF. CODE § 2290.5 (West 2008) (detailing the consent required before such treatment is provided).

¹⁸⁶ See McCann, *supra* note 183, at 105. European doctors are reportedly using information technology more frequently in primary care than U.S. doctors. See James G. Anderson, *Social, Ethical and Legal Barriers to E-Health*, 76 INT’L J. MED. INFORMATICS 480, 481 (2007).

¹⁸⁷ See Robert G. Brooks & Nir Menachemi, *Physicians’ Use of Email with Patients: Factors Influencing Electronic Communication and Adherence to Best Practices*, 8 J. MED. INTERNET RES. e2 (2006), <http://www.jmir.org/2006/1/e2/> (reporting that only 16.6% of Florida doctors surveyed used email for patient communications).

¹⁸⁸ See Jessica E. Vascellaro, *Social Networking Goes Professional*, WALL. ST. J., Aug. 28, 2007, at D1 (describing a “social-networking site for licensed physicians” that 25,000 doctors visit regularly and use to consult with colleagues in dealing with challenging patient problems).

¹⁸⁹ See Dinah Wisenberg Brin, *E-Prescribing May Grow as Industry Makes a Push*, WALL ST. J., June 27, 2007, at B5A (quoting Chairman of Walgreen Co.).

¹⁹⁰ See *Hageseth v. Superior Court*, 59 Cal. Rptr. 3d 385 (Cal. Ct. App. 2007) (holding that California court could exercise jurisdiction).

thus obtained. Even Dean Kronman¹⁹¹ should concede that the narrow lawyer-specialist of today cannot be replaced by a computer.

Some foresee, however, that computers will actually take the place of lawyers for many “clients.” A leading British theorist—quoted at the beginning of this Essay¹⁹²—predicts that within ten years online provision of computer-generated legal advice will replace human lawyers for most people seeking legal advice and that the average lawyer may go the way of travel agents, whose services have largely been supplanted by online booking companies.¹⁹³ Just as millions of Americans rely on TurboTax to prepare their tax returns, it might be that similar programs could enable them to dispense with lawyers for a variety of somewhat routinized legal tasks.¹⁹⁴ But for present purposes, it seems likely that unauthorized practice rules will present an impediment to some efforts to market such computerized legal advice. Probably more importantly, it may prove very difficult for computer programmers to model the lawyer’s analytical activity, a challenge that is compounded by the variety of state and local laws that may affect the handling of American legal problems. So for the present, it does not seem that computer-provided legal services have become an important substitute for human lawyers; the legal “diagnosis” still depends on human legal analysis.

Doctors, on the other hand, have relied on machines to diagnose patients for decades. The X-ray machine, for example, enabled them to look “inside” the patient in a manner never possible through “hands-on” examination. The variety of such diagnostic techniques has multiplied enormously since the advent of the X-ray. Any doctor who attempted a diagnosis under nonemergency conditions without doing blood tests, taking the patient’s blood pressure, etc., would be courting malpractice. And those mechanical diagnostic tools increasingly depend on the computer. Some—the MRI might be a leading example—could not operate without computers. Others are made much more efficient due to computerized techniques.

Indeed, the advent of this array of computerized techniques might precipitate a true revolution in the provision of medical services by replacing the caring doctor with the calculating machine. As Professor Groopman has recently written, medical diagnosis has depended on a mixture of rational and nonrational (perhaps intuitive) features that may interfere with clear-eyed diagnosis, particularly of unfamiliar medical conditions.¹⁹⁵ More

¹⁹¹ See *supra* text accompanying notes 145–149 (describing Dean Kronman’s lament about the declining importance of “wise counsel” by lawyers).

¹⁹² See *supra* text accompanying note ††.

¹⁹³ See SUSSKIND, *supra* note ††, at 29, 45–46.

¹⁹⁴ I intend to pursue these issues further in Richard L. Marcus, *The Electronic Lawyer*, 58 DEPAUL L. REV. (forthcoming 2008).

¹⁹⁵ See generally JEROME GROOPMAN, *HOW DOCTORS THINK* (2007).

than fifty years ago, it was suggested that computers might actually do a better job of devising responses to patient conditions than human doctors.¹⁹⁶ *The Economist* asserts that this idea is “now universally accepted,” and that the next frontier involves efforts to design computer programs that do a better job than next of kin in determining patient desires for heroic measures when the patient is incapacitated and unable to decide for herself.¹⁹⁷ While the legal profession has a magazine on the use of computers in law offices,¹⁹⁸ the medical profession has a number of such publications, including *Artificial Intelligence in Medicine*, *Computer Methods and Programs in Biomedicine*, *Journal of the American Medical Informatics Association*, and *Journal of Medical Internet Research*. Although some have theorized that computer programs could replace lawyers in providing advice to clients,¹⁹⁹ it might be that such a revolution is more likely to occur in medicine.

The medical profession is indeed preoccupied with these concerns. Attempts to develop computer programs that could diagnose medical conditions began in the 1950s.²⁰⁰ As early as 1990, writers were discussing the prospect that computers could “bring about fundamental changes in the structure and function of medical practice.”²⁰¹ More recently, medical commentators have emphasized that the Internet “offers the opportunity to fundamentally reinvent medicine. . . . The ‘e-health’ era is nothing less than the digital transformation of the practice of medicine.”²⁰² Other commentators have noted that “e-health is poised to become an essential element in the redesign of the primary care practice.”²⁰³ Communications technology can “revolutionize doctor and patient contact,”²⁰⁴ and “[i]f medi-

¹⁹⁶ See *Logical Endings*, *ECONOMIST*, Mar. 17, 2007, at 85, 85 (describing the 1947 suggestion by Theodore Sarbin that doctors are really just machines that make actuarial judgments about the best treatment and suggesting that computers might do a better job).

¹⁹⁷ See *id.* (describing a computer program that produced “almost identical” results to those from the patient’s kin and reporting the designer’s optimism that he can improve the program so that it will do considerably better).

¹⁹⁸ See *supra* note 21 (describing the monthly magazine *Law Office Computing*).

¹⁹⁹ See *supra* text accompanying notes 192–194 (regarding the possibility of the demise of “intermediation” provided by lawyers).

²⁰⁰ Jerome P. Kassirer, *A Report Card on Computer-Assisted Diagnosis—The Grade: C*, 330 *NEW ENG. J. MED.* 1824, 1824 (1994); see also Kenneth I. Shine, *The Physician as Health Agent*, 729 *ANNALS N.Y. ACAD. SCI.* 73 (1994) (describing the growing importance of technology for medical treatment during the twentieth century and finding that “[t]he physician became a purveyor of technology,” a process that has accelerated since 1980).

²⁰¹ James G. Anderson & Stephen J. Jay, *The Social Impact of Computer Technology on Physicians*, *COMPUTERS & SOC’Y*, Oct. 1990, at 28, 28.

²⁰² Russell C. Coile, Jr., *The Digital Transformation of Healthcare*, *PHYSICIAN EXECUTIVE*, Jan.–Feb. 2000, at 8, 8.

²⁰³ Thomas Bodenheimer & Kevin Grumbach, *Electronic Technology: A Spark to Revitalize Primary Care?*, 290 *JAMA* 259, 259 (2003).

²⁰⁴ Shou Ling Leong et al., *Enhancing Doctor-Patient Communication Using Email: A Pilot Study*, 18 *J. AM. BOARD FAM. PRAC.* 180, 180 (2005).

cine is to achieve major gains in quality, it must be transformed, and information technology will play a key part.²⁰⁵

Dr. David Blumenthal has captured this concern. Writing in 2002 on whether doctors' professionalism can survive the computer era, he offered the following reaction:

A decade ago, it would have been unimaginable to suggest that the medical profession might be headed, if not for extinction, at least toward a profoundly diminished role and status in ministering to society's ills. Yet the information revolution, coupled with other recent developments like the rise of alternative types of health care personnel and the new health care consumerism, has made such changes seem not only imaginable but even a plausible extension of prevailing trends.²⁰⁶

Although he concluded then that this risk was overstated,²⁰⁷ in 2007 he wrote in somewhat apocalyptic terms about the potential impact of health information technology (HIT):

One central, often unspoken question is whether HIT is best viewed as one more in the long list of technologies that modern medicine has effectively accommodated over the years without great disruption or whether it is something fundamentally different, a potentially transformative force that ultimately will bring about a radical redesign of the processes by which care is delivered.²⁰⁸

For the outsider, it is even more difficult to answer such a question. Indeed, sometimes the complaint of nondoctors is that there is not enough reliance on computers. For example, a proponent of enhanced computerization of medical records recently objected that, unlike many everyday matters that can be done by computer—such as recording TV programs or communicating with family—medical records are often accessible only in hard-copy form.²⁰⁹ The computerization of medical records, if done too aggressively, might produce medical costs of its own; recent reports suggest that the idea of implanting microchips in humans that would provide access to their entire medical record may itself be harmful.²¹⁰ For the present,

²⁰⁵ David W. Bates & Atul A. Gawande, *Improving Safety with Information Technology*, 348 *NEW ENG. J. MED.* 2526, 2526 (2003).

²⁰⁶ David Blumenthal, *Doctors in a Wired World: Can Professionalism Survive Connectivity?*, 80 *MILBANK Q.* 525, 526 (2002).

²⁰⁷ *See id.* at 543–44 (“The profession of medicine, therefore, does not seem headed for extinction—like some quaint species of the era between Hippocrates and Gates. Supported by humanity’s need for a healing class and by physicians’ genuine technical competence, the profession will survive. However, the work it does will likely change somewhat, as will its role in society and the relationships between doctors and patients.”).

²⁰⁸ David Blumenthal & John P. Glaser, *Information Technology Comes to Medicine*, 356 *NEW ENG. J. MED.* 2527, 2527 (2007).

²⁰⁹ *See* Thomas Goetz, Op-Ed., *Physician, Upgrade Thyself*, *N.Y. TIMES*, May 30, 2007, at A21.

²¹⁰ *See* Todd Lewan, *Animal Studies Raise Microchip Suspicions*, *CHI. TRIB.*, Sept. 16, 2007, at Q6 (describing studies suggesting that such implanted chips had “induced” malignant tumors in some lab mice and rats).

however, the greater concern is patient privacy; increased reliance on computerized records has produced a flurry of complaints about inappropriate intrusions into patient privacy.²¹¹ Doctors are now using “wireless handheld computers” to facilitate instantaneous and more accurate decisions at the point of care.²¹² In a variety of ways, then, computer applications may have a transformative impact on what doctors do that is greater than the transformative impact computers have had on the legal profession.

Simultaneously and relatedly, the “managed care” movement may be producing a structural and economic revolution for doctors analogous to the metamorphosis of commercial law firms discussed above.²¹³ Indeed, commentators compare the disenchantment doctors experience regarding such developments with the unhappiness of lawyers.²¹⁴ Just as the dynamics of competition affect lawyers, doctors may also find that they have less control over their daily activities and that they are beholden to insurance companies and other paymasters who may not be sufficiently attuned to true patient needs. Technology can be adapted to such considerations in a variety of ways. Thus, on the one hand, doctors may now be paid for their email contacts with patients, which appears to affect their enthusiasm for this form of contact.²¹⁵ However, on the other hand, computers surely are also a device used by doctors’ overseers to monitor doctors’ activities. Nonetheless, it

²¹¹ See, e.g., Robert Pear, *Warnings Over Privacy of U.S. Health Network*, N.Y. TIMES, Feb. 18, 2007, at A22 (describing resistance to efforts by the Bush Administration to promote use of computer networks for access). Consider the following views:

As the health-care industry embraces electronic record-keeping, millions of pages of old documents are being scanned into computers across the country. The goal is to make patient records more complete and readily available for diagnosis, treatment and claims-payment purposes. But the move has kindled patient concern about who might gain access to sensitive medical files—data that can now be transmitted with the click of a computer mouse.

Theo Francis, *Medical Dilemma: Spread of Records Stirs Patient Fears of Privacy Erosion*, WALL ST. J., Dec. 26, 2006, at A1.

²¹² See, e.g., Susan E. Hauser et al., *Using Wireless Handheld Computers to Seek Information at the Point of Care: An Evaluation by Clinicians*, 14 J. AM. MED. INFORMATICS ASS’N 807 (2007) (reporting that handheld computers with Internet access are useful tools for providing patient advice in real time); Claire Honeybourne et al., *Knowledge in the Palm of Your Hands: PDAs in the Clinical Setting*, 23 HEALTH INFO. & LIBR. J. 51 (2006) (reporting that a handheld device can provide critical information); Dimitris A. Kalogeropoulos et al., *Towards Knowledge-Based Systems in Clinical Practice: Development of an Integrated Clinical Information and Knowledge Management Support System*, 72 COMPUTER METHODS & PROGRAMS BIOMEDICINE 65 (2003) (endorsing the introduction of computer-based medical data processing into routine clinical practice).

²¹³ See *supra* Part IV.A.

²¹⁴ See David Mechanic, *Physician Discontent: Challenges and Opportunities*, 290 JAMA 941, 941 (2003) (“Surveys suggest, however, that nurses, dentists, and lawyers are no more satisfied, and perhaps are more dissatisfied, than physicians.”).

²¹⁵ See Milt Freudenheim, *Digital Rx: Take Two Aspirins and E-Mail Me in the Morning*, N.Y. TIMES, Mar. 2, 2005, at A1. Compare this with Professor Fischer’s report that in the early twentieth century, doctors worried about their ability to be paid for patient advice they provided over the telephone. See *supra* note 183 and accompanying text.

seems that the computer plays a limited role in physicians' dissatisfaction.²¹⁶ Some find that, although in managed care regimes doctors actually see fewer patients (and thus could have more time per patient to provide advice),²¹⁷ "the traditional single doctor-patient relationship is being replaced by one in which the patient is managed by a team of health care professionals," a system that may conflict with some doctors' preference for the old way.²¹⁸ Certainly a world of demanding patients who question their doctors' judgments (sometimes using information gleaned from Internet searches) is likely to be disagreeable for some doctors. But given the "consumer rights" orientation of current American society, it is difficult to believe that the new "consumer" mentality of patients is primarily due to the advent of computers.²¹⁹

In sum, computers have intruded in, and become a critical resource for, the medical profession at least as fully as for the legal profession and left similar uncertainty about whether the impact of computers has transformed the profession.

V. CONCLUSION: THE SEMANTICS OF CHANGE

Gauging the impact of any technology on something as complex as the legal profession is bound to be extremely difficult. Elements of continuity and of change will compete for attention; there will always be a question of evaluating their relative importance. For example, historian David Edgerton recently urged that the continued importance of old technology played a greater role in twentieth-century history than the technological innovations of that century.²²⁰ Determining when evolutionary changes have produced revolutionary results is more a game of semantics than of precise measure-

²¹⁶ Thus, Dr. Mechanic concludes:

[S]ome of the stresses experienced by physicians and other professional groups reflect a global economy, the influence of mass and instant communication, the accessibility of information, and the growing legal and ethical complexity of new organizational arrangements and public transactions. While physicians commonly attribute their discontent to managed care, the cultural, ideological, technological, and economic changes apparent in modern societies are increasingly challenging traditional assumptions of medical practice and require rethinking of practice approaches.

Mechanic, *supra* note 214, at 942. In the same vein, see David St. Clair, *The Truth About Managed Care Decisions*, HEALTH MGMT. TECH., Feb. 2000, at 30, 30 ("The myth of 'faceless bureaucrats' and 'accountants' vetoing doctors' care decisions is just that—a myth.").

²¹⁷ See Robert B. Klint, *A Dance in Anger: Physician Responses to Changes in Practice*, PHYSICIAN EXECUTIVE, Mar.–Apr. 1999, at 18, 19 (reporting on a 1991 study showing that when HMO market share doubled, doctors worked slightly fewer annual hours and saw 13.7% fewer patients per week).

²¹⁸ See Mario Stefanelli, *The Socio-Organizational Age of Artificial Intelligence in Medicine*, 23 ARTIFICIAL INTELLIGENCE MED. 25, 25 (2001).

²¹⁹ On this score, consider the TV ads by pharmaceutical companies designed to prompt patients to ask their doctors for certain prescription medicines.

²²⁰ See DAVID EDGERTON, *THE SHOCK OF THE OLD: TECHNOLOGY AND GLOBAL HISTORY SINCE 1900* (2007) (arguing that pre-twentieth-century technology was more important to the outcome of wars and other major events during the twentieth century than the new technology of the age).

ments. Indeed, sociologists seem to debate the distinctions between “evolutionary” and “revolutionary” changes almost ceaselessly.²²¹

In such a setting, questions of degree matter a great deal. The sociologist Ling, for example, compared the impact of the mobile telephone to that of the industrial revolution, which he saw as a genuine revolution:

It was during this period [1760 to 1840] that social observers witnessed the tremendous changes wrought by industrialization. There was the rise of wage labor. The extended family withered and reformed itself into the more transportable nuclear family. The church, once an institution wielding massive power, became a shadow of itself. Forms of governance and types of social movements saw fundamental changes. The division of labor took on finer and finer gradations. Labor organizations formed and were met in different ways by those who owned and operated the factories. Likewise, the legal, political, and social enfranchisement of various groups, most notably women, became a topic of pitched debate (as well as pitched stones). The rise of today’s education system was a child of the industrial revolution, as was the modern city itself. Thus, the interaction between industrialization and society resulted in a fundamentally reformed social landscape. The industrial revolution is, in many ways, the central epoch in the establishment of modern institutions. All other social changes must measure themselves against the changes of that period.²²²

Using this metric, it is easy to conclude that the Information Age has not yet produced such general and pervasive changes, even though it has changed a number of important things. Some of the most aggressive forecasts predict that computers bid fair to produce very dramatic changes in society in the years to come. For example, one noted futurist forecast in 1999 that relatively soon computers as we now know them will be replaced by technological devices embedded in our bodies and that these devices will have a computational ability that matches the human brain.²²³ Even putting aside this vision of totalitarian control of human behavior, it is easy to see that computers do hold the promise of fairly revolutionary change in human behavior and society. At least one artificial intelligence enthusiast predicts that within fifty years computers will have created a transformation comparable to the industrial revolution.²²⁴

Less aggressively, we are told that technology has already wrought great changes in some areas: “Technology completely alters the way hu-

²²¹ See, e.g., JOHN L. CAMPBELL, *INSTITUTIONAL CHANGE AND GLOBALIZATION* (2004) (exploring methods of characterizing changes due to increased globalization).

²²² LING, *supra* note 7, at 172.

²²³ See RAY KURZWEIL, *THE AGE OF SPIRITUAL MACHINES: WHEN COMPUTERS EXCEED HUMAN INTELLIGENCE* (1999).

²²⁴ See Association for the Advancement of Artificial Intelligence, *AI Topics*, <http://www.aaai.org/aitopics/pmwiki/pmwiki.php/AITopics/HomePage> (last visited Apr. 9, 2008) (quoting Eric Horvitz).

manitarian work is done.”²²⁵ “The much-heralded genetics revolution thus appears, at last, to be arriving.”²²⁶ “Computer science has revolutionized work at many engineering firms.”²²⁷ “The rise of YouTube certifies the passing of [Karl] Rove’s era, a cultural changing of the guard in the digital age.”²²⁸ For some of the faithful, we are told, the Internet has replaced the confessional.²²⁹ Craigslist, meanwhile, continues to expand its field of operations, emerging as a business-generation method for the world’s oldest profession.²³⁰ At the same time, one can find contrary opinions, such as that of Dean Nicholas Lemann: “Television swept across American society as rapidly as the Internet—and with even greater immediate effects.”²³¹

Certainly the computer has produced significant changes in the legal profession. We are told that “[c]hanges in IT will change the law itself.”²³² A seasoned litigator recently opined that the much ballyhooed demise of the civil jury trial resulted from the technology of the late twentieth century, particularly e-discovery.²³³ Another commentator urged that outsourcing of legal work over the Internet by small law firms is about to cause a “revolution.”²³⁴ Due to the computer, law office operations have changed remarkably²³⁵ and discovery seems significantly transformed.²³⁶ But many of the

²²⁵ Flood, *Famine and Mobile Phones*, *ECONOMIST*, July 28, 2007, at 61, 61 (quoting a representative of the World Food Programme, a U.N. body that is the single largest distributor of food aid).

²²⁶ *Do Not Ask or Do Not Answer?*, *ECONOMIST*, Aug. 25, 2007, at 69, 69.

²²⁷ David Owen, *The Anti-Gravity Men*, *NEW YORKER*, June 25, 2007, at 72.

²²⁸ Frank Rich, Op-Ed., *He Got Out While the Getting Was Good*, *N.Y. TIMES*, Aug. 19, 2007, at Week in Review 10. The argument is that YouTube undermines a politician’s ability to rigidly control the message—a Rove specialty—so that Rove’s direct mail method will no longer work. *See also* Jackie Calmes, *Paul Grabs Attention of Alienated Voters*, *WALL ST. J.*, Aug. 31, 2007, at A4 (reporting that presidential candidate Ron Paul’s use of the Internet is “redefining what a grass-roots campaign looks like”).

Less conventional political activity also has been altered by the Internet. *See* Noam Cohen, *Doorstep Protest: Very Real, Very Virtual*, *N.Y. TIMES*, Nov. 26, 2007, at C3 (describing a demonstration outside the New York City apartment of a business executive associated with a company involved in animal testing; the campaign to protest at the homes of supposedly responsible executives is managed by a website, which the woman who runs the organization Win Animal Rights says is “the great equalizer” because it allows organizations like hers to reach supporters and organize such protests); *see also* *Cats, Mice and Handsets*, *supra* note 175, at 74 (“[F]or pioneers of mobile telephony and texts as tools of protest and dissent, simply summoning people to demonstrations—a technique first deployed in the Philippines as long ago as 2001—is old hat. The search is on for even more creative ways to use this ubiquitous device.”).

²²⁹ *See* Stephanie Simon, *Penitents Turning to Web Instead of Confessionals*, *S.F. CHRON.*, Sept. 2, 2007, at A2.

²³⁰ *See* Bruce Lambert, *As Prostitutes Turn to Craigslist, Law Enforcement Takes Notice*, *N.Y. TIMES*, Sept. 5, 2007, at A1.

²³¹ Nicholas Lemann, *Tune In Yesterday*, *NEW YORKER*, Apr. 30, 2007, at 80.

²³² Ezra Dodd Church, Note, *Technological Conservatism: How Information Technology Prevents the Law from Changing*, 83 *TEX. L. REV.* 561, 561 (2004).

²³³ *See* George A. Davidson, *Who Killed the Civil Trial?*, *N.Y.L.J. MAG.*, Sept. 2007.

²³⁴ John Tredennick, *Outsourcing for the Small Law Office*, *TRIAL*, Mar. 2007, at 58, 59.

²³⁵ *See supra* text accompanying notes 20–40.

most significant possible effects on legal practice seem not to have occurred. Computer programs are not yet supplanting lawyers in the provision of legal advice to clients.²³⁷ Law schools have not gone online and abandoned their bricks and mortar operations.²³⁸ Trials have not gone online, with jurors deliberating by chat room.²³⁹ And the Fourth Amendment is not necessarily passé.²⁴⁰

Yet there is a substantial argument that the transformation of commercial law firms—aided but not caused by the computer—looms as something far closer to a revolutionary force in legal practice, although it is a somewhat drawn-out revolution.²⁴¹ Furthermore, the computer's possible impact on the medical profession could have more profound implications than on the legal profession.²⁴² Perhaps those in the throes of change cannot themselves determine whether it is revolutionary; even residents of Western Europe and the U.S. during the industrial revolution may have regarded the changes they were experiencing as evolutionary. Lacking a certain metric, and in the face of such varying criteria, we close with an ambiguous answer—the revolution may be upon us, but we cannot be sure.

²³⁶ See *supra* text accompanying notes 89–120.

²³⁷ See *supra* text accompanying notes 192–194.

²³⁸ See *supra* text accompanying notes 9–19.

²³⁹ See *supra* text accompanying notes 65–88.

²⁴⁰ See *supra* text accompanying notes 121–133.

²⁴¹ See *supra* text accompanying notes 134–160.

²⁴² See *supra* text accompanying notes 183–219.

