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Introduction

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AT THE CROSSROADS OF LAW AND TECHNOLOGY

Introduction by

Alan Heinrich, Karl Manheim,** & David J. Steele****

It has been 130 years since Harvard Law School Dean Christopher Columbus Langdell transformed American legal education with his case book method of instruction. According to Dean Langdell, Law, considered as a science, . . . has arrived at its present state by slow degrees; in other words, it is a growth, extending in many cases through centuries. This growth is to be traced in the main through a series of cases; and much the shortest and best, if not the only way of mastering the doctrine effectively is by studying the cases in which it is embodied.

At the dawn of the twenty-first century, American law schools still mostly follow Langdell. Every lawyer and judge in America has been schooled in this manner. We learn law by studying what has gone before. Change occurs incrementally, “by slow degrees.”

To a large extent this is good. Law serves as a calming force, mediating the impacts of political, social, and scientific change. One need only recall the persistence and continuity of legal doctrines after the American Revolution, the Civil War, and the industrial revolution. Law is our connection to the past, not out of any nostalgic romanticism, but to provide the certainty and predictability our social and economic institutions require.

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But the old ways of doing, teaching, and thinking about law are fundamentally obsolete. Nary a legal doctrine or jurisprudence will survive intact the present ferment. The information revolution underway will change law as nothing in our experience or understanding has. It took a millennium to develop a sophisticated common law regime, one based on rights, property, and regulation. It may take less than a decade for that regime to unravel, as core concepts lose meaning. Not surprisingly, we are unprepared.

The relationship between law and technology is traditionally symbiotic. Scientific and industrial advances lead to new legal norms and requirements, which in turn assert their own influence on technology. Regulators know this phenomenon as “technology forcing,” where government agencies set technical standards (in areas such as safety and environmental protection) that cannot be met with current technology. By phasing in higher standards, an agency induces technological improvement.¹

The flip side of technology forcing is now being felt in the legal profession and academy. “Law-forcing” occurs where technological change is so dramatic as to cause doctrinal reform. The advent of the Internet has already pressed many existing rules to the breaking point; more are surely to follow. Along the way, it has done nothing less than remake the global economy. There are not many historical parallels. Perhaps the invention of the printing press, which spawned, *inter alia*, both government regulation of speech and its corollary, the right of speech, is the closest example.

Everything about law is likely to be rethought in the coming years. How it is taught, practiced, adjudicated—even its relevance—are subject to reexamination. In the following section we briefly explore some of the transformations taking place before our eyes, to which law must either adjust or withdraw.

1. An example of this is the automobile airbag. In 1966, the Department of Transportation began to develop standards for “passive occupant restraint systems” despite industry resistance and the lack of current technology. The inflatable airbag emerged several years later and has become standard equipment in nearly all new vehicles sold in the United States. *See* *Motor Vehicle Mfrs. Ass’n v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 49 (1983) (“The Act intended that safety standards not depend on current technology and could be ‘technology-forcing’ in the sense of inducing the development of superior safety design.”).

I. LAW-FORCING: THE TRANSFORMATION OF RULES AND RELATIONSHIPS

Law will evolve in this technological age, as it has in past ones, to adapt to new forms of human interaction. How smoothly the transition occurs will depend on the pace of change and the flexibility of our legal institutions, including legal education.

A. *New Forms of Property*

What new forms of property will be created, can they be protected by legal systems, or will self-help become the dominant paradigm?² Some maintain that “property in cyberspace” is no different than other forms of intellectual property and fits comfortably under existing doctrine.³ Still, there is no denying that new forms of property are emerging, accompanied by their own mini-legal systems. The controversy over domain names and registration systems has spawned its own legislation,⁴ governing bodies,⁵ and dispute resolution mechanisms.⁶

2. Self-help in a technology context could include a variety of mathematical, physical, and design features that limit or expand control over use, alteration, and distribution. Encryption and the V-chip are common examples. Indeed, information itself can be structured to include self-help mechanisms, such as in computer code. See generally LAWRENCE LESSIG, *CODE AND OTHER LAWS OF CYBERSPACE* (1999). See also David R. Johnson, *Let's Let the Net Self-Regulate* (visited Mar. 15, 2000) <<http://www.cli.org/selford/Index.htm>>.

3. See Frank Easterbrook, *Cyberspace and the Law of the Horse*, 1996 U. CHI. LEGAL F. 207 (1996) (arguing that general principles can be applied to specialized endeavors such as the internet). For contrasting views, see Lawrence Lessig, *The Law Of The Horse: What Cyberlaw Might Teach*, 113 HARV. L. REV. 501 (1999); Gregory E. Perry & Cherie Ballard, *A Chip by any Other Name Would Still Be a Potato: The Failure of Law and Its Definitions to Keep Pace with Computer Technology*, 24 TEX. TECH L. REV. 797, 800 (1993) (arguing that the law often “places too much reliance upon the past” and is thus “caught unaware” by many technological advances).

4. See Anticybersquatting Consumer Protection Act, Pub. L. No. 106-113, 113 Stat. 1536 (1999) (codified at 15 U.S.C. § 1125(d) (2000)).

5. See generally The Internet Corporation for Assigned Names and Numbers (ICANN) (visited Mar. 12, 2000) <<http://www.icann.org/>>.

6. ICANN, *Uniform Domain Name Dispute Resolution Policy* (visited Mar. 12, 2000) <<http://www.icann.org/udrp/udrp.htm>>.

New property is also being created by research into the human genome. Can the genetic blueprint of DNA molecules be reduced to ownership? As pure information, it may not be patentable.⁷ Nor is the knowledge base subject to copyright (not authored) or trademark (not created). Yet, without some form of protection, private research might easily be discouraged.

The "Law of the Genome" has not been developed yet, but will be, just as property rights in tissue and organs are being developed through legislation and litigation.⁸ Concurrent research by the publicly funded National Human Genome Research Institute⁹ and by the privately owned Celera Genomics,¹⁰ has, until now, generated cooperation and competition. But, private versus public ownership of genetic information is suddenly a large and divisive issue as the genetic map nears completion.¹¹ Whether Celera can exclude others (the

7. The high-tech field of bioinformatics has generated many patents. However, such "biotechnology patents tend to suffer from enablement problems, i.e., the patent specification really doesn't allow an independent party to recreate the processes described in the patent." *Bad Patents, Legal Resources and Tools for Surviving the Patenting Frenzy of the Internet, Bioinformatics, and Electronic Commerce* (last visited Mar. 15, 2000) <<http://www.bustpatents.com/>>. The growing dispute over the patentability of information methods is an example of the difficulty law has in keeping pace with scientific and technological advances. See James Gleick, *Patently Absurd*, N.Y. TIMES MAG., Mar. 12, 2000, at 44.

8. See *Moore v. Regents of the Univ. of Cal.*, 51 Cal.3d 120, 793 P.2d 479, 271 Cal. Rptr. 146 (1990) (rejecting patient's claim of property right to tissue samples used to derive patented cell line and pharmaceuticals, but upholding claims based on fiduciary duty). Related statutory law is fairly extensive, typically dealing with organ donation and other biological materials. See *id.* at 137, 793 P.2d at 489, 271 Cal. Rptr. at 156.

9. The NHGRI is part of the National Institutes of Health (NIH). See *The National Human Genome Research Institute* (visited Mar. 15, 2000) <<http://www.nhgri.nih.gov/>>.

10. Celera is a unit of The Perkin-Elmer Corporation.

11. As this Article was going to press, a battle was erupting over access to genomic information. On March 14, 2000, President Clinton and British Prime Minister Tony Blair stated that the sequence of the human genome should be made freely available to all researchers. Indeed, the International Human Genome Sequencing Consortium has adopted a policy that all human genome sequence data should be placed in publicly accessible databases. See National Human Genome Research Institute, *International Human Genome Sequencing Consortium Backs Rapid Construction of a Working Draft and Stands Firm on Public Access* (visited Mar. 15, 2000) <<http://www.nhgri.nih.gov/NEWS/>>

hallmark of property ownership) from its genetic research is not simply a matter of intellectual property law. It requires a national dialogue on public health and public policy where the policymakers are well informed. The legal advisors will need to understand molecular biology; the genetic engineers will need to understand law.

While new property is emerging, old property is being challenged. The intense debate over software development illustrates the point. At the center of traditional business norms is the trade secret—the ability to prevent others from exploiting product and design information. Companies not only patent and copyright their creations, but closely guard it from competitors. Secret (“closed source”) code is traditional, safe, and insular. For mainstream software companies like Microsoft, it creates enormous wealth. But secrecy can cause products to be unfriendly and static, complicating compatibility with other software and stifling innovation.

Open source code describes products developed in the open and by collaboration. By facilitating cooperation with other products and developers, open code leads to greater flexibility and adaptability. Open code is a different kind of property, if property at all. Linux, for example, is an alternative to Microsoft’s Windows operating systems. Because it is freely available, it is not property in the traditional sense, nor does it produce wealth on its own accord. Only through bundling with value-added products and services can Linux command a price at retail. As Linux challenges Windows and gains market share, old ways of thinking about property are similarly challenged. The conflict between closed code and open code

human_sequencing_data_access.html>. Accordingly, all sequence data produced by the international consortium is deposited every 24 hours in GenBank, where it is freely available to any researcher with an Internet connection, without restrictions on use.

In contrast, the leading private genome research company, Celera Corp., has said it would not “give away its proprietary information to its competitors.” See Paul Jacobs & Peter G. Gosselin, *Firm Stands Fast on Retaining Genetic Data*, L.A. TIMES, Mar. 8, 2000, at C3. Not surprisingly, investors tend to prefer proprietary status for the decoded genome. After the Clinton-Blair announcement, rumors of unrestricted public access caused “frantic selling [of stocks which] wiped away tens of billions of dollars in market value from the industry.” Alex Berenson & Nicholas Wade, *A Call for Sharing of Research Causes Gene Stocks to Plunge*, N.Y. TIMES, Mar. 15, 2000, at A1.

(emblematic of old and new property) was one of the themes of this Symposium.¹²

Old property is not only in competition with new property, its continuing relevance may be threatened by emerging technologies. For example, the Internet threatens to weaken the protection of copyright and other forms of intellectual property. As long as production and distribution mechanisms were visible and regulable, intellectual property rights could be enforced through legal remedies. With the instant transmission and global distribution enabled by the Internet, legal protections for intellectual property owners are inadequate. This is demonstrated by the DeCSS DVD¹³ copy control case. Open code programmers reverse engineered DVD copy control encryption technology (known as Content Scrambling System, or "CSS") and posted their new "DeCSS" code, which defeats DVD encryption, on the Internet. The DVD Copy Control Association brought suit against the programmers alleging violation of their trade secrets. How effective will the injunction be, now that the decryption algorithms have been distributed across the planet? Is it really possible to characterize as a "trade secret" DVD encryption code that has been posted on the Internet and available for the entire world to download for free? Clearly, any such characterization is a legal fiction created to serve other equitable interests.¹⁴ But will trade secrets persist as a viable doctrine if it is reduced to the status of a legal fiction?¹⁵

12. See *Closed Corp. v. Open Sesame: A Simulated Infringement Case Arising in Cyberspace*, 33 LOY. L.A. L. REV. 1055 (2000).

13. DVD stands for "Digital Versatile Disc."

14. See *DVD Copy Control Ass'n, Inc. v. McLaughlin*, No. CV 786804 (Cal. Super. Ct. Santa Clara County Jan. 20, 2000) (order granting preliminary injunction), available at <http://www.eff.org/ip/Video/DVDCCA_case/20000120-pi-order.html> ("The Court is not persuaded that trade secret status should be deemed destroyed at this stage merely by the posting of the trade secret to the Internet. . . . To hold otherwise would do nothing less than encourage misappropriators of trade secrets to post the fruits of their wrongdoing on the Internet as quickly as possible and as widely as possible thereby destroying a trade secret forever. Such a holding would not be prudent in this age of the Internet.").

15. Another example of this phenomenon is presented by the renegade program "Napster," which facilitates the free (and often illegal) exchange of copyrighted music on the Internet. See *Napster, Inc.* (visited Apr. 18, 2000) <<http://www.napster.com>>. In an ironic twist, the Napster network has been hijacked by hackers who are using it to exchange other types of software.

B. Rights in the Brave New World of Manufactured Life and Identity

New biological forms and relationships are emerging. This includes everything from genetically altered crops to cloned pigs, each creating its own complex of legal and ethical questions, not the least of which is whether life itself can be patented.¹⁶ Extension of these technologies to human beings is likely not far off, raising profound questions of genetic essentialism. Will cloned and quasi-persons enjoy the same set of political and civil rights as "traditional humans"? Already our jurisprudence must deal with multiple biological parenthood (e.g., birth and donor mothers).¹⁷ How will it respond to new forms of personhood, whether they are biological, electromechanical, or virtual?¹⁸ Can machines have legal personality?¹⁹ What legal rights and obligations will artificial intelligence have?²⁰

Identity itself will become harder to define. Is it to be found in an individual's DNA structure or in the electronic record of her life's activities.²¹ If the latter, and perhaps the former, it can be appropriated or manufactured.²² "Digital personas" are now commonplace.

"Napster officials say they are considering their options." P.J. Huffstutter & Greg Miller, *Hackers Find New Uses for Song-Swap Software*, L.A. TIMES, Mar. 24, 2000, at C1.

16. See generally Ned Hettinger, *Patenting Life: Biotechnology, Intellectual Property, and Environmental Ethics*, 22 B.C. ENVTL. AFF. L. REV. 267 (1995).

17. See Joan Hollinger, *From Coitus to Commerce: Legal and Social Consequences of Noncoital Reproduction*, 18 U. MICH. J.L. REFORM 865, 866 n.4 (1985) ("It is already possible for a child to have five different 'parents': the woman who donated the egg, the man who donated the sperm, the woman to whose womb the fertilized embryo is transferred so she can carry it to birth, and the man and woman who will receive and presumably raise the infant.").

18. See, e.g., Charles Kester, *Is There a Person in That Body?: An Argument for the Priority of Persons and the Need for a New Legal Paradigm*, 82 GEO. L.J. 1643 (1994); Michael D. Rivard, *Toward a General Theory of Constitutional Personhood: A Theory of Constitutional Personhood for Transgenic Humanoid Species*, 39 UCLA L. REV. 1425 (1992).

19. See, e.g., Leon Wein, *The Responsibility of Intelligent Artifacts: Toward an Automation Jurisprudence*, 6 HARV. J.L. & TECH. 103 (1992).

20. See generally Lawrence B. Solum, *Legal Personhood For Artificial Intelligences*, 70 N.C. L. REV. 1231 (1992).

21. See Hugh Miller, *DNA Blueprints, Personhood, and Genetic Privacy*, 8 HEALTH MATRIX 179 (1998).

22. The problem of identity theft has become so pervasive that Congress has enacted a new felony statute to deal with the problem. See Identity Theft and Assumption Deterrence Act, Pub. L. No. 105-318, 112 Stat. 3010 (1998)

When it is as easy to swap genes as it is to invent e-mail names, rules of identity and definition will become even more critical.

II. CHALLENGES TO LEGAL INSTITUTIONS

As substantive rights and doctrines are transformed by technological change, the political and legal institutions within which these rights and doctrines have meaning will themselves be transformed. Legislatures, courts, regulatory bodies, and law enforcement agencies face substantial institutional challenges in the coming years.

The radical social implications of many recent technological developments would seem to invite wide-ranging legislative responses.²³ At the same time, however, the rapid and dynamic pace of change undermines the effectiveness of traditional legislative solutions. Today's legislative bodies must confront the very real possibility that their responses to technologically driven challenges will become obsolete upon their enactment.²⁴ As a result, they must attempt either to anticipate future technological change—a formidable task—or to draft technology-neutral legislation (which could frustrate the purpose of the legislative response in the first place).

As legislative bodies struggle to identify their role in a society being radically reshaped by technology, they may delegate more and more of their rule-making authority to administrative agencies. Agencies typically have greater flexibility and expertise than legislatures,²⁵ their rule-making procedures are less cumbersome than

(codified at 18 U.S.C. § 1028(a) (Supp. IV 1998)).

23. Recent developments in Internet domain name registration prompted the U.S. Congress to enact the Anticybersquatting Consumer Protection Act, Pub. L. No. 106-113, 113 Stat. 1536 (1999) (codified at 15 U.S.C. § 1125(d) (2000)).

24. For example, in 1992, Congress enacted the Audio Home Recording Act of 1992, Pub. L. No. 102-563, 106 Stat. 4237 (1992) (codified at 17 U.S.C. 1001-1010 (2000)) which, inter alia, imposed a "royalty charge" on sales of digital audio tape recorders and digital audio recording media (e.g. blank digital tape). Shortly thereafter, digital recordable disc machines and discs were developed, undermining the effectiveness of the Act. See Robert Starrett, *CD-Recording: Yesterday, Tomorrow, and Today*, CD-ROM PROFESSIONAL, Nov. 1995, at 111 (describing the capabilities of CD recording technology).

25. See generally Harvey L. Pitt, *Securities Regulation by Enforcement: A Look Ahead at the Next Decade*, 7 YALE J. ON REG. 149, 164 (1990) ("Administrative agencies were established largely to develop and consolidate expertise in technical areas of societal interest. . . . [A]dministrative agencies fill

traditional legislative processes, making it easier—and quicker—for agencies to adopt temporary measures and change old rules that have proven ineffective, unwise, or obsolete.²⁶

In many cases, however, the best type of legislative response to technology may well be a very limited and circumscribed response. Reactionary or ill-considered laws may have the effect of frustrating technological advancement. In his keynote address that concludes this Symposium, Ira Magaziner, one of the chief architects of the Clinton administration's Internet policy, discusses this danger and advocates a wait-and-see approach to on-line regulation.²⁷ Where collective action is necessary, Mr. Magaziner contends, the legislature may look to industry and other private sector stakeholder groups for self-regulatory initiatives.²⁸ Such was the case recently where the U.S. government facilitated the private sector's regulation of the Internet's domain name system.²⁹ Similarly, in the area of privacy protection, the federal government's main role has been to promote

the interstices of Congressional pronouncements, at a level far beyond that which Congress is willing or able to provide.") (footnotes omitted).

26. See Cass Sunstein, *Justice Scalia's Democratic Formalism*, 107 *YALE L.J.* 529, 551 (1997) ("For the most part, appropriate solutions to the problem of statutory obsolescence should come from administrative agencies, immersed in the problems at hand and having both technocratic and democratic virtues . . .").

One example of this kind of legislative response can be seen in the Children's Online Privacy Protection Act (COPPA), one of the first pieces of federal legislation exclusively to regulate on-line activities. See *Children's Online Privacy Protection Act*, Pub. L. No. 105-277, 112 Stat. 2681-728 (1998) (codified at 15 U.S.C. §§ 6501-6504 (2000)). COPPA requires operators of on-line services to obtain verifiable parental consent prior to collecting personal information from children under the age of 13. See *id.* Congress charged the FTC with approving specific mechanisms of obtaining verifiable parental consent under the Act, "taking into consideration available technology." 15 U.S.C. § 6501(9). The Commission has adopted a temporary "sliding scale" approach to parental consent, approving the use of unsecure e-mail consent in some circumstances. See *FTC Children's Online Privacy Protection Rule*, 64 Fed. Reg. 59,901-902 (1999) (to be codified at 16 C.F.R. § 312). This sliding scale approach expires in April 2002, when the Commission anticipates secure e-mail services will be widely available. See *id.* at 59,888 to 59,901-902.

27. See Ira Magaziner, *Keynote Address: At the Crossroads of Law and Technology*, 33 *LOY. L.A. L. REV.* 1165 (2000).

28. See *id.* at 1170-72.

29. See *id.*

industry self-regulation.³⁰ It remains to be seen, however, whether industry self-regulation will adequately address the significant privacy concerns raised by certain on-line practices and technologies.³¹

Unlike legislatures, courts generally do not have the same opportunity to take a laissez-faire approach to emergent technologies and the social and legal dilemmas they may create. Courts must decide the cases that are presented to them. And yet they must decide these cases on the basis of legal doctrines created many years ago that may no longer adequately address current realities and challenges.

From an institutional perspective, the present judicial decision-making process may no longer adequately meet the demands of the times. The laborious, sometimes glacial, pace of litigation would seem to be ill suited to a society marked by rapid technological change. For example, one commentator has observed that the slowness of the appellate process is particularly unsuited to cases involving rapidly changing technology, especially where some form of prospective relief is sought.³² Increasingly, the appellate courts may be faced with the prospect of reviewing factual findings that were sound when first made by the trial court but no longer valid at the time of appellate review.³³ One solution to this challenge would be for the appellate court to make its own factual finding.³⁴ This solution would have profound effects on the traditional "division of labor" within the judicial system.

30. *See id.*

31. According to a recent FTC report to Congress, industry self-regulation in this area is exhibiting some encouraging progress, but is nevertheless proceeding very slowly. *See Self-Regulation and Privacy Online: A Federal Trade Commission Report to Congress* (July 1999). Although the FTC stated that federal privacy legislation "is not appropriate at this time," *id.* at 12, some form of legislative action in the area of privacy protection is increasingly likely. In fact, a recent report states that over eighty different on-line privacy bills are pending at the federal or state level. *See Kelly Hearn, Wild Web Hears Hoofbeats of Lawmakers*, CHRISTIAN SCI. MONITOR, Feb. 14, 2000, at 20.

32. *See* Stuart Minor Benjamin, *Stepping into the Same River Twice: Rapidly Changing Facts and the Appellate Process*, 78 TEX. L. REV. 269 (1999).

33. *See id.*

34. *See id.*

Arguably, judicial decision-making may be challenged at a more radical level in coming years. Traditional rule-based, categorical reasoning, one of the hallmarks of the judicial decision-making process, is ill-suited to address areas of dynamic change. The Supreme Court itself has recognized this fact. In *Denver Area Educational Telecommunications Consortium, Inc. v. FCC*,³⁵ the Court considered a First Amendment challenge to three provisions of the Cable Television Consumer Protection and Competition Act of 1992. In light of the dynamic pace of change within the cable industry and the communications field generally, the Court eschewed its traditional First Amendment analysis.³⁶ In particular, the Court refused to assign cable television a particular "forum" category from its traditional First Amendment forum analysis and also declined to categorize the standard of review it would apply to the law.³⁷ Instead, the Court reached its result through an ad hoc, fact intensive analysis.³⁸ Jurisprudence in an era of dynamic change may well proceed on an increasingly case-by-case basis.

35. 518 U.S. 727 (1996).

36. *See id.* at 742 ("[A]ware as we are of the changes taking place in the law, the technology, and the industrial structure related to communications . . . we believe it unwise and unnecessary definitively to pick one analogy or one specific set of words now."); *cf. id.* at 776-77 (Souter, J., concurring). In his concurrence, Justice Souter stated:

As cable and telephone companies begin their competition for control over the single wire that will carry both their services, we can hardly settle rules for review of regulation on the assumption that cable will remain a separable and useful category of First Amendment scrutiny . . . [W]e have to accept the likelihood that the media of communications will become less categorical and more protean. Because we cannot be confident that for purposes of judging speech restrictions it will continue to make sense to distinguish cable from other technologies, and because we know that changes in these regulated technologies will enormously alter the structure of regulation itself, we should be shy about saying the final word today about what will be accepted as reasonable tomorrow.

Id. (Souter, J., concurring).

37. *See id.* at 742.

38. The Court adopted an ad hoc standard of review, scrutinizing the law to determine whether it "addresses an extremely important problem, without imposing, in light of the relevant interests, an unnecessarily great restriction on speech." *Id.* at 743.

At a practical level, courts are already confronting difficult questions regarding the reach of their authority. With the ever increasing globalization of communications and commerce, courts will be increasingly faced with cases of international dimensions—or cases without any clear geographical dimensions at all. The Symposium mock trial briefs that follow explore some of the difficult jurisdictional issues engendered by the Internet.

Of course, quite apart from the question of the *de jure* limits of a court's jurisdiction is the question of the *de facto* limits of a court's power. For example, in the DVD DeCSS case, the court issued a preliminary injunction prohibiting the posting of the DeCSS code anywhere on the Internet, even as it recognized the likelihood that its order would be disobeyed.³⁹ In fact, the DeCSS code has recently been embedded within a Domain Names System (DNS) record and continues to spread across the Internet, despite the court's injunction.⁴⁰

The transnational nature of the Internet, coupled with its attendant anonymity, poses serious challenges to law enforcement agencies, as well. A Clinton administration report has recently called for new and expanded law enforcement tools to address "the need for real-time tracing of Internet communications across traditional jurisdictional boundaries, both domestically and internationally, [and] the need to track down sophisticated users who commit unlawful acts on the Internet while hiding their identities."⁴¹ As law enforcement

39. "In granting this injunction this Court is mindful of the many enforcement problems. However, a possibility or even a likelihood that an order may be disobeyed or not enforced in other jurisdictions is not a reason to deny the relief sought." DVD Copy Control Ass'n, Inc. v. McLaughlin, No. CV 786804 (Cal. Super. Ct. Santa Clara County Jan. 20, 2000) (order granting preliminary injunction), available at <http://www.eff.org/ip/Video/DVDCCA_case/20000120-pi-order.html>.

40. At the time of this writing, the code was embedded in the DNS record goret.org, located at IP address 138.195.138.195. DNS records comprise part of the Internet's operational fabric and are most often used to convert a computer's Internet name (e.g., www.lls.edu) into its Internet address (e.g. 206.17.96.220). By using a DNS record as a transport, as opposed to merely posting the code on a Web site, the code can be widely distributed and is much harder for law enforcement to locate.

41. *The Electronic Frontier: The Challenge of Unlawful Conduct Involving the Use of the Internet, A Report of the President's Working Group on Un-*

agencies seek new powers to confront technological challenges, a new balance must be struck between the institutional needs of these agencies and the civil liberties of civilians.

These are, of course, just a few of the structural challenges facing our legal and political institutions as a result of rapidly changing technology. Whether these institutions can adequately respond to such challenges will have tremendous implications for the continuing democratic and economic vitality of our society.

III. CHALLENGES FACING LEGAL EDUCATION

If our political and legal institutions are to meet these challenges, our educational institutions must develop new ways to prepare individuals for leadership roles in a society marked by rapidly changing technology. At the same time, technological change presents significant challenges to our educational institutions themselves.

Law schools are purveyors of information to a profession that itself deals with information. How can advances in information management and distribution threaten this centuries-old institution? The answer is that lawyers and law professors are, to a large extent, information intermediaries. That is, they provide and process information. As data flows more readily from the information generator to the information consumer, professional intermediation serves different needs.

Law schools have begun to respond in three ways: (1) by developing new courses responsive to the peculiar legal issues of new technologies; (2) integrating technology into the pedagogy (teaching methods); and (3) offering distance education (virtual classrooms). Law schools that understand and implement these three areas of change will succeed in the information age. Those that do not will become obsolete.

Adding technology law to the curriculum is not as easy as it may look. Not only are the doctrinal rules in flux, but faculty and students must embrace the underlying technology addressed by the developing law. That means a course in cyberlaw should include instruction on network architecture, packet switching, and encryption.

lawful Conduct on the Internet, Section V: Conclusions and Recommendations (March 9, 2000), available at <<http://www.usdoj.gov/criminal/cybercrime/unlawful.htm>>.

A course in telecommunications law should include background on radio wave propagation and spectrum management. A course in biotech law should cover molecular structures. And so on.

In the old days (about ten years ago), technology courses were limited to those sub-disciplines such as patent law where science or engineering backgrounds were a prerequisite for entering the profession. Today, technology-based legal issues are not limited to the intellectual property firms. General practitioners are doing Internet law because their general business clients are. It should not be surprising, therefore, that the University of Chicago has added a new course to the first-year law curriculum, "Technology, Innovation and Society."

More than 150 cyberlaw and technology courses are now being taught at American law schools, ranging from survey courses to highly specialized "techlaw" courses.⁴² The course names—such as Harvard Law School's "Evidence, Truth, and the Internet"—bespeak the scope of change underway. Cyberlaw is emerging as a doctrinal area of its own, on par with contracts and torts.⁴³

Not only is the substance of law courses changing, but also the manner of instruction. Technology is making its way into the legal classroom in a big way. The laptop computer has replaced the pen and notebook. The chalkboard is giving way to the projected image. The linear outline is yielding to the multi-dimensional graphic and Power Point slide show. Lecterns and student desks are being connected to the Internet. Class and office hours are becoming "24/7" with chatrooms and messaging systems. With all these advances and entry points to knowledge, how can the Socratic method survive?

The third and most significant challenge to law schools is distance education. Distance learning over the Internet provides both opportunity and a threat to law schools. As on-line law schools proliferate,⁴⁴ physical location and "residency" lose significance. The

42. See *Cyberlaw and Technology Courses at U.S. Law Schools* (visited Mar. 15, 2000) <<http://faculty.lls.edu/manheim/cyberlawsurvey.htm>> (listing courses as diverse as "Mergers and Acquisitions in High Tech" and "Exclusive Rights in the Biotechnology and Pharmaceutical Industries," both of which are taught at the University of California at Berkeley).

43. See *Jurist – The Legal Education Network* (visited Mar. 15, 2000) <http://jurist.law.pitt.edu/cour_pgs.htm#Cyberspace>.

44. There are now two such schools in the United States, Concord Law

cost of education alone may lead some to prefer on-line instruction. Leading schools can extend their hegemony by offering courses to non-matriculating students.⁴⁵ Harvard,⁴⁶ as well as its professors,⁴⁷ already have.

Currently, the American Bar Association is taking a very cautious approach to distance learning in legal education. Ostensibly, this is because of perceived inadequacies in instruction.⁴⁸ But it may also be to protect an entrenched membership. Still, experimental programs are being encouraged, and the rules are bound to change.⁴⁹ This despite questioning from high places about the efficacy of on-line education.⁵⁰

School, see <<http://www.concordlawschool.com>>, and Regent University School of Law, see <<http://www.regent.edu/acad/schlaw>>. Two law schools in Great Britain are also on-line, University of Strathclyde (offering LL.M. in IT Law), see <<http://law-www-server.law.strath.ac.uk>>, and Semples Piggot Roches (the world's first Internet law program, offering the University of London External LL.B.), see <<http://www.spn-law.com>>.

45. See Donald J. Weidner, *The Crises of Legal Education: A Wake Up Call for Faculty*, 47 J. LEGAL EDUC. 92, 98, 100 (1997) (new technologies will soon allow teaching faculty from prestigious law schools to instruct students at a much lower cost than visiting or new faculty professors).

46. The Berkman Center's Online Education Program is offering several courses, including Intellectual Property in Cyberspace, Trust and Non-Trust in Law, and Violence Against Women. See The Berkman Center for Internet & Society at Harvard Law School (visited Apr. 18, 2000) <<http://cyber.law.harvard.edu/online>>.

47. Harvard Professor Arthur Miller is now offering classes on LawTV. See <<http://www.lawschool.com/lawtv>>.

48. See generally Andrea L. Johnson, *Distance Learning and Technology in Legal Education: A 21st Century Experiment*, 7 ALB. L.J. SCI. & TECH. 213 (1997); Helen Leskovic, *Distance Learning in Legal Education: Implications of Frame Relay Videoconferencing*, 8 ALB. L.J. SCI. & TECH. 305 (1998).

49. The ABA Legal Education Section published Temporary Distance Education Guidelines in 1997 to encourage experimentation with distance learning technologies. See James P. White, *Memorandum D9697-59* (visited Mar. 15, 2000) <<http://www.abanet.org/legaled/distance.html>>.

50. Supreme Court Justice Ruth Bader Ginsburg set off a firestorm recently when she questioned the efficacy of Internet-based law schools. See Katherine S. Mangan, *Justice Ginsburg Questions Internet-Only Law School*, CHRON. OF HIGHER EDUC., Sept. 24, 1999, at A36 ("I am uneasy about classes in which students learn entirely from home, in front of a computer screen, with no face-to-face interaction with other students and instructors."). For the text of Justice Ginsburg's remarks, see Ruth Bader Ginsburg, *Remarks for Dedication of Rutgers Center for Law and Justice* (Sept. 9, 1999) <<http://rutgers-newark.rutgers.edu/occ/speech.htm>>.

IV. BRIDGING THE GAP: THE LAW AND TECHNOLOGY PROGRAM

The Law and Technology Program was inspired and sponsored by Dr. Henry Yuen, President of Gemstar International Group, Ltd., as a model for a new type of instruction designed to better prepare both law and technology students to face the legal and social implications of technological change. The aim of the program was two-fold. First, the program sought to preview how a possible interdisciplinary course in law and technology might be structured. This potential course would bring together science-engineering students and law students to train them to resolve novel legal issues arising from advanced technology. Second, the program aimed to create a forum for dialogue between the legal and technical communities to heighten awareness about these novel legal issues.

The Law and Technology Program's first event was a mock trial designed to promote dialogue between the technologists and lawyers—and to explore where the dialogue breaks down. The key for both the technical and legal participants was to better understand where, and to what extent, the “translation” between them no longer worked. It was obvious that the esoteric issues would not be understood by those unskilled in the discipline. However, the “translation” goes beyond the mere technical understanding of law or science—it addresses how the two disciplines communicate and how they will work together to resolve a common problem.

Beyond the language barrier, each discipline also has its own unique culture, and even more important, its own methodology for solving problems. Understanding these cultural and methodological issues is a fundamental part of building productive interdisciplinary relationships.

At the mock trial the parties argued three narrow issues. First, could a federal court in California exercise personal jurisdiction over defendants whose only “presence” in California was “virtual”? Second, was venue proper considering the defendant's organizational structure and purpose? And third, was service of process adequately made by posting notice of the lawsuit to an Internet user's group and Internet newsletter? Limiting the mock trial to these issues allowed a more complete analysis and presentation of the novel legal issues

presented.⁵¹ Additionally, by limiting the legal issues, and stipulating all the pertinent facts, audience members were able to grasp the nature of the problem from the outset.

The novel legal issues, however, did require the participants to fully research traditional rules and case law in order to develop a suitable rationale for the rule of law they proposed the court adopt. The issue of whether or not personal jurisdiction was proper was aided somewhat by controlling case law addressing jurisdiction in cyberspace.⁵² However, the issue of whether or not service of process was proper was an issue of first impression for the court. Of course, these legal questions are factually dependent issues requiring a thorough understanding of the underlying technology. It became critical for each party to work together as a team, helping each other understand the significance of facts and how they supported their position.

Each party's lead attorney performed the opening and closing arguments. However, the Caltech students, making what was most likely their legal debut, performed the direct examination of their party's expert witness. The Loyola Law School students performed the cross-examination of the opposing party's expert witness. Both the Caltech students and the Loyola Law School students prepared extensive briefing materials on the various issues raised by the parties in their briefs, and briefing materials to aid the judge with his opinion.

The program was a unique experience for the participants and, by all accounts, an overwhelming success. Hopefully, further collaborative projects between law and technology students will follow.

The works that follow have been compiled and edited from the mock trial. These materials include: the facts of the case, the Brief in Support of the Motion to Dismiss, the Brief in Opposition to the Motion to Dismiss, the Summary of Expert Testimony in Support of

51. Although novel, the issues raised in the mock trial are still real. For instance, because of the anonymity of the Internet, cases are being filed against unknown defendants. *See, e.g.,* FTC v. One or More Unknown Parties (W.D.N.C. 1999), available at <<http://www.ftc.gov/os/1999/9905/7674451775.htm>>.

52. The Closed team successfully analogized the mock trial facts to *Panavi- sion International, L.P. v. Toepfen*, 141 F.3d 1316, 1320 (9th Cir. 1998).

the Motion, the Summary of Expert Testimony in Opposition to the Motion, the Judge's Opinion, and the Keynote Address.

In closing, we wish to thank the project's participants for their exceptionally hard work and dedication. The success of this event is in no small part owed to them. We also wish to thank the following individuals for their efforts: from Caltech, Professor K. Mani Chandy, Lawrence Gilbert, Nick Nichols, and Professor Tom Tombrello. From Loyola Law School, Dean Gerald McLaughlin, Kenneth Ott, and Elizabeth Fry. Additionally, we would like to thank Wes Monroe and Christie, Parker & Hale, LLP, for their support. Lastly, we would like to thank Dr. Henry Yuen, President of Gemstar International Group, Ltd. Dr. Yuen provided both the spark and the catalyst-ensuring the event's success.

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