DISSOLVING INTELLECTUAL PROPERTY *

Keynote Speech / Discours liminaire

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Our theme at this ATRIP meeting is: intellectual property bridging aesthetics and economics. Copyright law evokes aesthetics; patent law, technologies. These laws are supposed to enhance our aesthetic and technological wealth.[1] They aim at this goal by attempting to influence the economics of cultural goods. I shall try to take a long view of this attempt. First, I shall ask: How did the classic laws of copyright and patents crystallize? Second, I shall argue that the structures of these laws have been dissolving over time. Third, I shall indicate a few of the many lines of inquiry that are opening up.

I. Crystallization

As we all know, property calls for boundaries. These indicate who owns what and where their rights begin and end. A property law may be said to crystallize as it helps us to draw these boundaries clearly and coherently. How have the classic laws of copyright and patents come to do this job?

Think back in history. After the fall of the Roman Empire, culture, especially technology, flowed from Asia into Europe.[2] A critical mass was reached in the Renaissance, and printing acted as a catalyst. In early modern Europe, publishers and pirates became hubs for spreading culture, as did scholarly associations and mobile artisans.[3] At the same time, the Church, the guilds, the State, new enterprises, and individual creators squabbled over new cultural goods.[4]

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1 See, *e.g.*, U.S. Constitution, art. I, § 8, cl. 8 ("Progress of Science and useful Arts").

2 See J. NEEDHAM, *Science and Civilization in China*, Cambridge, Cambridge University Press, 1954, esp. vol. 1, ch. 7; A. PACEY, *Technology in World Civilization: A Thousand-Year History*, Cambridge, MIT Press, 1990, esp. chs. 1-3.

3 See, *e.g.*, R. DARNTON, *The Business of Enlightenment: A Publishing History of the Encyclopedia, 1775-1800*, Cambridge, Harvard University Press, 1979 (recounting how the *Encyclopédie* was published and pirated); D. S. BEN-ATAR, *Trade secrets: Intellectual Piracy and the Origins of American Industrial Power*, New Haven, Yale University Press, 2004 (explaining how migrating workers acted as industrial spies).

4 See, *e.g.*, P. E. GELLER, "Copyright History and the Future: What's Culture Got to Do With It?", (2000) 47 *Journal of the Copyright Society USA* 209 at 215-28; C. A. NARD and A. P. MORRISS, "Constitutionalizing Patents: From Venice to Philadelphia", (2006) 2 Review of Law & Economics 223 (analyzing the struggles leading, respectively, to classic copyright and patent laws).

Here we face the problem of public goods. It is difficult to exclude others from enjoying such goods. And, though used by one person, they tend to remain available to others.[5] For example, once I publish a poem, others can enjoy the poem again and again. Progress in the media, notably in information-processing, can facilitate sharing cultural goods.[6] These then approach ideal public goods more closely. We just saw print make texts more accessible. Open science makes technologies more available.[7]

Professor Mackaay explains one rationale for property rights: they assure markets in public goods. They are to provide incentives for creation and dissemination, but without restricting competition.[8] In the eighteenth century, the overall structure of the classic civil law started to crystallize. That law vested private individuals with property rights that could be freely alienated in the public marketplace.[9] Any property law has to draw boundaries determining who holds rights and the matters subject to these rights. It also has to structure boundaries relating right-holders and subject-matters to the rest of the world.[10]

The classic laws of copyright and patents also crystallized in the eighteenth century. How did they draw boundaries determining the holders and

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5 See generally H. DEMSETZ, "Information and Efficiency: Another Viewpoint", (1969) 12 *Journal of Law & Economics* 1 at 10-13 (indicating that assets fall on a spectrum between private and public goods, but none are perfect public goods).

6 See generally H. A. INNIS, *Empire and Communications* (D. GODFRY, ed.), Victoria, Press Porcépic, 1986 (1950), esp. ch. 6 (illustrating how media become information-processing tools and open up access, for example, as print did).

7 See generally J. MOKYR, *The Gifts of Athena: Historical Origins of the Knowledge Economy,* Princeton, Princeton University Press, 2002, esp. ch. 2 (explaining how increasingly open scientific and technical knowledge fed industrial technologies).

8 See E. MACKAAY, "Economic Incentives in Markets for Information and Innovation", (1990) 13 *Harvard Journal of Law & Public Policy* 867. See also M. LEHMANN, "The Theory of Property Rights and the Protection of Intellectual and Industrial Property", (1985) 16 *International Review of Industrial Property and Copyright Law* 525 at 537 (characterizing rights of intellectual property as "restrictions in competition in order to promote competition").

9 See D. J. BOORSTIN, *The Mysterious Science of the Law: An Essay on Blackstone's Commentaries*, Chicago, University of Chicago Press, 1941, ch. 9; A.-J. ARNAUD, *Les origines doctrinales du Code civil français,* Paris, L.G.D.J., 1969, bk. 3.

10 See W. N. HOHFELD, "Some Fundamental Legal Conceptions as Applied in Judicial Reasoning (Part 2)", (1917) 26 *Yale Law Journal* 710, esp. at 733-34.

subject-matters of rights? Individual authors originating texts and images were vested with copyrights; inventors, with patents upon issuance.[11] Classically, copyright protected texts that could be printed or performed and images that could be engraved. A patent protected only a new technology that a patent applicant disclosed, ultimately on the public record.[12]

Turn to boundaries relative to the rest of the world. Of course, rightholders could control embodiments, like writings or machines, through first sale. Further, the holder of copyright in a text or image could stop others from copying and communicating the text or image to the public, but not from translating or transforming it.[13] The holder of a patent could stop any subsequent inventor of the same technology from making and marketing that technology.

II. DISSOLUTION

Advance to the nineteenth and twentieth centuries. Steam started to move manufacturing and transport more quickly; applied science, to drive research laboratories; the media, to reach the masses. Increasingly, industrialization called for progress in information-processing.[14]

At the same time, the overall structure of the civil law lost its classic clarity and coherence. It adapted to pressures brought by industry, labour, consumers, and other interest groups.[15] As part of the civil law, copyright

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11 Not without ideological struggles! See M. ROSE, *Authors and Owners: the Invention of Copyright*, Cambridge, Harvard University Press, 1993; B. EDELMAN, *Le sacre de l'auteur*, Paris, Éditions du Seuil, 2004; A. MOSSOFF, "Rethinking the Development of Patents: An Intellectual History, 1550-1800", (2001) 52 *Hastings Law Journal* 1255.

12 See, *e.g.*, C. MACLEOD, *Inventing the Industrial Revolution: The English patent system, 1660-1800*, New York, Cambridge University Press, 1988, esp. chs. 3-4 (recounting how disclosure went from the exception to the rule of British patent law).

13 See A.-C. RENOUARD, *Traité des droits d'auteurs*, Paris, Jules Renouard, 1838, vol. 2, p. 37; A. BIRRELL, *Seven Lectures on the Law and History of Copyright in Books*, New York, Rothman Reprints, 1971 (1899), ch. 6.

14 See J. R. BENIGER, *The Control Revolution: Technological and Economic Origins of the Information Society*, Cambridge, Harvard University Press, 1986, esp. ch. 10.

15 See generally J. HABERMAS, *Between Facts and Norms: Contributions to a Discourse Theory of Law and Democracy*, Cambridge, MIT Press, 1996, ch. 9 (tracing changes in the classic structure of the civil law).

and patent laws have undergone such pressures as well. In addition, these laws have faced special stresses arising out of progress in information-processing.[16] Are the laws of copyright and patents still doing their job of drawing boundaries? Let's ask this question at three levels: right-holders, subject-matters, and the rest of the world.

A. Holders

First, who has come to hold rights? Classically, authors and inventors worked alone or in small groups. Since the nineteenth century, creators and innovators have collaborated in ever-larger teams. Of course, individuals can communicate with each other through open markets. But, as Ronald Coase suggests, where markets fail to organize labour efficiently, firms take over.[17]

With the industrial revolution, firms had to invest more intensively. They needed property in assets such as copyrights and patents that could serve as capital. And they coordinated teams, for example, to make film epics and to manage large-scale research. The courts had begun to hedge on the classic principle of vesting rights in individual authors and inventors.[18] The firms easily had rights allocated to themselves, either as corporate creators or by contract.

This shift in right-holders has recently taken a new twist. The Internet allows individuals to collaborate worldwide. Without firms as principals, individuals create music, videogames, and software online. We have yet to draw precise boundaries among networked claimants.[19]

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16 Compare F. GURRY, "The Growing Complexity of International Policy in Intellectual Property", (2005) 11 *Science and Engineering Ethics* 13 (indicating new policy pressures), with J. BOYLE, "A Politics of Intellectual Property: Environmentalism for the Net", (1997) 47 *Duke Law Journal* 87 (explaining pressures to keep intellectual property from encroaching on the public domain).

17 See R.H. COASE, "The Nature of the Firm", in *The Firm, the Market and the Law,* Chicago, University of Chicago Press, 1988, p. 33.

18 See, *e.g.*, Cass. (France), Aug. 8, 1793, *Bossange* c. *Monardier*, noted by B. EDELMAN, *op. cit.*, note 11, p. 374 (vesting copyright in the principal who ordered a collective work, in this case the State taking rights in the *Dictionnaire* of the Académie française).

19 See generally Y. BENKLER, "Coase's Penguin, or Linux and the Nature of the Firm", (2002) 112 *Yale Law Journal* 369 (analyzing networked collaboration and asking what allocations of interests would optimize contributions).

B. Subject-Matters

Move on to the second level: What is to be protected? Classically, writings and machines provided examples for our notions of works and inventions. In the nineteenth century, industrial-property offices increasingly purported to sort out diverse products of mind.[20] But neither our familiar examples nor our bureaucrats have helped to take account of increasingly larger and varied information flows.

In theory, we distinguish subject-matters from rights. In practice, the notions of works and inventions have become open-ended as rights have expanded. For example, classically, copyright protected a French novel only in its French text. From the nineteenth to the twentieth century, the translation right was recognized. Copyright in our novel then applied to all the texts translating the novel into languages worldwide.[21] By analogy, rights were elaborated in derivative works: for example, copyright in our novel extended to a work of the cinema adapted from the novel. At much the same time, courts started to find infringement in the making and marketing of inventions functionally equivalent to those patented. They stretched patent rights over ever-larger sets of technologies.[22]

Boundaries between types of subject-matters have been blurred. In the nineteenth century, industry discovered design. Professor Reichman has shown how new rights of intellectual property started to emerge.[23] From the nineteenth through the twentieth century, legislators fashioned rights in designs, utility models, semiconductor topographies, plant varieties:

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20 See, *e.g.*, B. SHERMAN and L. BENTLY, *The Making of Modern Intellectual Property Law: The British Experience, 1760-1911*, Cambridge, Cambridge University Press, 1999, esp. ch. 4 and p. 180-93 (showing how, in British law, registration managed the boundaries between designs, technologies, etc.).

21 See, *e.g.*, L. BENTLY, "Copyright and Translations in the English Speaking World", (1993) 12 *Translatio: FIT Newsletter* 491; M. VOGEL, "Die Entfaltung des Übersetzungsrecht im deutschen Urheberrecht des 19. Jahrhunderts", [1991] *GRUR* 16 (tracing how translation rights arose, respectively, in British and German laws).

22 See, *e.g.*, J. D. SARNOFF, "The Historic and Modern Doctrine of Equivalents and Claiming the Future, Part I (1790-1870) [and] Part II (1870-1952)", (2005) 87 *Journal of the Patent & Trademark Office Society* 371 and 441 (detailing the development of the doctrine of equivalents in U.S. law).

23 See J. H. REICHMAN, "Legal Hybrids Between the Patent and Copyright Paradigms", (1994) 94 *Columbia Law Review* 2432 at 2448-2504.

the list goes on and on. Let us adapt an insight from critical philosophy: Ideas without facts are empty, and data without algorithms are blind.[24] Copyright and patent laws no longer suffice to draw boundaries among mixes along the spectrum from ideas to facts, much less at the margins. For example, we vacillate about what rights to assure, and what to protect, in databases and computer programs.[25]

C. Structuring Boundaries

We touched first on right-holders; second, on subject-matters. This brings us to the third level: How to draw boundaries relating holders and subject-matters of rights to the rest of the world? We spoke of crystallization to evoke overall structures in the classic laws of copyright and patents. Now we resort to earthy metaphors: rights form thickets, and rules become muddy.

What is a rights thicket? A rights thicket forms as property claims overlap. Creative endeavours can then go forward only with an increasing number of licenses.[26] We just indicated how right-holders are regrouping, subject-matters inflating, and rights proliferating. Consider software elaborated by networked creators and innovators. Each of these claimants could sue to enjoin derivative works or equivalent inventions and hold up new software.[27] Rights thus no longer facilitate marketing, but rather block competition.

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24 See generally I. KANT, *Critique of Pure Reason*, Indianapolis, Hackett Publishing Co., 1996, p. 107 (A 51 = B 75) ("Thoughts without content are empty; intuitions without concepts are blind.").

25 See, *e.g., British Horseracing Board v. William Hill,* E.C.J. Case C-203/02, [2005] *European Copyright and Design Reports* 1 (retrenching on new rights in data).

26 See M. A. HELLER and R. EISENBERG, "Can Patents Deter Innovation? The Anticommons in Biomedical Research", (1998) 280 *Science* 698; C. SHAPIRO, "Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard-Setting" in A. B. JAFFE, J. LERNER, and S. SCOTT, (eds.), *Innovation Policy and the Economy,* Cambridge, MIT Press, N.B.E.R., 2001, vol. 1, p. 119.

27 See, *e.g., SCO Group, Inc. v. Novell, Inc.*, 2004 U.S. Dist. LEXIS 12267 (D. Utah, 9 June 2004); *Red Hat, Inc. v. SCO Group*, 2004 U.S. Dist. LEXIS 7077 (D. Del., 6 April 2004) (U.S.) (facing challenges to uses of network-created software).

What are muddy rules? Muddy rules are articulated in vague notions or in uncertain conditions.[28] Of course, all law contains indeterminate rules: that is why we need courts. But as rules become unworkable, the jurisprudence of a field spirals out of control. Since the nineteenth century, courts have been trying to delimit subject-matters and rights of intellectual property. They distinguished between ideas and copyright expressions and required non-obvious steps in patentable inventions.[29] At the same time, they generated the most esoteric doctrines in our field.

Globalization compounds all these trends. We are caught in rights thickets, and slip on muddy rules, in hundreds of jurisdictions at a time. I have argued elsewhere that choosing one or a few among hundreds of applicable laws risks arbitrary results in cyberspace.[30] There are also industrial-property offices scattered across the world, only complicating the difficulties of securing rights across borders. Centuries ago, technological development was slow and local enough that delay in patenting abroad was tolerable. Now, industry is faced with the choice: Either pay the costs and endure the delays of applying to offices worldwide. Or, with defensive publication, waive patents and block competitors from patenting.[31]

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28 See generally C. M. ROSE, "Crystals and Mud in Property Law", (1988) 40 *Stanford Law Review* 577 (distinguishing crystalline from muddy rules). See, *e.g.*, D. L. BURK, "Muddy Rules for Cyberspace", (1999) 21 *Cardozo Law Review* 121 (illustrating how to deal with muddy rules, while admitting transactions costs).

29 Compare I. CHERPILLOD, *L'objet du droit d'auteur*, Lausanne, CEDIDAC, 1985, and H. ULLRICH, *Standards of Patentability for European Inventions: Should an Inventive Step Advance the Art?*, I.I.C. Studies, Weinheim, VCH Verlag, 1980 (analyzing the emergence of limiting doctrines, respectively, in copyright and patent laws). See also S. STRÖMHOLM, *Le droit moral de l'auteur*, Stockholm, P.A. Norstedt & Sönners Förlag, 1966 [vol. 1], 1973 [vol. 2] (tracing the rise of moral rights in copyright, which further complicated matters).

30 See P. E. GELLER, "International Intellectual Property, Conflicts of Laws, and Internet Remedies", [2000] *European Intellectual Property Review* 125, updated mid-2004 in (2005) 10 *Journal of Intellectual Property Rights* (NISCAIR) 133, and translated in (1999) *Cahiers de Propriété Intellectuelle* 227 (French), 2000 *GRUR Int.* 659 (German), and updated mid-2004 as well in (2005) 17 *Intellectual Property Studies* (CASS IP Center) 1 (Chinese).

31 See generally O. BAR-GILL and G. PARCHOMOVSKY, "The Value of Giving Away Secrets", (2003) 89 *Virginia Law Review* 1857 (also pointing out that defensive publication fosters cumulative innovation as well as the chances of licensing).

III. Lines of Inquiry

When I started thinking about this talk, I tried its title out on a colleague, and he responded: "Well, Paul, dissolution rhymes with evolution."[32]

A. From Property to Liability

How, as researchers, shall we move forward from this critical juncture? How to move from the dissolution to the evolution, or metamorphosis, of intellectual property? To begin, distinguish between easy and hard cases.

Suppose that you create a comic strip. Illicitly, I republish your comic strip, without creatively transforming or adding to it. Before stopping me, a court need not disentangle your contributions from mine: I have contributed nothing. Damages are obvious: your market has been usurped by my use.

Now turn to a hard case. Suppose that I develop software for a web-based videogame. Suppose, too, that end-users introduce, into my game, characters improvised from your comic strip. And some players improve on my software to make it faster and more complex. What relief may we expect from the courts?[33]

Courts may grant property or liability remedies.[34] A court easily orders trespassers off land, that is, off real property. But to tailor this injunction, the court needs to know the boundaries of the property at issue. In our case, the court may ask: How to disentangle the players' contributions to aesthetic and technological wealth from ours? Have they improvised on more than age-old mythic heroes or routine software modules that we had merely adapted? Should their contributions be enjoined? Should they merely pay us money?[35]

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32 J. R. Margolis, Solicitor Hong Kong, over dinner, 13 Feb. 2005.

33 See, *e.g.*, *Marvel Enters. Inc. v. NCSoft Corp.*, 74 U.S.P.Q.2d 1303 (C.D. Cal. 2005), also at http://www.eff.org/IP/Marvel_v_NCSoft/ (presenting such claims).

34 See G. CALEBRESI and A. D. MELAMED, "Property Rules, Liability Rules, and Inalienability: One View of the Cathedral", (1972) 85 *Harvard Law Review* 1089.

35 See, *e.g.*, P. SAMUELSON, R. DAVIS, M. D. KAPOR, and J. H. REICHMAN, "A Manifesto Concerning the Legal Protection of Computer Programs", (1994) 94 *Columbia Law Review* 2308 (proposing a liability regime for software).

This approach changes our perspective on subject-matters. It seems too late to string bridging categories between works and inventions. Classically, property did not arise in abstract ideas or raw facts. Nor is it self-evident that we should protect every mix in the spectrum of subject-matters.[36] We may ask: What remedies are appropriate against creative takings of specific mixes? Start with texts: If you may not stop me from critically quoting one of your articles, why should you be able to stop me from creatively transforming the article?[37] May you have me enjoined from using footnote references taken from all your articles posted on a website, effectively a database? Go on to technologies: such inquires may be pursued for designs, computer programs, genetic sequences, and so forth. When should courts stop innovators from exploiting advances in these fields?[38]

In such cases, courts may refrain from enforcing property with injunctions, but they still have the task of assessing monetary liability. A case becomes especially hard if, creatively or innovatively recasting a claimant's product of mind, a user addresses wholly new markets. The claimant, not having incurred any damages on its established market, may seek to share in the user's profits on new markets. In doing so, the claimant might well overreach to recoup benefits that it did not itself generate.[39] It begs the question to look to the civil law or equity for measures of the price to pay. The question puts boundary issues at the heart of our field to the test of economics. Monetary awards inevitably transfer wealth and power among market players. Courts, in assessing awards, influence investments in creation

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36 See generally J. H. REICHMAN, "Charting the Collapse of the Patent-Copyright Dichotomy: Premises for a Restructured International Intellectual Property System", (1995) 13 *Cardozo Arts & Entertainment Law Journal* 475 at 508-17 (questioning whether new rights in the middle of the spectrum obstruct competition).

37 See, *e.g.*, P. E. GELLER, "*Hiroshige vs. Van Gogh:* Resolving the Dilemma of Copyright Scope in Remedying Infringement", (1998) 46 *Journal of the Copyright Society USA* 39 at 46-70, reprinted in D. MCCLEAN and K. SCHUBERT (eds.), *Dear Images: Art, Copyright and Culture*,London, Ridinghouse ICA, 2002, p. 421 (analyzing criteria for remedies for aesthetic takings).

38 See, *e.g.*, J. H. REICHMAN, "Of Green Tulips and Legal Kudzu: Repackaging Rights in Subpatentable Innovation", (2000) 53 *Vanderbilt Law Review* 1743 at 1777-97 (exploring remedies for incrementally innovative takings of technologies).

39 See generally, M. A. LEMLEY, "Property, Intellectual Property, and Free Riding", (2005) 83 *Texas Law Review* 1031 (questioning whether benefits received as positive externalities should be compensated under the law of intellectual property).

and innovation. Should they make the claimant whole or simulate the marketplace?[40]

B. Institutional Contexts

Legal changes take place in institutional contexts. Of course, we researchers in intellectual property share a professional bias in favour of solving all problems with the law. However, subjectively, creative communities can only tolerate so much of our lawyering without feeling threats to their spontaneity. Objectively, the world has only limited resources for giving an ever-larger humanity, with ever-more complex concerns, its day in court.[41]

Intellectual property illustrates these subjective limits. We speak of the "private" recasting of "public-domain" materials, but boundaries here are in flux.[42] The poet's garret, the inventor's workshop, even the corporate studio or laboratory, were largely private spaces. To shelter such spaces for creative endeavours, fair and research uses have been exempted from liability.[43] But these limitations tend to be so subtle or complicated that creators often do not pay much attention to them. Further, creative endeavours are increasingly moving into quasi-public networks in cyberspace.[44]

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40 Compare J.H. REICHMAN, "Of Green Tulips and Legal Kudzu", *loc. cit.*, note 38 (contemplating awards to defray investment costs), with R. J. EPSTEIN and A. J. MARCUS, "Economic Analysis of the Reasonable Royalty: Simplification and Extension of the Georgia-Pacific Factors", (2003) 85 *Journal of the Patent & Trademark Office Society* 555 (contemplating awards of what users would pay for infringing uses to increase profits over those attainable without the uses).

41 See N. K. KOMESAR, *Law's Limits: The Rule of Law and the Supply and Demand of Rights*, Cambridge, Cambridge University Press, 2001), ch. 8.

42 See generally P. SAMUELSON, "Mapping the Digital Public Domain: Threats and Opportunities", (2003) 66 *Law & Contemporary Problems* 147 (exploring such boundaries as they are now changing, both *de facto* and *de jure*).

43 See, *e.g.*, E. POUILLET, *Traité théorique et pratique de la propriété littéraire et artistique et du droit de représentation*, Paris, Marchal et Billard, 3d ed., 1908, p. 601 ("A copy made as a [private] study is exempt from remedies for infringement.").

44 See, *e.g.*, Trib. Gr. Inst. Paris réf. (France), 10 June 1997, *Queneau* c. *Boue*, (1997) *J.C.P.*, II, 22974, note OLIVIER, translated in [2000] *European Copyright and Design Reports* 343 (holding that the communication of variations on poetry within a research intranet would not infringe the right of public communication).

Creators are resorting to sharing and other self-help arrangements.[45] For example, open-source licensors waive claims in resulting software.[46] This model has been adapted to other fields, such as biotechnology.[47]

We touch here on the objective limits of institutions. Consider a pair of examples, one concerning copyright and the other, patents. With regard to copyright, the marketplace is increasingly outflanked by new networks.[48] On the Internet, claims are asserted at levels ranging from service providers down to end-users.[49] At some levels, for example, in encryption efforts, there are risks of constricting feedback, on which creation thrives. At other levels, for example, in cases of file-sharing, there are risks of endangering privacy interests.[50] With regard to patents, industrial-property offices are failing to process filings. The Internet can serve the notice functions of such filings, and it can network legal procedures worldwide.[51] If the courts grant fewer injunctions, parties may prefer dispute-settlement across bor-

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45 See, *e.g.*, J. H. REICHMAN and P. F. UHLIR, "A Contractually Reconstructed Research Commons for Scientific Data in a Highly Protectionist Intellectual Property Environment", (2003) 66 *Law & Contemporary Problems* 315 (analyzing the interplay of consensual approaches and property claims in research).

46 See, *e.g.*, the GNU GPL decision, Landesgericht Munich I (Germany), 19 May 2004, [2004] *MultiMedia und Recht* 693 (enjoining use of software under an open-source license for failure to comply with license conditions).

47 See, *e.g.*, A. K. RAI, "Open and Collaborative Research: A New Model for Biomedicine", in R. HAHN (ed.), *Intellectual Property Rights in Frontier Industries: Software and Biotech*, Washington D.C., AEI-Brookings Press, 2005, p. 131.

48 See, *e.g.*, D. HUNTER and F. G. LASTOWKA, "Amateur-to-Amateur", (2004) 46 *William & Mary Law Review* 951 (analyzing how networked sharing and creative collaboration among end-users call for rethinking copyright premises).

49 See generally L. SOLUM and M. CHUNG, "The Layers Principle: Internet Architecture and the Law", (2004) 79 *Notre Dame Law Review* 815 (arguing against Internet regulation that, from one level, interferes with one or many other levels).

50 See, *e.g.*, *BMG Canada Inc. v. John Doe* (2004) 32 C.P.R. (4th) 64 (Fed. Ct.) (Canada) (finding infringement showings insufficient to identify private end-users).

51 See, *e.g.*, P. E. GELLER, "An International Patent Utopia", [2003] *European Intellectual Property Review* 515, translated in (2004) *Propriétés intellectuelles* 503 (French), (2004) *GRUR Int.* 271 (German, and (2004) 15 *Intellectual Property Studies* (CASS IP Center) 78 (Chinese) (outlining networked notice and dispute-settlement procedures to supplant the patent bureaucracy and much patent litigation).

ders. Such procedures are being tried in the field of trademarks and domain names.[52] We may well ask how to institute others.[53]

CONCLUSION

It is time to conclude. Some of you may be asking yourselves: Why no mention of legislation? In our field, legislation keeps increasing in complexity and scope, often to no purpose. At the centre of this over-regulation, I submit, lie old habits of thought.

The eighteenth century applied the notion of property to writings and machines. The nineteenth and twentieth centuries have elaborated this notion, albeit with increasing disarray before our increasing wealth of information. Only in the easy cases of literal or close copying do laws of intellectual property still seem to help us draw clear and coherent boundaries.

Is our notion of intellectual property obsolete? I have touched on lines of research that move from this theoretical question to more practical inquiries. For example, when to enjoin? How to assess monetary awards? When not to protect? How to globalize settling disputes? You have, I'm sure, other questions, perhaps along these lines.

I thank you for your patience and, in advance, for your comments.

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52 See L. R. HELFER and G. B. DINWOODIE, "Designing Non-National Systems: The Case of the Uniform Domain Name Dispute Resolution Policy", (2001) 43 *William and Mary Law Review* 141.

53 See generally P. E. GELLER, "From Patchwork to Network", (1998) 9 *Duke Journal of International & Comparative Law* 69, (1998) 31 *Vanderbilt Journal of Transnational Law* 553 (outlining how law-making may be globally networked).