Notes

CHAPTER 1. Introduction: A Moment of Opportunity and Challenge

1. Barry Wellman et al., "The Social Affordances of the Internet for Networked Individualism," *JCMC* 8, no. 3 (April 2003).
2. Langdon Winner, ed., "Do Artifacts Have Politics?" in *The Whale and The Reactor: A Search for Limits in an Age of High Technology* (Chicago: University of Chicago Press, 1986), 19–39.
3. Harold Innis, *The Bias of Communication* (Toronto: University of Toronto Press, 1951). Innis too is often lumped with McLuhan and Walter Ong as a technological determinist. His work was, however, one of a political economist, and he emphasized the relationship between technology and economic and social organization, much more than the deterministic operation of technology on human cognition and capability.
4. Lawrence Lessig, *Code and Other Laws of Cyberspace* (New York: Basic Books, 1999).
5. Manuel Castells, *The Rise of Networked Society* (Cambridge, MA, and Oxford: Blackwell Publishers, 1996).

PART I. The Networked Information Economy

1. Elizabeth Eisenstein, *Printing Press as an Agent of Change* (Cambridge: Cambridge University Press, 1979).

CHAPTER 2. Some Basic Economics of Information Production and Innovation

1. The full statement was: "[A]ny information obtained, say a new method of production, should, from the welfare point of view, be available free of charge (apart from the costs of transmitting information). This insures optimal utilization of the information but of course provides no incentive for investment in research. In a free enterprise economy, inventive activity is supported by using the invention to create property rights; precisely to the extent that it is successful, there is an underutilization of information." Kenneth Arrow, "Economic Welfare and the Allocation of Resources for Invention," in *Rate and Direction of Inventive Activity: Economic and Social Factors*, ed. Richard R. Nelson (Princeton, NJ: Princeton University Press, 1962), 616–617.
2. Suzanne Scotchmer, "Standing on the Shoulders of Giants: Cumulative Research and the Patent Law," *Journal of Economic Perspectives* 5 (1991): 29–41.
3. *Eldred v. Ashcroft*, 537 U.S. 186 (2003).
4. Adam Jaffe, "The U.S. Patent System in Transition: Policy Innovation and the Innovation Process," *Research Policy* 29 (2000): 531.
5. Josh Lerner, "Patent Protection and Innovation Over 150 Years" (working paper no. 8977, National Bureau of Economic Research, Cambridge, MA, 2002).
6. At most, a "hot news" exception on the model of *International News Service v. Associated Press*, 248 U.S. 215 (1918), might be required. Even that, however, would only be applicable to online editions that are for pay. In paper, habits of reading, accreditation of the original paper, and first-to-market advantages of even a few hours would be enough. Online, where the first-to-market advantage could shrink to seconds, "hot news" protection may be worthwhile. However, almost all papers are available for free and rely solely on advertising. The benefits of reading a copied version are, at that point, practically insignificant to the reader.
7. Wesley Cohen, R. Nelson, and J. Walsh, "Protecting Their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)" (working paper no. 7552, National Bureau Economic Research, Cambridge, MA, 2000); Richard Levin et al., "Appropriating the Returns from Industrial Research and Development"*Brookings Papers on Economic Activity* 3 (1987): 783; Mansfield et al., "Imitation Costs and Patents: An Empirical Study," *The Economic Journal* 91 (1981): 907.
8. In the 2002 Economic Census, compare NAICS categories 5415 (computer systems and related services) to NAICS 5112 (software publishing). Between the 1997 Economic Census and the 2002 census, this ratio remained stable, at about 36 percent in 1997 and 37 percent in 2002. See 2002 Economic Census, "Industry Series, Information, Software Publishers, and Computer Systems, Design and Related Services" (Washington, DC: U.S. Census Bureau, 2004).
9. Levin et al., "Appropriating the Returns," 794–796 (secrecy, lead time, and learning-curve advantages regarded as more effective than patents by most firms). See also F. M. Scherer, "Learning by Doing and International Trade in Semiconductors" (faculty research working paper series R94-13, John F. Kennedy School of Government, Harvard University, Cambridge, MA, 1994), an empirical study of semiconductor industry suggesting that for industries with steep learning curves, investment in information production is driven by advantages of being first down the learning curve

rather than the expectation of legal rights of exclusion. The absorption effect is described in Wesley M. Cohen and Daniel A. Leventhal, "Innovation and Learning: The Two Faces of R&D," *The Economic Journal* 99 (1989): 569–596. The collaboration effect was initially described in Richard R. Nelson, "The Simple Economics of Basic Scientific Research," *Journal of Political Economy* 67 (June 1959): 297–306. The most extensive work over the past fifteen years, and the source of the term of learning networks, has been from Woody Powell on knowledge and learning networks. Identifying the role of markets made concentrated by the limited ability to use information, rather than through exclusive rights, was made in F. M. Scherer, "Nordhaus's Theory of Optimal Patent Life: A Geometric Reinterpretation," *American Economic Review* 62 (1972): 422–427.

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CHAPTER 3. Peer Production and Sharing

1. For an excellent history of the free software movement and of open-source development, see Glyn Moody, *Rebel Code: Inside Linux and the Open Source Revolution* (New York: Perseus Publishing, 2001).
2. Elinor Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge: Cambridge University Press, 1990).
3. Josh Lerner and Jean Tirole, "The Scope of Open Source Licensing" (Harvard NOM working paper no. 02–42, table 1, Cambridge, MA, 2002). The figure is computed out of the data reported in this paper for the number of free software development projects that Lerner and Tirole identify as having "restrictive" or "very restrictive" licenses.
4. Netcraft, April 2004 Web Server Survey, http://news.netcraft.com/archives/web_server_survey.html.
5. Clickworkers Results: Crater Marking Activity, July 3, 2001, http://clickworkers.arc.nasa.gov/documents/crater-marking.pdf.
6. B. Kanefsky, N. G. Barlow, and V. C. Gulick, *Can Distributed Volunteers Accomplish Massive Data Analysis Tasks?* http://www.clickworkers.arc.nasa.gov/documents/abstract.pdf.
7. J. Giles, "Special Report: Internet Encyclopedias Go Head to Head," *Nature,* December 14, 2005, available at http://www.nature.com/news/2005/051212/full/438900a.html.
8. http://www.techcentralstation.com/111504A.html.
9. Yochai Benkler, "Coase's Penguin, or Linux and the Nature of the Firm," *Yale Law Journal* 112 (2001): 369.
10. IBM Collaborative User Experience Research Group, History Flows: Results (2003), http://www.research.ibm.com/history/results.htm.
11. For the full argument, see Yochai Benkler, "Some Economics of Wireless Communications," *Harvard Journal of Law and Technology* 16 (2002): 25; and Yochai Benkler, "Overcoming Agoraphobia: Building the Commons of the Digitally Networked Environment," *Harvard Journal of Law and Technology* 11 (1998): 287. For an excellent

overview of the intellectual history of this debate and a contribution to the institutional design necessary to make space for this change, see Kevin Werbach, "Supercommons: Towards a Unified Theory of Wireless Communication," *Texas Law Review* 82 (2004): 863. The policy implications of computationally intensive radios using wide bands were first raised by George Gilder in "The New Rule of the Wireless," *Forbes ASAP*, March 29, 1993, and Paul Baran, "Visions of the 21st Century Communications: Is the Shortage of Radio Spectrum for Broadband Networks of the Future a Self Made Problem?" (keynote talk transcript, 8th Annual Conference on Next Generation Networks, Washington, DC, November 9, 1994). Both statements focused on the potential abundance of spectrum, and how it renders "spectrum management" obsolete. Eli Noam was the first to point out that, even if one did not buy the idea that computationally intensive radios eliminated scarcity, they still rendered spectrum property rights obsolete, and enabled instead a fluid, dynamic, real-time market in spectrum clearance rights. See Eli Noam, "Taking the Next Step Beyond Spectrum Auctions: Open Spectrum Access," *Institute of Electrical and Electronics Engineers Communications Magazine* 33, no. 12 (1995): 66–73; later elaborated in Eli Noam, "Spectrum Auction: Yesterday's Heresy, Today's Orthodoxy, Tomorrow's Anachronism. Taking the Next Step to Open Spectrum Access," *Journal of Law and Economics* 41 (1998): 765, 778–780. The argument that equipment markets based on a spectrum commons, or free access to frequencies, could replace the role planned for markets in spectrum property rights with computationally intensive equipment and sophisticated network sharing protocols, and would likely be more efficient even assuming that scarcity persists, was made in Benkler, "Overcoming Agoraphobia." Lawrence Lessig, *Code and Other Laws of Cyberspace* (New York: Basic Books, 1999) and Lawrence Lessig, *The Future of Ideas: The Fate of the Commons in a Connected World* (New York: Random House, 2001) developed a rationale based on the innovation dynamic in support of the economic value of open wireless networks. David Reed, "Comments for FCC Spectrum Task Force on Spectrum Policy," filed with the Federal Communications Commission July 10, 2002, crystallized the technical underpinnings and limitations of the idea that spectrum can be regarded as property.

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2. Kenneth J. Arrow, "Gifts and Exchanges," *Philosophy & Public Affairs* 1 (1972): 343.

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CHAPTER 5. Individual Freedom: Autonomy, Information, and Law

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CHAPTER 6. Political Freedom Part 1: The Trouble with Mass Media

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4. Starr, *Creation of the Media*, 48–62, 86–87.
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6. Starr, *Creation of the Media*, 135.
7. The following discussion of the birth of radio is adapted from Yochai Benkler, "Overcoming Agoraphobia: Building the Commons of the Digitally Networked Environment," *Harvard Journal of Law and Technology* 11 (Winter 1997–1998): 287. That article provides the detailed support for the description. The major secondary works relied on are Erik Barnouw, *A History of Broadcasting in the United States* (New York: Oxford University Press, 1966–1970); Gleason Archer, *History of Radio to 1926* (New York: Arno Press, 1971); and Philip T. Rosen, *Modern Stentors: Radio Broadcasters and the Federal Government, 1920–1934* (Westport, CT: Greenwood Press, 1980).
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CHAPTER 7. Political Freedom Part 2: Emergence of the Networked Public Sphere

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CHAPTER 8. Cultural Freedom: A Culture Both Plastic and Critical

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CHAPTER 9. Justice and Development

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CHAPTER 10. Social Ties: Networking Together

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5. Ibid., 42–43, tables CH-WFAM, CH-WFRN.
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8. Amitai Etzioni, "Debating the Societal Effects of the Internet: Connecting with the World," *Public Perspective* 11 (May/June 2000): 42, also available at http://www.gwu.edu/~ccps/etzioni/A273.html.
9. Manuel Castells, *The Rise of Networked Society* 2d ed. (Malden, MA: Blackwell Publishers, Inc., 2000).
10. Barry Wellman et al., "The Social Affordances of the Internet for Networked Individualism," *Journal of Computer Mediated Communication* 8, no. 3 (April 2003).
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12. Keith Hampton and Barry Wellman, "Neighboring in Netville: How the Internet Supports Community and Social Capital in a Wired Suburb," *City & Community* 2, no. 4 (December 2003): 277.
13. Gustavo S. Mesch and Yael Levanon, "Community Networking and Locally-Based

Social Ties in Two Suburban Localities," *City & Community* 2, no. 4 (December 2003): 335.

14. Useful surveys include: Paul DiMaggio et al., "Social Implications of the Internet," *Annual Review of Sociology* 27 (2001): 307–336; Robyn B. Driskell and Larry Lyon, "Are Virtual Communities True Communities? Examining the Environments and Elements of Community," *City & Community* 1, no. 4 (December 2002): 349; James E. Katz and Ronald E. Rice, *Social Consequences of Internet Use: Access, Involvement, Interaction* (Cambridge, MA: MIT Press, 2002).
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16. Jeffery I. Cole et al., "The UCLA Internet Report: Surveying the Digital Future, Year Three" (UCLA Center for Communication Policy, January 2003), 33, 55, 62, http://www.ccp.ucla.edu/pdf/UCLA-Internet-Report-Year-Three.pdf.
17. Pew Internet and Daily Life Project (August 11, 2004), report available at http://www.pewinternet.org/PPF/r/131/report_display.asp.
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19. Barry Wellman, "The Social Affordances of the Internet."
20. A review of Ito's own work and that of other scholars of Japanese techno-youth culture is Mizuko Ito, "Mobile Phones, Japanese Youth, and the Re-Placement of Social Contact," forthcoming in *Mobile Communications: Re-negotiation of the Social Sphere*, ed., Rich Ling and P. Pedersen (New York: Springer, 2005).
21. Dana M. Boyd, "Friendster and Publicly Articulated Social Networking," *Conference on Human Factors and Computing Systems (CHI 2004)* (Vienna: ACM, April 24–29, 2004).
22. James W. Carrey, *Communication as Culture: Essays on Media and Society* (Boston: Unwin Hyman, 1989).
23. Clay Shirky, "A Group Is Its Own Worst Enemy," published first in *Networks, Economics and Culture* mailing list July 1, 2003.

PART III. Policies of Freedom at a Moment of Transformation

1. For a review of the literature and a substantial contribution to it, see James Boyle, "The Second Enclosure Movement and the Construction of the Public Domain," *Law and Contemporary Problems* 66 (Winter-Spring 2003): 33–74.
2. Early versions in the legal literature of the skepticism regarding the growth of exclusive rights were Ralph Brown's work on trademarks, Benjamin Kaplan's caution over the gathering storm that would become the Copyright Act of 1976, and Stephen Breyer's work questioning the economic necessity of copyright in many industries. Until, and including the 1980s, these remained, for the most part, rare voices—joined in the 1980s by David Lange's poetic exhortation for the public domain; Pamela

Samuelson's systematic critique of the application of copyright to computer programs, long before anyone was paying attention; Jessica Litman's early work on the political economy of copyright legislation and the systematic refusal to recognize the public domain as such; and William Fisher's theoretical exploration of fair use. The 1990s saw a significant growth of academic questioning of enclosure: Samuelson continued to press the question of copyright in software and digital materials; Litman added a steady stream of prescient observations as to where the digital copyright was going and how it was going wrong; Peter Jaszi attacked the notion of the romantic author; Ray Patterson developed a user-centric view of copyright; Diane Zimmerman revitalized the debate over the conflict between copyright and the first amendment; James Boyle introduced erudite criticism of the theoretical coherence of the relentless drive to propertization; Niva Elkin Koren explored copyright and democracy; Keith Aoki questioned trademark, patents, and global trade systems; Julie Cohen early explored technical protection systems and privacy; and Eben Moglen began mercilessly to apply the insights of free software to hack at the foundations of intellectual property apologia. Rebecca Eisenberg, and more recently, Arti Rai, questioned the wisdom of patents on research tools to biomedical innovation. In this decade, William Fisher, Larry Lessig, Litman, and Siva Vaidhyanathan have each described the various forms that the enclosure movement has taken and exposed its many limitations. Lessig and Vaidhyanathan, in particular, have begun to explore the relations between the institutional battles and the freedom in the networked environment.

CHAPTER 11. The Battle Over the Institutional Ecology of the Digital Environment

1. Paul Starr, *The Creation of the Media: Political Origins of Modern Communications* (New York: Basic Books, 2004).
2. Ithiel de Sola-Pool, *Technologies of Freedom* (Cambridge, MA: Belknap Press, 1983), 91–100.
3. *Bridgeport Music, Inc. v. Dimension Films*, 2004 U.S. App. LEXIS 26877.
4. Other layer-based abstractions have been proposed, most effectively by Lawrence Solum and Minn Chung, *The Layers Principle: Internet Architecture and the Law*, University of San Diego Public Law Research Paper No. 55. Their model more closely hews to the OSI layers, and is tailored to being more specifically usable for a particular legal principle—never regulate at a level lower than you need to. I seek a higher-level abstraction whose role is not to serve as a tool to constrain specific rules, but as a map for understanding the relationships between diverse institutional elements as they relate to the basic problem of how information is produced and exchanged in society.
5. The first major treatment of this phenomenon was Michael Froomkin, "The Internet as a Source of Regulatory Arbitrage" (1996), http://www.law.miami.edu/froomkin/articles/arbitr.htm.
6. Jonathan Krim, "AOL Blocks Spammers' Web Sites," *Washington Post*, March 20,

2004, p. A01; also available at http://www.washingtonpost.com/ac2/wp-dyn?pagename=article&contentId=A9449-2004Mar19&notFound=true.

7. FCC Report on High Speed Services, December 2003 (Appendix to Fourth 706 Report NOI).
8. 216 F.3d 871 (9th Cir. 2000).
9. *National Cable and Telecommunications Association v. Brand X Internet Services* (decided June 27, 2005).
10. *Turner Broad. Sys. v. FCC*, 512 U.S. 622 (1994) and *Turner Broad. Sys. v. FCC*, 520 U.S. 180 (1997).
11. *Chesapeake & Potomac Tel. Co. v. United States*, 42 F.3d 181 (4th Cir. 1994); *Comcast Cablevision of Broward County, Inc. v. Broward County*, 124 F. Supp. 2d 685, 698 (D. Fla., 2000).
12. The locus classicus of the economists' critique was Ronald Coase, "The Federal Communications Commission," *Journal of Law and Economics* 2 (1959): 1. The best worked-out version of how these property rights would look remains Arthur S. De Vany et al., "A Property System for Market Allocation of the Electromagnetic Spectrum: A Legal-Economic-Engineering Study," *Stanford Law Review* 21 (1969): 1499.
13. *City of Abilene, Texas v. Federal Communications Commission*, 164 F3d 49 (1999).
14. *Nixon v. Missouri Municipal League*, 541 U.S. 125 (2004).
15. Bill Number S. 2048, 107th Congress, 2nd Session.
16. *Felten v. Recording Indust. Assoc. of America Inc.*, No. CV- 01-2669 (D.N.J. June 26, 2001).
17. *Metro-Goldwyn-Mayer v. Grokster, Ltd.* (decided June 27, 2005).
18. See Felix Oberholzer and Koleman Strumpf, "The Effect of File Sharing on Record Sales" (working paper), http://www.unc.edu/cigar/papers/FileSharing_March2004.pdf.
19. Mary Madden and Amanda Lenhart, "Music Downloading, File-Sharing, and Copyright" (Pew, July 2003), http://www.pewinternet.org/pdfs/PIP_Copyright_Memo.pdf/.
20. Lee Rainie and Mary Madden, "The State of Music Downloading and File-Sharing Online" (Pew, April 2004), http://www.pewinternet.org/pdfs/PIP_Filesharing_April_04.pdf.
21. See 111 F.Supp.2d at 310, fns. 69–70; *PBS Frontline* report, http://www.pbs.org/wgbh/pages/frontline/shows/hollywood/business/windows.html.
22. A. M. Froomkin, "Semi-Private International Rulemaking: Lessons Learned from the WIPO Domain Name Process," http://www.personal.law.miami.edu/froomkin/articles/TPRC99.pdf.
23. Jessica Litman, "The Exclusive Right to Read," *Cardozo Arts and Entertainment Law Journal* 13 (1994): 29.
24. *MAI Systems Corp. v. Peak Computer, Inc.*, 991 F.2d 511 (9th Cir. 1993).
25. Lawrence Lessig, *Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity* (New York: Penguin Press, 2004).
26. Jessica Litman, "Electronic Commerce and Free Speech," *Journal of Ethics and Information Technology* 1 (1999): 213.

27. See Department of Justice Intellectual Property Policy and Programs, http://www.usdoj.gov/criminal/cybercrime/ippolicy.htm.
28. *Eldred v. Ashcroft*, 537 U.S. 186 (2003).
29. *Bridgeport Music, Inc. v. Dimension Films*, 383 F.3d 390 (6th Cir.2004).
30. 383 F3d 390, 400.
31. Mark A. Lemley, "Intellectual Property and Shrinkwrap Licenses," *Southern California Law Review* 68 (1995): 1239, 1248–1253.
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34. James Boyle, "Cruel, Mean or Lavish? Economic Analysis, Price Discrimination and Digital Intellectual Property," *Vanderbilt Law Review* 53 (2000); Julie E. Cohen, "Copyright and the Jurisprudence of Self-Help," *Berkeley Technology Law Journal* 13 (1998): 1089; Niva Elkin-Koren, "Copyright Policy and the Limits of Freedom of Contract," *Berkeley Technology Law Journal* 12 (1997): 93.
35. *Feist Publications, Inc. v. Rural Telephone Service Co., Inc.*, 499 U.S. 340, 349–350 (1991).
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37. J. H. Reichman and Paul F. Uhlir, "Database Protection at the Crossroads: Recent Developments and Their Impact on Science and Technology," *Berkeley Technology Law Journal* 14 (1999): 793; Stephen M. Maurer and Suzanne Scotchmer, "Database Protection: Is It Broken and Should We Fix It?" *Science* 284 (1999): 1129.
38. See Stephen M. Maurer, P. Bernt Hugenholtz, and Harlan J. Onsrud, "Europe's Database Experiment," *Science* 294 (2001): 789; Stephen M. Maurer, "Across Two Worlds: Database Protection in the U.S. and Europe," paper prepared for Industry Canada's Conference on Intellectual Property and Innovation in the Knowledge-Based Economy, May 23–24 2001.
39. Peter Weiss, "Borders in Cyberspace: Conflicting Public Sector Information Policies and their Economic Impacts" (U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, February 2002).
40. *eBay, Inc. v. Bidder's Edge, Inc.*, 2000 U.S. Dist. LEXIS 13326 (N.D.Cal. 2000).
41. The preemption model could be similar to the model followed by the Second Circuit in *NBA v. Motorola*, 105 F.3d 841 (2d Cir. 1997), which restricted state misappropriation claims to narrow bounds delimited by federal policy embedded in the Copyright Act. This might require actual proof that the bots have stopped service, or threaten the service's very existence.
42. *New York Times v. Sullivan*, 376 U.S. 254, 266 (1964).

Index