Endnotes

- 1 "On September 19, 2007, while..." Jennifer Sullivan, "Last phone call steered search," Seattle Times, October 2, 2007; William Yardley, "Missing woman found alive in wrecked car after 8 days," New York Times, September 29, 2007.
- 2 "The March 2008 resignation ..." How an information system helped nail Eliot Spitzer and a prostitution ring, blogs.zdnet.com/BTL/?p=8211&tag=n1.e540.
- 3 "A company will give you..." Pudding Media, puddingmedia.com.
- 3 "So much disk storage is..." Adapted from Latanya Sweeney, Information Explosion. Confidentiality, Disclosure, and Data Access: Theory and Practical Applications for Statistical Agencies, L. Zayatz, P. Doyle, J. Theeuwes, and J. Lane (eds), Urban Institute, Washington, DC, 2001.
- 5 "Consider the story of Naral..." Adam Liptak, "Verizon reverses itself on abortion messages," New York Times, September 28, 2007.
- 6 "Its peculiar character, too, is..." Letter from Thomas Jefferson to Isaac McPherson, August 13, 1813. Jefferson, Writings 13:333-35. presspubs.uchicago.edu/founders/documents/a1_8_8s12.html.
- 8 "If it can't be found..." This maxim emerged in the late 1990s. See Scott Bradner, "How big is the world?," Network World, October 18, 1999. http://www.networkworld.com/archive/1999b/1018bradner.html.
- 8 "Moore's Law" Gordon Moore, "Cramming more components onto integrated circuits," Electronics, Vol. 38, No. 8, April 19, 1965.

 ftp://download.intel.com/research/silicon/moorespaper.pdf. Moore's original paper is worth a look—it was written for a popular electronics publication. Later articulations of the "Law" state that the doubling period is 18 months rather than two years. A very extensive (but not wholly persuasive) "debunking" appears in arstechnica.com/articles/paedia/cpu/moore.ars.

- 10 "In 1983, Christmas shoppers could..." Carol Ranalli, "Digital camera lets computers see," Infoworld, November 21, 1983.
- 10 "Even 14 years later, film..." "Kodak, GE, Digital report strong quarterly results," Atlanta Constitution, January 17, 1997.
- 10 "The move would cost the..." Claudia H. Deutsch, "Shrinking pains at Kodak," New York Times, February 9, 2007.
- "That is the number of..." The expanding digital universe, IDC white paper sponsored by EMC, March 2007. www.emc.com/about/destination/digital_universe/pdf/Expanding_Digital_Universe_IDC_WhitePaper_022507.pdf and The Diverse and Expanding Digital Universe, March 2008, www.emc.com/collateral/analyst-reports/diverse-exploding-digital-universe.pdf.
- 12 "Along with processing power and..." Data from Internet Systems Consortium, ISC Domain Survey: Number of Internet Hosts. www.isc.org/index.pl?/ops/ds/host-count-history.php.
- 13 "The story dropped off the..." Seth Mydans, "Monks are silenced, and for now, Internet is, too," New York Times, October 4, 2007; OpenNet initative, "Pulling the Plug: A Technical Review of the Internet Shutdown in Burma." http://opennet.net/research/bulletins/013.
- 13 "It may prove simpler to..." Rachel Donadio, "Libel without borders," New York Times, October 7, 2007.
- 15 "Recent federal laws, such..." Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism Act of 2001 (Public Law 107–56), signed into law by President George Bush on October 26, 2001. This law expanded the legal authority of law enforcement agencies to search electronic communications and records in order to combat domestic terrorism.
- 15 "Now when any newcomer comes..." L. Jon Wertheim, "Jump the Shark," New York Times, November 24, 2007.
- "That woman's lawyer later blamed..." Steve Pokin, "A real person, a real death," St. Charles (Missouri) Journal, November 10, 2007; Christopher Maag, "A hoax turned fatal draws anger but no charges," New York Times, November 28, 2007; Rebecca Cathcart, "MySpace is said to draw subpoena in hoax case," New York Times, January 10, 2008.

- 19 "The attack on the transit..." Of the many descriptions of the event, one of the most complete is available from Wikipedia at en.wikipedia.org/wiki/7 July 2005 London bombings.
- 19 "Hundreds of thousands of surveillance..." Sarah Lyall, "London Bombers Visited Earlier, Apparently on Practice Run," New York Times, September 21, 2005.

- 19 "BIG BROTHER IS WATCHING YOU..." George Orwell, 1984, Signet Classics, 2003, p. 2.
- 20 "According to a 2007 Pew/Internet....." Digital Footprints, "Online identity management and search in the age of transparency," Pew Internet and American Life Project, 2007. www.pewinternet.org.
- 20 "Many of us publish and..." Digital Footprints.
- 20 "A third of the teens with..." Teens and Social Media, Pew Internet & American Life Project report, December 19, 2007, p. 13. www.pewinternet.org/pdfs/PIP Teens Social Media Final.pdf.
- 21 "More than half of all..." Ibid.
- 23 "'The fact that this girl...'" O'Ryan Johnson, "Green Line Groper Arrested," Boston Herald, December 8, 2007.
- 23 "Mr. Berman claims he is innocent..." "Newton man arraigned in groping case," Boston Globe, December 11, 2007.
- 23 "In June 2005, a woman..." Sarah Boxer, "Internet's Best Friend (Let Me Count the Ways)," New York Times, July 30, 2005.
- 23 "It is unlikely that the..." Jonathan Krim, "Subway Fracas Escalates Into Test of the Internet's Power to Shame," Washington Post, July 7, 2005.
- 24 "One fan got a pre-release..." Jonathan Richards, "Digital DNA could finger Harry Potter leaker," The Times of London, July 19, 2007.
- 24 "They knew where he was, ..." Christopher Elliot, "Some Rental Cars Are Keeping Tabs on the Drivers," New York Times, January 13, 2004.
- 26 "They can be almost undetectable." http://www.rfid-asia.info/2007/02/ digestible-rfid-tag-alternative-for.htm. See U.S. Patent Application 20070008113, filed by the Eastman Kodak Company, titled "System to monitor the ingestion of medicines." It describes "a digestible radio frequency identification (RFID) tag."
- 27 "The technology is there to..." Rhea Wessel, Metro Groups Galeria Kaufhof Launches UHF Item-Level Pilot, RFID Journal, September 20, 2007, www.rdifjournal.com/article/articleview/3624/1/1/.
- 27 "When questioned, Trooper Rasinski said..." Alex Taylor III, "Corzine crash spotlights SUV Safety," Fortune, April 19, 2007.
- 27 "We know his exact speed..." Tom Hester, Jr. (Associated Press), "Trooper speeding revealed in Corzine crash," USA Today, April 18, 2007.
- 27 "Your insurance company is probably..." Jeff Gamage, "Car's 'black box' and what it tells," Philadephia Inquirer, November 24, 2007. Bob Holliday, "Little black box: Friend or foe?," The Pantagraph (Bloomington, Illinois), March 4, 2007.
- 28 "EDRs capture information about speed, ..." Bill Howard, "The Black Box: Big Brother's Still Watching," TechnoRide, April 19, 2007. www.technoride.com/ 2007/04/the black box big brothers sti.php.

- 28 "CSX Railroad was exonerated..." Leo King, "CSX wins wrongful death suit," National Corridors Newsletter, Vol. 3, No. 45, November 4, 2002. www.nationalcorridors.org/df/df11042002.shtml.
- 28 "Taking bits from the car was..." The People of the State of New York v. Robert Christmann, Justice Court of New York, Village of Newark, 3 Misc. 3d 309; 776 N.Y.S.2d 437, decided January 16, 2004.
- 29 "Researchers at Purdue have developed..." John Mello, "Codes Make Printers Stool Pigeons," TechNewsWorld, October 18, 2005. The web site for the Purdue research group is cobweb.ecn.purdue.edu/~prints/index.shtml.
- 30 "Because his ticket did not..." Matt Daniel, "Starts and Stops," Boston Globe, March 25, 2007.
- 31 "On October 18, 2007, a..." Eric Pfanner, "Britain tries to explain data leak affecting 25 million," New York Times, November 22, 2007.
- 32 "When a federal court released..." Jeffrey Heer, "Exploring Enron." jheer.org/ enron/v1/.
- 34 "To use the official lingo, ..." An excellent overview of de-identification and related topics can be found at the web site of the Carnegie Mellon University Laboratory for International Data Privacy. It can be found at privacy.cs. cmu.edu.
- 34 "According to the Cambridge voter..." Latanya Sweeney, Recommendations to Identify and Combat Privacy Problems in the Commonwealth, Testimony before the Pennsylvania House Select Committee on Information Security (House Resolution 351), Pittsburgh, PA, October 5, 2005; available at privacy.cs.cmu. edu/dataprivacy/talks/Flick-05-10.html.
- 34 "Nationally, gender, zip code, and..." Latanya Sweeney, Comment of the Department of Health and Human Services on "Standards of Privacy of Individually Identifiable Health Information;" available at privacy.cs.cmu.edu/ dataprivacy/HIPAA/HIPAAcomments.html.
- 35 "'There is no patient confidentiality,'..." Michael Lasalandra, "Panel told releases of med records hurt privacy," Boston Herald, March 20, 1997.
- 36 "In 2003, Scott Levine, owner..." Jalkumar Vijayan, "Appeals Court: Stiff prison sentence in Acxiom data theft case stands," ComputerWorld, Febraruy 23, 2007.
- 36 "Millions of Americans are victimized..." Javelin Strategy & Research, 2007 Identity Fraud Survey Report, February, 2007. A summary appears at www.privacyrights.org/ar/idtheftsurveys.htm.
- 37 "These records can be subpoenaed, ..." Daniel B. Wood, "Radio ID tags proliferate, stirring privacy debate," Christian Science Monitor, December 15, 2004; Debbie Howlett, "Motorists can keep on rolling soon," USA Today, May 26, 2004; "High-Tech Evidence, A lawyer's friend or foe?," National Law Journal, August 24, 2004.
- 40 "In 1988, when a videotape..." 18 USC Sect. 2710, 1988.
- 41 "A university president had to..." "Salisbury U. president removes Facebook profile after questions," Associated Press, October 17, 2007.

- 41 "You can read the 'About Me'..." Her web site is at www.smokeandashes.net.
- 41 "Or consider that there is..." Andrew Levy, "The ladettes who glorify their shameful drunken antics on Facebook," Daily Mail, November 5, 2007.
- 43 "Absolutely not, says the Brown..." Rachel Arndt, "Admissions officers poke around Facebook," The Brown Daily Herald, September 10, 2007.
- 44 "For a little money, you..." www.americablog.com/2006/01/americablogjust-bought-general-wesley.html.
- 44 "It was a great service..." Frank Main, "Everyone can buy cell phone records," Chicago Sun-Times, January 5, 2006.
- 45 "Beverly O'Brien suspected her..." O'Brien v. O'Brien, No. 5D03-3484, 2005 WL 322367 (Fla. Dist. Ct. App. February 11, 2005); available at www.5dca.org/ Opinions/Opin2005/020705/5D03-3484.pdf.
- 47 "Anyone could figure out where..." John S. Brownstein, Christopher A. Cassa, and Kenneth D. Mandl, "No place to hide-reverse identification of patients from published maps," New England Journal of Medicine, 355:16, October 19, 2007, 1741-1742.
- 48 "Yet they were able to..." The data sources the MIT students used are readily available. The Illinois crime data can be found at www.icpsr.umich.edu/NACJD/help/faq6399.html. You can search the Social Security Death Index at ssdi.rootsweb.com/.
- 49 "According to a report in..." Keith Bradsher, "China Enacting a High-Tech Plan to Track People," New York Times, August 12, 2007.
- 49 "Many cell phones can be..." See, for example, Department of Energy web page on cell phone vulnerabilities, www.ntc.doe.gov/cita/CI Awareness Guide/ V2comint/Cellular.htm.
- 49 "A federal court ruled that..." United States of America v. John Tomero, et al., S2 06 Crim. 0008 (LAK), United States District Court for the Southern District of New York, 462 F. Supp. 2d 565, Opinion of Judge Lewis A. Kaplan, November 27, 2006.
- 49 "Tomero could have prevented it..." Declan McCullagh and Anne Broache, "FBI taps cell phone mic as eavesdropping tool," CNET News.com, December 1, 2006. www.news.com/2100-1029 3-6140191.html.
- 49 "OnStar warns, 'OnStar will cooperate...'" OnStar "Helpful Info" web page. www.onstar.com/us_english/jsp/explore/onstar basics/helpful info. jsp?info-view=serv plan.
- 49 "The FBI has used this method..." Declan McCullagh, "Court to FBI: No spying on in-car computers," CNET News.com, November 19, 2003. www.news.com/2100-1029 3-5109435.html.
- 50 "You have chosen to say, ..." Ellen Nakashima, "FBI Prepares Vast Database Of Biometrics; \$1 Billion Project to Include Images of Irises and Faces," Washington Post. December 22, 2007.
- 52 "In what is generally agreed..." "Creating a new Who's Who," Time Magazine, July 9, 1973.

- 52 "Specifically, it states, 'No agency...'" 5 USC sect. 552(b).
- 53 "In January 2002, just a..." There is a good exposition of the Total Information Awareness Office on the site of EPIC, http://epic.org/privacy/profiling/tia/.
- 53 "In a May 2002 email..." Email dated May 21, 2002, released on January 23, 2004 to David L. Sobel of the Electronic Privacy Information Center under a Freedom of Information Act request.
- 54 "The New York Times broke..." John Markoff, "Pentagon plans a computer system that would peek at personal data of Americans," New York Times, November 9, 2002.
- 54 "In his June 2007 report..." Michael J. Sniffen, "Homeland Security drops datamining tool," Washington Post, September 6, 2007.
- 55 "That project sought to compile..." Walter Pincus, "Pentagon Will Review Database on U.S. Citizens Protests Among Acts Labeled 'Suspicious,'" Washington Post, Thursday, December 15, 2005.
- 56 "After testifying in an antitrust..." 1995 email from Bill Gates, quoted by Steve Lohr in Antitrust case is highlighting role of email, New York Times, November 2, 1998.
- 57 "Electronic files, e-mail, data files, ..." Harvard University Personnel Manual for Administrative/Professional Staff and Non-Bargaining Unit Support Staff, Section 2.6.C (December, 2007).
- 59 "That is actually not a..." Danny Sullivan, "Nielsen NetRatings Search Engine Ratings," Search Engine Watch, August 22, 2006.
- 60 "In this particular case, we..." thesarc.blogspot.com/2006/08/aol-user-says-just-kidding-about.html.
- 61 "Instantaneous photographs and newspaper enterprise..." Samuel Warren and Louis Brandeis, "The Right to Privacy," Harvard Law Review, IV, 5 (December 15, 1890).
- 62 "Yet the Warren-Brandeis definition..." R. M. Fano, "Review of Alan Westin's Privacy and Freedom," Scientific American, May 1968, 148–152.
- 63 "The result was a landmark study..." Alan F. Westin, Privacy and Freedom, Atheneum, 1967.
- 63 "The following are suggested as..." Privacy and Freedom, p. 370.
- 64 "In 1973, the Department of Health, ..." U.S. Dep't. of Health, Education, and Welfare, Secretary's Advisory Committee on Automated Personal Data Systems, Records, computers, and the Rights of Citizens viii (1973). Text courtesy of EPIC at www.epic.org/privacy/consumer/code_fair_info.html.
- 65 "Although the U.S. sectorial approach..." www.export.gov/safeharbor/.
- 66 "Only 0.3% of Yahoo! users..." Saul Hansell, "Compressed data: The big Yahoo privacy storm that wasn't," New York Times, May 13, 2002.
- 66 "Now many phone calls travel..." Eric Lichtblau, James Risen, and Scott Shane, "Wider spying fuels aid plan for Telecom industry," New York Times, December 16, 2007.

- 67 "So your computer might send..." Ben Edelman, "The Sears 'Community' Installation of ComScore." www.benedelman.org/news/010108-1.html.
- 67 "Dr. Roberta Ness, president of..." "Privacy Rule slows scientific discovery and adds cost to research, scientists say," Science Daily, November 14, 2007, www.sciencedaily.com/releases/2007/11/071113165648.htm.
- 68 "Sociologist Amitai Etzioni repeatedly asks..." Amitai Etzioni, quoted by Fred H. Cate, "The failure of Fair Information Practice Principles," in Jane K. Winn, ed., Consumer Protection in the Age of the "Information Economy," Ashgate, 2006.
- 68 "Those laws have become unmoored..." Cate, "The failure of Fair Information Practice Principles."
- 69 "His data trail indicated that..." Chris Cuomo, Eric Avram, and Lara Setrakian, "Key Evidence Supports Alibi in Potential Rape Defense for One Indicted Duke Player," ABC News at abcnews.go.com/GMA/LegalCenter/story?id=1858806&page=1.
- 70 "Although the individual might have..." D. Weitzner, "Beyond Secrecy: New Privacy Protection Strategies for Open Information Spaces," IEEE Internet Computing, September/October 2007. dig.csail.mit.edu/2007/09/ieee-icbeyond-secrecy-weitzner.html.
- 70 "We all have a right to..." David Brin, The Transparent Society, Perseus Books, 1998, p. 334.
- 70 "Some ongoing research is..." Daniel J. Weitzner, Harold Abelson, Tim Berners-Lee, Joan Feigenbaum, James Hendler, and Gerald Jay Sussman, Information Accountability, MIT CSAIL Technical Report, MIT-CSAIL-TR-2007-034, June 13, 2007.
- 71 "We are alone." 1984, Chapter 2, Section 8.

- 73 "The U.S. produced a 42-page..." The report, in its redacted and unredacted form, is available on the Web-for example, on Wikipedia at en.wikisource.org/wiki/Calipari Report.
- 73 "The redacted report was posted..." "Operation Iraqi Freedom, the official web site of the Multi-National Force," at www.mnf-iraq.com. The report was removed as soon as the error was discovered, but by that time, copies had already been made.
- 74 "The revelations were both dangerous..." Gordon Housworth, "Insurgents harvest secret NORORN materials from botched redaction of Nicola Calipari-Giuliana Sgrena incident report," Intellectual Capital Group. spaces.icgpartners.com/ apps/discuss.asp?guid=25930D60E7294C459DB22915B37F3F46.
- 75 "The article was posted on..." www.nytimes.com/library/world/mideast/ 041600iran-cia-index.html.

- 75 "A controversy ensued about the..." cryptome.org/cia-iran.htm.
- 76 "As posted on the Post's..." Serge F. Kovaleski and Sari Horwitz, "In letter, killer makes demands and threats," Washington Post, October 26, 2002, A14.
- 76 "The paper fixed the problem..." "Washington Post's scanned-to-PDF sniper letter more revealing than intended," PlanetPDF web site, October 26, 2002, www.planetpdf.com/mainpage.asp?webpageid=2434. Figures from presentation slides by Steven J. Murdoch and Maximillian Dornseif, "Hidden data in Internet published documents," University of Cambridge, December 27, 2004, www.ccc.de/congress/2004/fahrplan/files/316-hidden-data-slides.pdf.
- 77 "The report was not final..." James Bone and Nicholas Blanford, "UN office doctored report on murder of Hariri," Times of London, October 22, 2005; Michael Young, Assad's dilemma, International Herald Tribune, October 28, 2005. The report is available on the Washington Post web site: www.washingtonpost.com/wp-srv/world/syria/mehlis.report.doc.
- 78 "In particular, when the change..." Stephen Shankland and Scott Ard, "Hidden text shows SCO prepped lawsuit against BofA," ZDNet, March 4, 2004. news.zdnet.com/2100-3513 22-5170073.html.
- 79 "According to the Evening Standard..." Joe Murphy, "Campbell aide and team behind the dodgy dossier," Evening Standard (London), June 25, 2003.
- 80 "But it turns out that..." Tuomas Aura, Thomas A. Kuhn, and Michael Roe, "Scanning electronic documents for personally identifiable information," WPES '06, October 30, 2006, 41–49.
- 83 "One of the earliest triumphs..." Thomas Stockham, "Restoration of Old Acoustic Recordings by means of Digital Signal Processing," Audio Engineering Society, 1971.
- 83 "A special camera..." The Canon EOS-1 SLR offers this option. See "Original Image Verification System," www.canon.com/technology/canon_tech/category/35mm.html.
- 84 "Congress outlawed such virtual kiddie..." Child Pornography Protection Act of 1996 (CPPA), 18 U.S.C. 2256(8)(B).
- 84 "If a digital camera has..." David Pogue, "Breaking the myth of megapixels," New York Times, February 8, 2007.
- 93 "Some documents created with Word 2007..." See, for example, Shan Wang, "New 'Word' frustrates users," Harvard Crimson, November 26, 2007.
- 94 "Microsoft says they disagree and..." Robert Weisman, "Microsoft fights bid to drop Office software," Boston Globe, September 14, 2005.
- 94 "Quinn suspected 'Microsoft money and..." www.groklaw.net/article.php?story=20060123132416703.
- 94 "Nonetheless, other software companies would..." Commonwealth of Massachusetts, Information Technology Division web site, page on "OpenDocument File Format."
- 97 "During World War I, the German..." D. Kahn, The Codebreakers, Scribner, 1996.

- 97 "The first letters of the..." Adam McLean, ed., The Steganographia of Johannes Trithemius, Magnum Opus Hermetic Sourceworks, Edinburgh, 1982.
- 99 "Who uses steganography today..." Jack Kelley, "Terror groups hide behind web encryption," USA Today, February 5, 2001. See also Farhad Manjoo, "The case of the missing code," Salon.com, July 17, 2002.
- 99 "But most of the drives..." Simson Garfinkel and Abhi Shelat, "Remembrance of Data Passed: A Study of Disk Sanitization Procedures," IEEE Security and Privacy, January/February 2003, 17-27.
- 102 "The Federal Trade Commission now..." Federal Trade Commission, 16 CFR Part 682, Disposal of Consumer Report Information and Records.
- 102 "2007 Massachusetts Law about security breaches." Commonwealth of Massachusetts, Chapter 82 of the Acts of 2007, "An act relative to security freezes and notification of data breaches," Chapter 93I.
- 103 "A researcher bought ten cell..." Larry Magid, "Betrayed by a cell phone," CBS News, August 30, 2006. www.cbsnews.com/stories/2006/08/30/tech/main1949206.shtml.
- 105 "Mocking the project's grand ambitions..." Robin McKie and Vanessa Thorpe, Guardian Unlimited, March 3, 2002; The BBC Domesday Project web site at www.atsf.co.uk/dottext/domesday.html.
- 106 "The data was recovered, though..." Jeffrey Darlington, Andy Finney, and Adrian Pearce, "Domesday redux: The rescue of the BBC Domesday Project videodiscs," Ariadne, No. 36, www.ariadne.ac.uk/issue36/tna/; see also www.domesday1986.com.
- 106 "The recovered modern Domesday Book..." www.atsf.co.uk/dottext/ domesday.html.
- 106 "Even the data files of..." www.domesdaybook.co.uk/index.html.

- 109 "'It's something magic." Eva Wolchover, "Web reconnects cousins cut off by Iron Curtain," Boston Herald, December 18, 2007; "Web post reunites cousins after 70 years," Associated Press Online, December 19, 2007; Email from Sasha Berkovich.
- 112 "It was amusing to know..." www.google.com/intl/en/press/zeitgeist2007/ mind.html.
- 115 "The reporter then published an..." Alex Berenson, "Lilly said to play down risk of top pill," New York Times, December 17, 2006; Alex Berenson, "Drug files show maker promoted unapproved use," New York Times, December 18, 2006.
- 117 "Limiting the fora available to...'" U.S. District Court, Eastern District of New York, Zyprexa Litigation, 07-CV-0504, In re Injunction, I, IV.F, February 13, 2007.

- 119 "It appeared in the Atlantic Monthly..." Vannevar Bush, "As we may think," Atlantic Monthly, July 1945.
- 120 "There is no practical obstacle..." H.G. Wells, "The idea of a permanent world encylopaedia," in World Brain, Methuen, 1938, 60–61. Available online at sherlock.sims.berkeley.edu/wells/world brain.html.
- 122 "Speaking to the Association of..." Eric Schmidt, "Technology is Making Marketing Accountable," speech before the Association of National Advertisers, October 8, 2005; available at www.google.com/press/podium/ana.html.
- 122 "That's just a bit more..." www.ericdigests.org/2002-2/hidden.htm.
- 124 "For example, after 9/11, a..." "Information that was once available," BBC News Online, Intelligence data pulled from web sites, October 5, 2001.
- 125 "Because the pages had been..." Chris Sherman, "Deleted "Sensitive" Information Still Available via Google," Search Engine Watch, October 9, 2001.
- 131 "'The Anatomy of a Large-Scale...'" infolab.stanford.edu/~backrub/ google.html.
- 131 "Modern Information Retrieval: A Brief Overview" IEEE Data Engineering Bulletin, 24(4), pp. 35–43, 2001.
- 131 "'The Most Influential Paper Gerald...'" "Library Trends," Spring 2004. findarticles.com/p/articles/mi_m1387/is_4_52/ai_n7074022.
- 136 "On March 19, 2005, ..." According to Kinderstart's Complaint for Injunctive and Declaratory Relief and Damages, U.S. District Court, Northern District of California, San Jose Division, Case No. C 06-2057 RS, March 17, 2006; available at blog.ericgoldman.org/archives/kinderstartgooglecomplaint.pdf.
- 136 "Google's public description of its..." Google's webmaster help center, "Little or no original content." www.google.com/support/webmasters/bin/answer.py?answer=66361.
- 136 "Plaintiff KinderStart contends that..." "Google's motion to dismiss Kinderstart lawsuit," quoted by Eric Goldman. blog.ericgoldman.org/archives/2006/05/kinderstart v g.htm.
- 136 "'PageRank,' claimed KinderStart..." Kinderstart.com LLC, on behalf of itself and all others similarly situated, v. Google, U.S. District Court for the Northern District of California, Case C 06-2057 JF (RS), opinion of Judge Jeremy Fogel, July 13, 2006.
- 137 "The page Google indexed was..." Matt Cutts blog, "Gadgets, Google, and SEO, Ramping up on international webspam," February 4, 2006. www.mattcutts.com/blog/ramping-up-on-international-webspam/.
- 137 "But a coding trick caused..." "BMW given Google 'death penalty," BBC News, February 6, 2006. news.bbc.co.uk/1/hi/technology/4685750.stm.
- 137 "Don't deceive your users or..." Google Webmaster Guidelines. www.google.com/support/webmasters/bin/answer.py?hl=en&answer=35769.
- 138 "More than 90% of online..." Digital Footprints, "Online identity management and search in the age of transparency," Pew Internet and American Life Project, 2007, www.pewinternet.org, p. 5.

- 139 "He published a paper about..." Brian Pinkerton, "Finding What People Want," Second International WWW Conference. thinkpink.com/bp/WebCrawler/ WWW94.html.
- 139 "The 1997 academic research paper..." Sergey Brin and Lawrence Page, "The Anatomy of a Large-Scale Hypertextual Web Search Engine," Stanford University Computer Science Department, 1997. infolab.stanford.edu/~backrub/google.html.
- 139 "To this day, Stanford University..." U.S. Patent #6285999, "Method for node ranking in a linked database," Filed January 9, 1998 and issued September 4, 2001. Inventor: Lawrence Page; Assignee: The Board of Trustees of the Leland Stanford Junior University.
- 141 "Sounding every bit like a..." Danny Sullivan, "GoTo Going Strong, Search Engine Watch," July 1, 1998. http://searchenginewatch.com/showPage. html?page=2166331.
- 142 "Microsoft's MSN offered a creative..." Verne Kopytoff, "Searching for profits: Amid tech slump, more portals sell search engine results to highest bidder," San Francisco Chronicle, June 18, 2001.
- 142 "'We can't afford to have...'" Kopytoff, "Searching for profits."
- 142 "If they are going to stuff..." Commercial Alert Files Complaint Against Search Engines for Deceptive Ads, Commercial Alert web site, July 16, 2001. www.commercialalert.org/news/news-releases/2001/07/commercialalert-files-complaint-against-search-engines-for-deceptive-ads.
- 144 "Google's technology was brilliant, ..." A good history of the development of the search business is John Battelle, The Search, Portfolio, 2005.
- 145 "Among the items and services..." AdWords Advertising Policies, Content Policy.
- 145 "But bias can be coded..." Eric Goldman, "Search Engine Bias and the Demise of Search Engine Utopianism," Yale Journal of Law & Technology, 2005–2006. Available at SSRN: http://ssrn.com/abstract=893892.
- 146 "In so doing, the company..." Laurie J. Flynn, "Amazon says technology, not ideology, skewed results," New York Times, March 20, 2006.
- 146 "Only 12% of the first..." "Different Engines, Different Results," A Research Study by Dogpile.com in collaboration with researchers from Queensland University of Technology and the Pennsylvania State University, 2007. (Dogpile offers a Metasearch engine, so the results of the study make a case for the usefulness of its product. Although the study could be questioned on that ground, the report fully details its methodology, so an independent researcher could attempt to test or duplicate the results.)
- 146 "An industry research study found..." iProspect Search Engine User Behavior Study, April 2006; available at www.iprospect.com/premiumPDFs/WhitePaper 2006 SearchEngineUserBehavior.pdf.
- 147 "A study of queries to..." B.J. Jansen, A. Spink, and T. Saracevic, 2000. "Real life, real users, and real needs: A study and analysis of user queries on the web," Information Processing & Management, 36(2), 207-227.

- 147 "Google's experience is even more..." Private correspondence to Hal Abelson.
- 147 "36% of users thought seeing..." iProspect study, page 4.
- 149 "Google proclaims of its Page..." http://www.google.com/intl/en/corporate/ tenthinas.html.
- 150 "In his book, Ambient Findability..." Peter Morville, Ambient Findability, O'Reilly Media, 2005.
- 150 "Marek is now facing three..." blogoscoped.com/archive/2007-09-11-n78. html.
- 151 "Montcrief's innocent site fell to..." The Search, Chapter 7.
- 152 "Google in particular was unavailable..." "China blocking Google," BBC News, September 2, 2002, news.bbc.co.uk/2/hi/technology/2231101.stm; "Google fights Chinese ban," BBC News, September 3, 2002, news.bbc.co.uk/1/hi/ technology/2233229.stm.
- 152 "The company reluctantly decided not..." "China, Google News and source inclusion," The Official Google Blog, September 27, 2004. googleblog. blogspot.com/2004/09/china-google-news-and-source-inclusion.html.
- 153 "How would it balance its..." www.google.com/corporate/.
- 153 "'It is unfair and smacks...'" Peter Pollack, "Congress grills tech firms over China dealings," Arstechnica, February 15, 2006. arstechnica.com/news.ars/ post/20060215-6192.html.
- 153 "'While removing search results is...'" Kevin J. Delaney, "Google launches service in China," Wall Street Journal, January 25, 2006.
- 153 "A disappointed libertarian commentator countered..." Pamela Geller Oshry, quoted by Hiawatha Bray, "Google China censorship fuels calls for U.S. boycott," Boston Globe, January 28, 2006.
- 154 "'I cannot understand how your...'" Verne Kopytoff, "Lawmakers bash top hightech firms for yielding to China," San Francisco Chronicle, February 16, 2006.
- 154 "One researcher tested the Chinese..." blogoscoped.com/archive/ 2006-06-18-n85.html.
- 156 "You're here as a volunteer; ..." Quoted in The Search, p. 228.
- 156 "Public image-matching services include..." Ray Blitstein, "Image analysis changing way we search, shop, share photos," San Jose Mercury News, April 30, 2007.
- 156 "Chinese dissidents were imprisoned when..." Ariana Eunjung Cha and Sam Diaz, "Advocates sue Yahoo in Chinese torture case," Washington Post, April 19, 2007.
- 159 "And competition there is..." "Summary of Antitrust Analysis: Google's Proposed Acquisition of DoubleClick," Microsoft memorandum available at Google Watch, December 24, 2007. googlewatch.eweek.com/content/google vs microsoft/ meet google search giant monopolist extraordinaire.html.

- 159 "For that, we will launch..." Kevin J. O'Brien, "Europeans weigh plan on Google challenge," International Herald Tribune, January 18, 2006. "Attack of the Eurogoogle," Economist.com, March 9, 2006.
- 159 "A year later, Germany dropped..." The Theseus image and video search project, Pandia Search Engine News, November 28, 2007. http://www.pandia.com/ sew/570-theseus.html.

- 161 "'It used to be,' the..." Congressional Record, September 13, 2001, p. S9357.
- 161 "'The technology has outstripped...'" Quoted by John Schwartz, "Disputes on electronic messages: Encryption takes on new urgency," New York Times, September 25, 2001.
- 161 "'I just assumed,' he said..." Schwartz, "Disputes," NYT.
- 162 "If you don't try, you're..." Schwartz, "Disputes," NYT.
- 162 "'We are not working on...'" Declan McCullagh, "Senator backs off backdoors," Wired News, October 17, 2001.
- 162 "Senator Gregg's proposal was a..." "Whoever, after January 31, 2000, sells in interstate or foreign commerce any encryption product that does not include features or functions permitting duly authorized persons immediate access to plaintext or immediate decryption capabilities shall be imprisoned for not more than 5 years, fined under this title, or both." 105th Congress, H.R. 695. House Report 104-108, part 4 "Security and Freedom Through Encryption (SAFE) Act of 1997," Section 2803.
- 163 "The report concluded that on..." National Research Council, Cryptography's Role in Securing the Information Society, Kenneth W. Dam and Herbert S. Lin, Editors, National Academy Press, 1996.
- 163 "FBI Director Louis Freeh testified..." Testimony of FBI Director Louis Freeh, before the Senate Judiciary Committee Hearing on Encryption, United States Senate, Washington, D. C., July 9, 1997.
- 164 "'The question,' posed MIT's Ron Rivest, ..." Statement by Ron Rivest at MIT Press Forum on Encryption, MIT, April 7, 1998.
- 165 "If anyone wishes to decipher..." Suetonius, The Lives of the Caesars: The Life of Julius Caesar, Chapter 56, from the Loeb Classical Library, 1913.
- 166 "The Caesar cipher is really..." Actually, the Romans didn't use J, U, or W, so Caesar had only 22 shifts available.
- 166 "Parts of this manual, which..." Folio 30 verso of Peterhouse MS. 75.I. For the dispute on the authorship, see Derek J. Price, The Equatorie of the Planetis, Cambridge University Press, 1955, and Kari Anne Rand Schmidt, The Authorship of The Equatorie of the Planetis, Chaucer Studies XIX, D.S. Brewer, 1993.

- 171 "Babbage never published his technique, ..." Babbage's contribution remained unknown until 1970.
- 172 "There is a deep relation..." Claude Shannon, "Communication Theory of Secrecy Systems," Bell System Technical Journal, Vol. 28–4 (1949), pp. 656–715.
- 173 "The Soviet KGB fell victim..." www.nsa.gov/publications/publi00039.cfm.
- 174 "The messages included correspondence between..." Rossella Lorenzi, Discovery News. 2007.
- 174 "Although Babbage and Kasiski had..." "A new cipher code," Scientific American Supplement, v.58 (January 27, 1917), p. 61. From the Proceedings of the Engineers Club of Philadelphia. [Baker Business Library, Historical Collection, By appointment only]. Available online at www.nku.edu/-christensen/Sciamericansuppl17January1917.pdf.
- 175 "In the absence of a..." As coined by Charlie Kaufman, Radia Perlman, and Mike Speciner in Network Security: Private Communication in a Public World, Prentice-Hall, 1995, p. 40.
- 176 "In 2001, however, WEP was..." Nikita Borisov, Ian Goldberg, and David Wagner, Intercepting Mobile Communications: The Insecurity of 802.11, Proceedings of the Seventh Annual International Conference on Mobile Computing and Networking, July 16–21, 2001.
- 176 "A spokesman for Texas Instruments, ..." "RFID crack raises spector [sic] of weak encryption: Steal a car—and the gas needed to get away," Computerworld, March 17, 2005; available at www.computerworld.com/mobiletopics/mobile/technology/story/0,10801,100459,00.html.
- 177 "The Flemish linguist Auguste Kerckhoffs..." Auguste Kerckhoffs, "La cryptographie militaire," Journal des sciences militaires, Vol. IX, pp. 5–38, January 1883, pp. 161–191, February 1883. Available on the Web at www.petitcolas.net/fabien/kerckhoffs/crypto militaire 1.pdf.
- 177 "Claude Shannon restated Kerckhoffs's Principle..." This adage has come to be known as Shannon's maxim. Shannon, "Communication Theory of Secrecy Systems," 662ff.
- 177 "The method was kept secret..." Jeffrey A. Bloom, Ingemar J. Cox, Ton Kalker, Jean-Paul M.G. Linnartz, Matthew L. Miller, and C. Brendan Traw, "Copy Protection for DVD Video," Proceedings of the IEEE, Vol. 87, No. 7, July 1999, pp. 1267–1276.
- 178 "A newer standard, Advanced Encryption..." Federal Information Processing Standards Publication 197, Advanced Encryption Standard. csrc.nist.gov/publications/fips/fips197/fips-197.pdf.
- 179 "This is what the paper..." Whitfield Diffie and Martin Hellman, "New directions in cryptography," IEEE Transactions on Information Theory, November 1976. An important piece of the puzzle was contributed by Berkeley graduate student Ralph Merkle, and today Diffie, Hellman, and Merkle are typically given joint credit for the innovation.
- 179 "It was revealed in 1997..." James Ellis, "The History of Non-secret Encryption;" available at www.cesg.gov.uk/site/publications/media/ellis.pdf.

- 181 "The key agreement protocol starts..." The particular one-way computation of Diffie and Hellman is the remainder of x^y when divided by p, where p is an industry-standard, fixed prime number.
- 185 "One can multiply numbers in..." To be precise, multiplication of n-bit numbers can be done in slightly super-linear time, while fastest factoring algorithms take time exponential in the cube root of n.
- 186 "Anyone who wants to use..." This idea, and the use of the word "certificate," were introduced by Loren Kohnfelder in his 1978 MIT bachelor's thesis. Loren M. Kohnfelder, "Towards a Practical Public-key Cryptosystem," MIT S.B. Thesis, May 1978 (unpublished).
- 187 "At first, public-key encryption..." As quoted in "The Science of Secrecy: The birth of the RSA cipher." www.channel4.com/science/microsites/S/secrecy/ page5b.html.
- 187 "They simply did not appreciate..." Conversation between Bobby Ray Inman and Hal Abelson, February 1995. Shortly after RSA appeared, the NSA asked MIT not to publish the paper, but MIT refused, citing academic freedom.
- 189 "This is analogous to driftnet..." Testimony of Philip Zimmermann to Subcommittee for Economic Policy, Trade, and the Environment, U.S. House of Representatives, October 12, 1993.
- 190 "In Zimmermann's own words..." Zimmermann, Congressional testimony, October 12, 1993.
- 191 "For example, the Chinese government..." Regulation of Commercial Encryption Codes, China State Council Directive No. 273.
- 191 "In 2007, the United Kingdom enacted..." Part 3, Section 49 of the Regulation of Investigatory Powers Act.
- 191 "But it is up-to-date..." Patrick Radden Keefe, Chatter: Dispatches from the Secret World of Global Eavesdropping, Random House, 2005.
- 192 "A series of executive orders..." The Protect America Act of 2007, §1927 of the Foreign Intelligence Surveillance Act
- 192 "Such developments may stimulate encryption..." Patricia J. Williams, "The protect Alberto Gonzales Act of 2007," The Nation, August 27, 2007.
- 193 "On the one hand, encryption technology..." www.strategypage.com/dls/ articles/2004850.asp.

195 "But, he warned, once the..." Andersen's story is described in Ashbel S. Green, "Music Goliath unloads on wrong David," The Oregonian, July 1, 2007, at www.oregonlive.com. Further details can be found in the lawsuit Andersen v. Atlantic Recording Corporation et al., case number 3:2007cv00934, U.S. District Court of Oregon at Portland, filed June 22, 2007, at www.ilrweb.com.

- 196 "When they could not produce..." Janet Newton, "RIAA named in first class action," p2planet, August 16, 2007, at www.p2pnet.net/story/13077. The actual complaint can be found at www.ilrweb.com, Amended Complaint 070816.
- 196 "The RIAA has filed more..." Cited in Joshua Freed (Associated Press), "RIAA: Expect More Music Download Suits," lexisone, October 4, 2007, at www.lexisone.com/news/ap/ap100407e.html.
- 196 "There's even a web site, ..." Ray Beckerman, "How the RIAA Litigation Process Works," info.riaalawsuits.us/howriaa_printable.htm. Also see the declaration of Carlos Linares, RIAA VP for Anti-Piracy Legal Affairs, U.S. District Court, MA, filed as part of many John Doe lawsuits—for example, U.S. District Court of Massachusetts, Case 1:07-cv-10834-NG, filed May 2, 2007; available at www.ilrweb.com, 070502LineresDeclaration. The RIAA's p2plawsuits.com web site was visited August 3, 2007.
- 197 "But we also realize that..." Quoted in Dennis Roddy, "The Song Remains the Same," Pittsburgh Post-Gazette, September 14, 2003, at www.post-gazette.com.
- 197 "Besides Andersen, other snared 'dolphin'..." Lowell Vickers, "Family sued by recording industry," Rockmart Journal, Rockmart Georgia, April 24, 2006, news.mywebpal.com. Also Walter v. Paladuk, U.S. District Court of Eastern Michigan described in "RIAA Sues Stroke Victim in Michigan," recordingindustryvspeople.blogspot.com. Also Eric Bangemann, "I Sue Dead People," Ars Technica, February 4, 2005, arstechnica.com/news.ars/post/20050204-4587.html.
- 197 "For defendants who can prove..." The fines (as of 2007) are stipulated in 17 USC 504 (2007).
- 198 "Said the RIAA's lawyer after..." David Kravets, "RIAA Juror: 'We Wanted to Send a Message'," Wired Blog Network, October 9, 2007, at blog.wired.com/27bstroke6/2007/10/riaa-juror-we-w.html.
- 199 "Without a commercial motive, there..." For a detailed discussion of the increasing penalties up through 1999, see Lydia Pallas Loren, "Digitization, Commodification, Criminalization: The Evolution of Criminal Copyright Infringement and the Importance of the Willfulness Requirement," Washington University Law Quarterly, 77:835, 1999.
- 200 "The Boston U.S. Attorney issued..." Quoted in Josh Hartmann, "Student Indicted on Piracy Charges," The Tech, April 8, 1994, at the-tech.mit.edu/V114/N19/piracy.19n.html.
- 200 "He cited Congressional testimony from..." United States District Court District of Massachusetts, 871 F. Supp. 535, December 28, 1994.
- 201 "Its supporters argued that NET..." See the statement before the Senate by Senator Leahy of Vermont, Congressional Record: July 12, 1999 (Senate) page S8252-S8254; available at cyber.law.harvard.edu/openlaw/DVD/dmca/cr12jy99s.txt.
- 203 "A year later, after an..." The full story has a lot of legal twists and turns. Even after declaring bankruptcy and having its assets bought, Napster survives today as a pay-per-track music service. For a complete timeline, see Stephanie

- Hornung, "Napster: The Life and Death of a P2P Innovator," Berkeley Intellectual Property Weblog, January 15, 2003, at journalism.berkeley.edu/projects/ biplog/archive/000428.html.
- 204 "Systems incorporating peer-to-peer communication..." Steve Crocker, "Host Software," Network Working Group Request for Comment: Number 1, April 7, 1969, at www.apps.ietf.org/rfc/rfc1.html.
- 204 "As one 2001 review gushed, ..." Clay Shirky, Kelly Trueloy, Rael Dornfest, and Lucas Gonze, 2001 P2P Networking Overview, O'Reilly, 2001. The \$500 million investment estimate is guoted at www.oreilly.com/catalog/p2presearch/ summary/index.html.
- 205 "But the success of decentralized ... " See, for example, Hari Balakrishnan, M. Frans Kaashoek, David Karger, Robert Morris, and Ion Stoic, "Looking Up Data in P2P Systems," Communications of the ACM, February 2003/Vol. 46, No. 2; also Stephanos Androutsellis-Theotokis and Diomidis Spinellis, "A Survey of Peer-to-Peer Content Distribution Technologies," ACM Computing Surveys, Vol. 36, No. 4, December 2004, pp. 335-371.
- 206 "In October 2001, the RIAA..." The complaint is MGM etc. al. v. Grokster et al., at www.eff.org/IP/P2P/MGM v Grokster/20011002 mgm v grokster complaint.pdf.
- 206 "'I say to you that the...'" Testimony of MPAA President Jack Valenti in Hearings on the Home Recording of Copyrighted Works before the Subcommittee on Courts, Civil Liberties, and the Administration of Justice of the Committee on the Judiciary, House of Representatives, April, 12, 1982, at cryptome.org/ hrcw-hear.htm.
- 206 "In a narrow 5 to 4..." Sony Corp. of America v. Universal City Studios, Inc., 464 U.S. 417 (1984).
- 207 "In April 2003, the Central California..." U.S. District Court Judge Stephen V. Wilson, at www.eff.org/IP/P2P/MGM v Grokster/030425 order on motions.pdf.
- 207 "In reaction, the RIAA immediately..." RIAA News Release, June 25, 2003, "Recording Industry to Begin Collecting Evidence and Preparing Lawsuits Against File [sic]," at riaa.com.
- 207 "In short, from the evidence..." www.eff.org/IP/P2P/MGM_v_Grokster/ 20040819 mgm v grokster decision.pdf.
- 207 "In June 2005, the Court..." MGM Studios v. Grokster, Ltd., 545 U.S. 913 (2005).
- 208 "Many people certainly thought so, ..." From testimony by Chairman and CEO of the Walt Disney Company, President Michael Eisner, in hearings on Protecting Content in a Digital Age, U.S. Senate Committee on Commerce, Science, and Transportation, February 28, 2002, 37.
- 208 "That's more than a trillion..." Revenues were \$33.6 billion in 2006, per news.bbc.co.uk/2/hi/entertainment/4639066.stm.
- 208 "The company that bought Replay's..." See Fred von Lohmann and Wendy Seltzer, "Death by DMCA," IEEE Spectrum Online, June 2006, at www.spectrum. ieee.org/jun06/3673.

- 209 "Non-coincidentally, in 2002, the..." Turner Broadcasting System CEO Jamie Kellner, interviewed in Cableworld, April 29, 2002, at www.2600.com/news/050102-files/jamie-kellner.txt.
- 209 "In 1993, a U.S. Federal Circuit..." MAI Systems Corp. v. Peak Computer, Inc., 991 F.2d 511 (9th Cir. 1993). The 9th Circuit's rigid interpretation of copying here has been widely criticized by legal scholars, but it has also been the basis for subsequent court rulings. For a discussion, see Joseph P. Liu, "Owning Digital Copies: Copyright Law and the Incidents of Copy Ownership," 42 Wm. &t Mary L. Rev. 1245, 1255–78 (2001). The copyright statute was modified in 1998 to also permit copying the code into memory for the purpose of maintenance or repair (17 USC 117).
- 209 "A 1995 report from the Department..." Bruce A. Lehman, Intellectual Property and the National Information Infrastructure: The Report of the Working Group on Intellectual Property Rights, 1995, pp. 64–66, at www.uspto.gov/web/offices/com/doc/ipnii/.
- 210 "Similarly, if Fortress prepares music files..." See Adobe LiveCycle Enterprise Suite, at www.adobe.com/products/livecycle/. Also Windows Media Rights Manager 10.1.2 SDK, at msdn2.microsoft.com/en-us/library/bb649422.aspx.
- 210 "DRM systems are widely used..." One such system is XrML (eXtensible rights Markup Language), based on work originally done at Xerox Palo Alto Research Center and licensed by Microsoft. See www.xrml.org.
- 211 "Encrypting the files helps, but..." For an example, see "Microsoft Windows Media copy protection broken," informity, September 12, 2006, at informity. com/articles/2006/09/12/microsoftwindowsmedia/. As the article quotes a Microsoft representative, "Microsoft has long stated that no DRM system is impervious to circumvention—a position our content partners are aware of as well." PDF decrypters are readily found on the Web. We'd provide links in this note, but our publisher is wary of possible DMCA violations.
- 211 "This basic technique was worked..." Some of this early work is S. T. Kent, "Protecting externally supplied software in small computers," Ph.D. dissertation, Massachusetts Institute of Technology. Dept. of Electrical Engineering and Computer Science, 1981. Also S. R. White and L. Comerford, "ABYSS: An Architecture for Software Protection," *IEEE Trans. Softw. Eng.* 16, 6 (June 1990), 619–629. Also Ryoichi Mori and Masaji Kawahara, "Superdistribution: The Concept and the Architecture," *Transactions of the IEICE*, Vol. E 73, No. 7, July 1990, pp. 1133–1146.
- 211 "The required chip, called a Trusted..." See the organization's web site at https://www.trustedcomputinggroup.org. The original name of this organization was the Trusted Computing Platform Alliance, and the original members were Intel, Microsoft, HP, Compag, and IBM.
- 211 "One industry estimate shows that..." Shane Rau, "IDC Executive Brief: The Trusted Computing Platform Emerges and Industry's First Comprehensive Approach to IT Security," February 2006, at https://www.trustedcomputinggroup.org/news/Industry Data/IDC 448 Web.pdf.

- 212 "As one security researcher warned: ..." Talk by Lucky Green, at the Berkeley Conference on the State of Digital Rights Management, February 28, 2003, reported in transcript at www.law.berkeley.edu/institutes/bclt/drm/ trans/drm-2-28-p2.htm.
- 213 "A world of trusted systems..." Jonathan Zittrain, in The Future of the Internet and How to Stop It, argues that the viability of the Internet as a "generative platform" is being threatened by the lock-in motivated by concerns for security.
- 213 "Windows Vista implements this in..." See Dave Marsh, Output Content Protection and Windows Vista, April 27, 2005, at www.microsoft.com/ whdc/device/stream/output protect.mspx.
- 213 "In the words of one..." Bruce Schneier, "The Futility of Digital Copy Prevention," CRYPTO-GRAM, May 15, 2001, at www.schneier.com/crypto-gram-0105.html.
- 214 "A New York U.S. District..." Universal City Studios, Inc. v. Corley, 273 F.3d 429 (2d Cir. 2001) decision available at www.eff.org/IP/Video/MPAA DVD cases/ 20011128_ny_appeal_decision.html.
- 214 "Alternative proposals that would have..." Defeated alternative versions were the "Digital Copyright Clarification and Technology Act of 1997," S. 1146 (Ashcroft), 105th Cong. (1997) in the Senate, and the "Digital Era Copyright Enhancement Act," H.R. 3048, 105th Cong. (1997) (Boucher).
- 215 "That is, allowing anti-circumvention devices..." Letter from U.S. Rep. Barney Frank to Hal Abelson, July 6, 1998.
- 215 "There are many published explanations..." For example, Matt Blaze, "Cryptology and physical security: Rights amplification in master-keyed mechanical locks," IEEE Security and Privacy, March/April 2003, at www.crypto.com/papers/mk.pdf.
- 215 "Indeed, AT&T threatened legal action..." David Kravitz, "Unlocking Your iPhone is Legal; Distributing the Hack, Maybe Not," Wired Blog Network, August 27, 2007, at blog.wired.com/27bstroke6/2007/08/to-unlock-the-i.html. The Librarian of Congress's ruling is "Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies," November 27, 2006, Federal Register, Vol. 71, No. 227. Rules and regulations, pp. 68472-68480. www.copyright.gov/fedreg/2006/71fr68472.html.
- 216 "It took two years for the case..." Chamberlain v. Skylink, 381 F.3d 1178 (Fed. Cir. 2004). Initial December 2002, DMCA complaint available at www.eff.org/ legal/cases/Chamberlain v Skylink/MotionSummJudgment.pdf.
- 216 "The ruling was overturned on..." Lexmark International v. Static Control Components, 387 F.3d 522 (6th Cir. 2004), at www.eff.org/legal/cases/ Lexmark v Static Control/20041026 Ruling.pdf.
- 216 "Had the appeals court not..." Storage Technology Corp. v. Custom Hardware Engineering & Consulting, 2005 U.S. App. LEXIS 18131 (Fed. Cir. 2005), at fedcir.gov/opinions/04-1462.pdf.
- 217 "Any company marketing a product..." See www.dvdcca.org/.

- 217 "Another start-up working on a..." Rick Merritt, "Judge rules against DVD consortium," *EE Times*, March 29, 2007, at www.eetimes.com/news/latest/showArticle.jhtml?articleID=198701186.
- 218 "In 2002, Congress considered a..." This was the "Consumer Broadband and Digital Television Promotion Act," introduced by Senator Fritz Hollings (D-SC) in March 2002.
- 218 "By outlawing technology for circumventing..." Timothy B. Lee, "Circumventing Competition: The Perverse Consequences of the Digital Millennium Copyright Act," CATO Institute, Policy Analysis no. 564, March 21, 2006, at www.cato.org/pub display.php?pub id=6025.
- 219 "The relentless message is that..." See www.koyaanasqatsi.org. Ironically, the film, which some people have praised as the greatest film ever made, was unavailable during most of the 1990s due to a copyright dispute.
- 219 "The period of copyright was..." The image from the Centinel is from microfilm in the Harvard University Library. The current law is available from the U.S. Copyright Office at www.copyright.gov/title17/circ92.pdf.
- 220 "For digital satellite radio, you..." See 17 USC \$110(6), \$121(a)(2), and \$114.
- 221 "In contrast, in an October..." Pariser's testimony is quoted in: Eric Bangeman, "Sony BMG's chief anti-piracy lawyer: 'Copying' music you own is 'stealing'," Ars technica, October 2, 2007, at http://arstechnica.com/news.ars. When subsequently questioned about this, RIAA President Cary Sherman claimed that Pariser had "mis-spoken" and had misheard the question. (NPR Talk of the Nation, January 3, 2008.) The RIAA's legal advice on CD copying is at http://www.riaa.com/physicalpiracy.php. The LA Times survey is described in Charles Duhigg, "Is Copying a Crime? Well...," August 9, 2006, at www.latimes.com.
- 222 "That resentment can easily grow..." John Gilmore, "What's Wrong with Copy Protection," February 16, 2001, at www.toad.com/gnu/whatswrong.html.
- 222 "As the president of the MPAA..." Estimate from MPAA news release, June 21, 2007, "Lights ... camera ... busted!," available at www.mpaa.org/PressReleases. asp. The quotation is from MPAA President Dan Glickman, commenting in response to the 9th Circuit Court's ruling in *Grokster* (subsequently overturned), January 25, 2005, at www.riaa.com/newsitem.php/news_room.php.
- 223 "In Jobs's view, a world..." Steve Jobs, "Thoughts on Music," February 6, 2007, at http://www.apple.com/hotnews/thoughtsonmusic/.
- 223 "Musicload asserted that DRM makes..." "Die Nutzung von Musik für der Verbraucher erschweren und verhindern, dass sich der legale Download zum Massenmarkt entwickelt." Quoted in Heise Online, March 17, 2007, at www.heise.de/newsticker/meldung/86944.
- 223 "Its director general claimed that..." Bayley, quoted in Andrew Edgecliffe-Johnson, "Anti-piracy moves 'hurt sales'," Financial Times, November 20, 2007, at www.ft.com.
- 223 "By the summer of 2007, ..." "Apple Launches iTunes Plus: Higher Quality DRM-Free Tracks Now Available on the iTunes Store Worldwide," May 30, 2007, at

- www.apple.com/pr/library/2007/05/30itunesplus.html. Also Ken Fisher, "Universal to track DRM-free music online via watermarking," August 15, 2007, at arstechnica.com/news.ars/post/20070815-universal-to-track-drmfree-music-online-via-watermarking.html.
- 223 "The same perspective can apply..." See D. Weitzner, H. Abelson, T. Berners-Lee, J. Feigenbaum, J. Hendler, and G. Sussman, "Information Accountability," MIT Comp. Sci. and Artificial Intelligence Lab Technical Report, No. 2007-34, June 13, 2007. Available at hdl.handle.net/1721.1/37600.
- 223 "A few months later, even..." Eliot Van Buskirk, "Some of Amazon's MP3 Tracks Contain Watermarks," Wired Blog Network, Sept. 25, 2007, at blog.wired.com/ music/2007/09/some-of-amazons.html.
- 223 "When Jobs made his February..." Gregg Keizer, "Warner Chief Calls Jobs' DRM Fight 'Without Logic'," Computerworld, February 10, 2007.
- 224 "Before the end of the..." Jessica Mintz, "Warner offers DRM-free music on Amazon," Associated Press, December 28, 2007.
- 224 "One plan links the service..." "Universal Music Takes on iTunes," Business Week *News*, October 22, 2007, at www.businessweek.com/magazine/content/ 07 43/b4055048.htm?chan=rss topStories ssi 5.
- 224 "New companies are emerging that..." One example is Ruckus Network, which offers content from its catalog of music and videos to students on participating campuses, where the content is delivered as streaming media. See www. ruckusnetwork.com. One weakness of the model is its use of DRM-the music can be downloaded but not burned to CDs-but that might change with the increasing move toward DRM-free distribution.
- 224 "People can make unlimited use..." One such effort, a start-up with participants from Harvard Law School called Noank Media, is planning pilots with several Chinese universities.
- 224 "Stimulating open sharing on the..." For a thorough discussion of commons, and especially their relation to the digital environment, see Yochai Benkler, The Wealth of Networks: How Social Production Transforms Markets and Freedom, Yale University Press, 2006.
- 225 "Success could pave the way ... "One example: Bruce Lehman, Undersecretary of Commerce during the Clinton administration and author of the copyright report mentioned in endnote 29, was a major architect of the DMCA. In a panel discussion held at McGill University on March 25, 2007, he admitted that "our Clinton administration policies didn't work out very well" and "our attempts at ... copyright control have not been successful," and he criticized the recording industry for their failure to adapt to the online marketplace. Video available at video.google.com/videoplay?docid=4162208056624446466.
- 226 "At issue is the fact..." The Google books library project is described at books.google.com/googlebooks/library.html. The lawsuits are described at Elinor Mills, CNET News.com, "Authors Guild Sues Google over library project," September 20, 2005, news.com.com/2100-1030 3-5875384.html; Alorie Gilbert, CNET News.com, "Publishers sue Google over book search project," October 19,

- 2005, news.com.com/Publishers+sue+Google+over+book+search+project/2100-1030_3-5902115.html. The comment by Authors' Guild president Nick Tayor appears in a debate over the issue held at the New York Public Library on November 17, 2005. The transcript can be found at www.nypl.org/research/calendar/imagesprog/google111705.pdf.
- 227 "These were major controversial issues..." In the U.S., details of these rights, called riparian rights, differ from state to state. A seminal case in the West here is Strickler v. Colorado Springs, 16 Colo. 61, 70, 26 P. 313, 316 (1891). We're grateful to Danny Weitzner for pointing out the connection between information and water.
- 227 "From ancient times, property rights..." For a discussion from the perspective of the 1920s, see Hiram L. Jome, "Property in the Air as Affected by the Airplane and the Radio," The Journal of Land & Public Utility Economics, Vol. 4, No. 3. (August 1928), pp. 257–272. "The Latin common law maxim, formulated in the early part of the sixteenth century, [was] Cuius est solum, eius est usque ad caelum (He who owns the soil, owns it up to the sky)." Jome discusses the example of the owner of the "Cackle Corner Poultry Farm," who complained to the U.S. Postmaster General about low-flying mail planes frightening his hens and lowering egg production. The U.S. Air Commerce Act of 1926 nationalized the navigable airspace (see 49 USC \$40103). It's intriguing to compare this "creation of a new national resource" with the almost simultaneous nationalization of the spectrum by the Radio Act of 1927, as described in Chapter 8, "Bits in the Air."
- 227 "Congress forestalled the growth of..." The parallel between air rights and information rights is drawn by Larry Lessig in Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity (Penguin, 2004), and before that by Keith Aoki in "(Intellectual) Property and Sovereignty: Notes toward a Cultural Geography of Authorship," Stanford Law Review, Vol. 48, No. 5 (May 1996), pp. 1293–1355. Technology-stimulated controversies over ancient doctrines of land ownership have also extended into modern times. In 1976, Ecuador, Colombia, Brazil, Congo, Zaire, Uganda, Kenya, and Indonesia adopted the Bogota Declaration, which claimed the right of national sovereignty for equatorial countries over portions of geostationary orbits over their territory.

- 229 "She found his profile on..." Erin Alberty, "A love that clicked," Saginaw News, December 10, 2006.
- 229 "Lester tricked her mother into..." David N. Goodman, "Michigan girl heading home from Jordan after attempted rendezvous with man she met on MySpace.com," Minneapolis Star-Tribune, June 9, 2006.
- 230 "Do you know where your..." Julian Sher, "The not-so-long arm of the law," USA Today, May 1, 2007.

- 231 "But on September 12, 2007, ..." abclocal.go.com/wjrt/story?section= local&id=5653762.
- 231 "The affair finally ended a..." "MySpace Teen breaks up on 'Dr. Phil," WNEM.com, November 27, 2007. www.wnem.com/news/14702796/detail.html.
- 232 "What are the rules of ... " John Perry Barlow, "The economy of ideas," May 1994. www.wired.com/wired/archive/2.03/economy.ideas pr.html.
- 232 "For example, when Pete Solis..." Alison Hoover, "Keeping MySpace safe," The Washington Times, June 28, 2006.
- 233 "If a government seeks to..." This analysis, and Figure 7.1, are based on Jonathan Zittrain, Internet Points of Control, 43 B. C. L. Rev. 653 (2003).
- 235 "The case of Cubby v. ..." Cubby v. CompuServe, No. 90 Civ. 6571 (PKL), U.S. District Court for the Southern District of New York, October 29, 1991.
- 235 "Sometimes, though, it takes away..." Eugene Volokh, "Chilled Prodigy," Reason, August/September 1995.
- 236 "The whole company was a..." Stratton Oakmont, Inc., and Daniel Porush, v. Prodigy Services Co., Index No. 31063/94, Supreme Court of New York, Nassau County, May 24, 1995.
- 237 "To determine whether material is..." U.S. Supreme Court, Miller v. California, 413 U.S. 15 (1973).
- 238 "Bob and Carleen were not indicted ... "David Loundy, "Whose Standards? Whose Community?," Chicago Daily Law Bulletin, August 1, 1994, 5. www.loundy.com/ CDLB/AABBS.html.
- 238 "Shipping the bits was just..." 1996 FED App. 0032P (6th Cir.), United States Court of Appeals, Sixth Circuit, U.S. v. Robert Alan Thomas and Carleen Thomas, decided and filed January 29, 1996. www.epic.org/free speech/ censorship/us v thomas.html.
- 239 "On those Usenet newsgroups where..." Philip Elmer-DeWitt, "On a screen near you," Time Magazine, July 3, 1995.
- 240 "[Y]ou are trying to ward..." John Perry Barlow, "A declaration of the independence of Cyberspace," February 8, 1996. homes.eff.org/~barlow/ Declaration-Final.html.
- 241 "As the most participatory form..." ACLU v. Reno, Civil action no. 96-963, U.S. District Court for the Eastern District of Pennsylvania, June 12, 1996.
- 242 "For example, he told adult..." Tristan Louis, "Dirty business at CMU," Internet World, October 1995. www.tnl.net/who/bibliography/rimm/.
- 242 "He published a book called..." Casino Forum, March 1995.
- 243 "'No provider or user of an...'" CDA, \$230(c)(1,2).
- 243 "'We doubt,' wrote the appeals..." Fair Housing Council of San Fernando Valley, et al., v. Roommates.com, 04-56916 and 04-57173, U.S. Court of Appeals for the Ninth Circuit, May 15, 2007.
- 244 "One man who made it..." www.cnn.com/US/OKC/daily/9512/12-30/index.html.

- 245 "But the Good Samaritan provision..." Kenneth M. Zeran v. America Online, Inc., No. 97-1523, U.S. Court of Appeals for the Fourth Circuit, 129 F. 3d 327, November 12, 1997. legal.web.aol.com/decisions/dldefam/zeranapo.html.
- 245 "Much as he may have..." Zeran v. Diamond Broadcasting, Inc., U.S. Court of Appeals, Tenth Circuit, Nos. 98-6092 and 98-6094, filed January 28, 2000. legal.web.aol.com/decisions/dldefam/zerandia.html.
- 246 "The court sided with AOL..." Sidney Blumenthal and Jacqueline Jordan Blumenthal v. Matt Drudge and America Online, Inc., Civil action No. 97-1968, U.S. District Court for the District of Columbia, April 22, 1998. www.techlawjournal.com/courts/drudge/80423opin.htm.
- 247 "The sequence of decisions 'thrusts...'" Jane and John Doe v. America Online, Supreme Court of Florida, March 8, 2001, No. SC94355, dissent of J. Lewis. www.eff.org/legal/ISP liability/CDA230/doe v aol.pdf.
- 249 "Much as he was sympathetic..." U.S. District Court for the Eastern District of Pennsylvania, ACLU v. Gonzalez, Civil Action 98-5591, Final Adjudication, March 22, 2007. www.paed.uscourts.gov/documents/opinions/07D0346P.pdf.
- 250 "When she sent them away..." "After 5 years on the Internet, Pathfinder reaches its final destination." Cleveland Plain Dealer, May 3, 1999.
- 250 "In fact, the 'woman' sending..." "Computer stalking case a first for California," New York Times, January 25, 1999; Valerie Alvord, "Cyberstalkers must beware of the e-law," USA Today, November 8, 1999.
- 250 "Only when a message is..." Brandenburg v. Ohio, 395 U.S. 444 (1969).
- 250 "No danger flowing from speech..." Whitney v. California, 274 U.S. 357, 375–76 (1927). Justice Holmes joined this opinion.
- 251 "Reasonable jurists could, and did..." Rene Sanchez, "Abortion foes' Internet site on trial; Doctors' fear of violence collides with radical opponents' rights to free speech," Washington Post, January 15, 1999; Planned Parenthood of the Columbia/Willamette Inc., et al., v. American Coalition of Life Activists, et al., U.S. Court of Appeals for the Ninth Circuit, No. 04-35214, 422 F.3d 949. Decision dated September 6, 2005.
- 251 "The '2005 Violence Against Women...'" H.R. 3402, §113(a).
- 252 "The Telecommunications Act of 1934..." \$223(a)(1)(B). www.dinf.ne.jp/doc/english/Us Eu/ada e/telcom act/47/223.htm.
- 252 "The law was challenged by..." The Suggestion Box, Inc. v. Gonzales. Quotes from www.theanonymousemail.com/.
- 252 "So the law is in force..." TheAnonymousEmail.com successfully obtains clarification of Federal "Annoyance Law" in its suit against Attorney General Gonzalez and the Federal Government. www.hotstocked.com/news/suggestion-box-inc-SGTB-4182764.html.
- 253 "The congressional sponsors have succumbed..." RH 5319, 109th Congress, 2nd session, July 27, 2006.
- 253 "But in the words of one..." Alexander Meiklejohn, "Testimony on the Meaning of the First Amendment to the Senate Judiciary Subcommittee on Constitutional Rights," 1955.

- 254 "In Thailand, www.stayinvisible.com is blocked..." Examples from the OpenNet Initiative.
- 254 "Google has even hired a..." Christopher S. Rugaber, "Google ask feds to fight Internet censorship abroad," Houston Chronicle, June 22, 2007.
- 255 "On October 30, 2000, the..." Bill Alpert, Unholy gains, Barron's, October 30, 2000.
- 255 "The Australian court agreed with Gutnick..." High Court of Australia, Dow Jones and Co. v. Gutnick [2002] HCA 56 (December 10, 2002). www.austlii.edu.au/au/cases/cth/high ct/2002/56.html#fn204.
- 255 "Gutnick ultimately won an apology..." "Gutnick settles suit," The Advertiser, November 12, 2004.
- 255 "Is it possible that a rogue..." Felicity Barringer, "Internet makes Dow Jones open to suit in Australia," New York Times, December 11, 2002.
- 255 "By imposing death sentences..." Warren Richey, "Once it's on the Web, whose law applies?," Christian Science Monitor, December 19, 2002.
- 256 "'We should not allow a...'" Court of Appeals for the Ninth Circuit, Yahoo! Inc. v. La Ligue Contree Le Racisme et al., No. 01-17424, D. C. No. CV-00-21275,-JF, p. 505.
- 257 "But as one British commentator..." John Naughton, "The Germans get their Flickrs in a twist over 'censorship," The Observer, June 17, 2000.

- 259 "The cable network CNN carried..." www.cnn.com/2006/POLITICS/07/17/bush. tape/index.html.
- 259 "Most broadcast stations bleeped out the expletive." Jeff Jarvis, "America gives a shit," Reason Magazine, October 2006. www.reason.com/news/show/36821.html.
- 259 "The FCC ruled that this..." This seems a curiously self-referential standard, since the broadcast community gets to see and hear only what the FCC rulings permit.
- 259 "It promised to fine and even..." www.fcc.gov/eb/Orders/2004/FCC-04-43A1.html.
- 260 "Have you ever tried to..." www.fcc.gov/omnibus_remand/FCC-06-166.pdf.
- 260 "A federal court reversed the..." Fox Television Stations et al. v. Federal Communications Commission, U.S. Court of Appeals for the Second Circuit, Docket Nos. 06-1760-ag (L), 06-2750-ag (CON), 06-5358-ag (CON), June 4, 2007
- 260 "Congress quickly introduced legislation to..." The Protecting Children from Indecent Programming Act introduced by Senator John Rockefeller (D-WV) would effectively overturn the court decision on the Fox Television Stations v. FCC, pressesc.com/01184929170_senate_indecency_bill, Linda Greenhouse "Justices take up on-air vulgarity again," New Your Times, March 18, 2008.

- 260 "Congress may have thought that..." Notices of Apparent Liability and Memorandum Opinion and Order, March 15, 2006, FCC 06-17, 1.
- 260 "The Supreme Court struck down..." U.S. Supreme Court, Miami Herald Publishing Company v. Tornillo, 418 U.S. 241 (1974).
- 260 "In spite of the spike..." www.televisionwatch.org/junepollresults.pdf.
- 260 "Because the broadcast media have..." Opinion of Justice Stevens in Federal Communications Commission v. Pacifica Foundation et al., 438 U.S. 726, 748.
- 261 "Indeed, federal legislation has been..." The Family and Consumer Choice Act of 2007 is cosponsored by Rep. Daniel Lipinski (D-IL) and Rep. Jeff Fortenberry (R-NE).
- 262 "Lower Manhattan communicated for several..." Peter Meyers, "In crisis zone, a wireless patch," New York Times, October 4, 2001.
- 263 "The main job of the ship's..." www.titanic-titanic.com/warnings.shtml.
- 263 "Who would pay to send..." The term "radio" became standard only after World War II.
- 264 "A completely different ship reported..." Karl Baarslag, S O S to the Rescue, Oxford University Press, 1935, 72.
- 265 "Some people could 'catch the...'" "Wireless melody jarred," New York Times, January 14, 1910, 2.
- 265 "'When the world weeps together..." www.titanicinquiry.org/USInq/USReport/AmInqRepSmith01.php.
- 265 "The Radio Act of 1912..." An act to regulate radio communication, August 13, 1912, 1.
- 267 "Sports broadcasting was born with..." Erik Barnouw, A Tower in Babel, Oxford University Press, 1966, 69, 85.
- 267 "The first five radio stations..." Barnouw, 91, 104.
- 267 "The number of radio receivers..." "Asks radio experts to chart the ether," New York Times, February 28, 1922, 16.
- 267 "Intercity sued Hoover to have..." Hoover v. Intercity Radio, Inc., No. 3766, Court of Appeals of District of Columbia, 52 App. D.C. 339, February 5, 1923.
- 267 "The spectrum was 'a great...'" Herbert Hoover, Speech to the first National Radio Conference (February 27, 1922), Memoirs of Herbert Hoover, v. 2: The Cabinet and Presidency, MacMillan, 1952, 140.
- 267 "'[T]he large mass of subscribers...'" NYT, February 28, 1922.
- 268 "After all, their money would..." The reminiscences of Herbert Clark Hoover, Oral History Research Project, Radio Unit, Columbia University, January 1951, 12.
- 268 "But as the slicing got..." End Cincinnati radio row, New York Times, February 15, 1925.
- 268 "Hoover fined Zenith; Zenith challenged..." UNITED STATES v. ZENITH RADIO CORPORATION et al., District Court, N.D. Illinois, E.D., 12 F.2d 614; April 16, 1926.

- 268 "Anyone could start a station..." Hoover asks help to avoid air chaos, New York Times, July 10, 1926.
- 268 "Congress finally was forced to act." Daniel Klein argues in "Rinkonomics" that regulation may be unnecessary where there is enough coincidence of interest. www.econlib.org/library/Columns/y2006/Kleinorder.html.
- 269 "In case of competition among..." The Radio Act of 1927, Public Law No. 632, February 23, 1927, 1, 9.
- 270 "Nothing in this Act shall..." Radio Act of 1927, 29.
- 271 "In time, he discovered that..." Barnouw, 169ff; Gerald Carson, The Roquish World of Dr. Brinkley, Rinehart and Co., 1960, 33ff. A new biography of Brinkley has appeared: Pope Brock, Charlatan, Crown, 2008.
- 271 "This combination will do for..." KFKB Broadcasting Assn, Inc., v. Federal Radio Commission, 60 App. D.C. 79, 47 F.2d 670, February 2, 1931.
- 271 "In a national voll, it..." Carson, 143.
- 271 "An arguable point—as Albert..." Quoted by Anthony Lewis in Make No Law, Vintage, 1991, 60. Lewis cites Levy, Emergence of a Free Press, 302–303.
- 272 "There is a fixed natural..." NATIONAL BROADCASTING CO., INC. ET AL. v. UNITED STATES ET AL., No. 554, SUPREME COURT OF THE UNITED STATES, 319 U.S. 190; 63 S. Ct. 997; 87 L. Ed. 1344; 1943 U.S. LEXIS 1119; 1 Media L. Rep. 1965; February 10 and 11, 1943, Argued; May 10, 1943, Decided. This passage cites two radio engineering textbooks, one published in 1933, and the other in 1937.
- 272 "Central planning works no better..." This analogy is due to Michael Marcus.
- 273 "De facto, as one historian..." E. Pendleton Herring, "Politics and radio regulation," Harvard Business Review, January 1935.
- 274 "Hoover understood this way back..." NYT, February 28, 1922.
- 274 "When you listen to XM..." Mark Lloyd, "The strange case of satellite radio," Center for American Progress, February 8, 2006.
- 276 "That is, the spectrum resource..." Federal Communications Commission, Spectrum Policy Task Force, Report of the Spectrum Efficiency Working Group, November 15, 2002, 9.
- 276 "Perhaps such a station could..." Mark M. Bykowsky and Michael J. Marcus, "Facilitating spectrum management reform via callable/interruptible spectrum," FCC, September 13, 2002.
- 277 "Everybody shares the capacity of..." Credit for this analogy to Eli M. Noam, "Taking the next step beyond spectrum auctions: Open spectrum access." www.columbia.edu/dlc/wp/citi/citinoam21.html.
- 277 "Something similar can be done..." See, for example, Lawrence Lessig, "Code and the Commons," Keynote address at a conference on Media Convergence, February 9, 1999; Yochai Benkler, "The commons as a neglected factor of information policy," 26th Annual Telecommunications Conference, October 3-5, 1998; Benkler, "Overcoming Agoraphobia," Harvard J. L. & Tech., 287 (Winter

- 1997–98); Benkler, "Property, commons, and the First Amendment," white paper for the First Amendment Program, Brennan Center for Justice at NY School of Law; Jon M. Peha, "Emerging technology and spectrum policy reform," International Telecommunications Union (ITU) Workshop on Market Mechanisms for Spectrum Management, Geneva, January 2007.
- 277 "Two ideas are key: first, ..." For other examples, see Kevin Werbach, "Open spectrum: the new wireless paradigm," New American Foundation, Spectrum series working paper 6, October 2002.
- 278 "Spread spectrum was discovered and..." Robert A. Scholtz, The origins of spread-spectrum communications, IEEE Trans. Communications, COM-30, No. 5, May 1982, 822–853; Notes on spread-spectrum history, COM-31, no. 1, January 1983, 82–84; Robert Price, "Further notes and anecdotes on spread-spectrum origins," ibid., 85–97; Rob Walters, Spread Spectrum, Booksurge LLC, 2005.
- 278 "Antheil was a self-styled expert..." George Antheil, "Glands on a hobby horse," Esquire, April 1936, 47; "Glandbook for the questing male," May 1936, 40; "The glandbook in practical use," June 1936, 36.
- 278 "Antheil suggested glandular extracts." George Antheil, Bad Boy of Music, Doubleday, Doran & Co., 1945, 327–332.
- 279 "A small item on the 'Amusements'..." Hedy Lamarr Inventor, New York Times, October 1, 1941, 24.
- 280 "Calling herself 'just a plain...'" "\$4,547,000 Bonds," New York Times, September 2, 1942; "Hollywood puts on a show," Time Magazine, October 12, 1942.
- 280 "He didn't recognize the patentee..." www.rism.com/.
- 284 "All the interfering broadcasts can..." For this reason, modern treatments of information theory use the letter *I*, for "interference," instead of *N* for "noise." One man's signal is another man's noise. Physically, it's all just interference with the signal of interest.
- 285 "It is a story that could..." Web page on "Early civil spread spectrum history" at www.marcus-spectrum.com/SSHistory.htm.
- 286 "In the radio world, where..." See Debora L. Spar, Ruling the Waves, Harvest, 2003; also a presentation by Marcus, collegerama.tudelft.nl/mediasite/Catalog/?cid=73e977a6-0283-4ee6-9813-a61df0dd1778.
- 286 "Incumbents, such as existing radio..." Ironically, the regulatory structures can hold in place entitlements that were secured in the pre-regulatory period. The very corporations that profited from the early absence of government control now depend on government regulation to protect them.
- 287 "Hundreds of FCC staff and..." Center for Public Integrity, "Networks of Influence," February 28, 2004.
- 287 "In 1981, Marcus and his..." Notice of inquiry, Authorization of spread spectrum and other wideband emissions not presently provided for in the FCC rules and regulations, Gen Docket No. 81-413, September 15, 1981, www.marcus-spectrum.com/documents/SpreadSpectrumNOI.pdf. This inquiry was informed

- by a report prepared for the FCC by the MITRE Corporation, "Potential use of spread spectrum techniques in non-government applications," Walter C. Scales, December 1980, www.mitre.org/work/tech papers/tech papers 07/ MTR80W335/MTR80W335.pdf.
- 287 "There should have been no..." "A brief history of Wi-Fi," Economist, June 10, 2004.
- 287 "RCA and GE complained anyway..." FCC 84-169, Further notice of inquiry and notice of proposed rulemaking, in the matter of authorization of spread spectrum and other wideband emissions not presently provided for in the FCC rules and regulations, Gen Docket No. 81-413, May 21, 1984; Authorization, June 18, 1985. www.marcus-spectrum.com/documents/SpreadSpectrumFNOINPRM.pdf, www.marcus-spectrum.com/documents/81413R0.txt.
- 288 "In 1997, when the FCC..." One of the very few newspaper articles that mentioned the beginning of WiFi was "FCC OK's short-range wireless communications," Chicago Sun-Times, January 10, 1997, 50 (in the "Financial" section). By contrast, an auction of spectrum for cell phone use was covered in almost every business page on January 14 or 15.
- 290 "There are vast opportunities to..." See David Reed, "The sky's no longer the limit," Context Magazine, Winter 2002-2003, and testimony of David P. Reed before the FCC Spectrum Policy Task Force, July 8, 2002, www.newamerica. net/publications/resources/2002/david reed comments to fcc spectrum policy task force.
- 290 "This problem was apparent even..." Laurence F. Schmeckebier, The Federal Radio Commission, The Brookings Institute, Institute for Government Research, Service Monographs of the United States Government, No. 65, 55.
- 291 "The three biggest contributors were..." opensecrets.org/industries/ mems.asp.
- 291 "In 1971, Anthony Oettinger foresaw..." "Compunications in the National Decision Making Process," in Computers, Communications and the Public Interest, Martin Greenberger (ed.), Johns Hopkins University Press, Baltimore, Maryland, 1971 (with discussion by Ithiel Pool, Alain Enthoven, and David Packard).
- 293 "A typical caution was the..." Alan Frank, quoted in Broadcasters launch ads against device, Yahoo! Finance (biz.yahoo.com), September 10, 2007.
- 293 "At that point, government authority..." Lawrence Lessig and Yochai Benkler, "Net Gains: Will Technology Make CBS Unconstitutional?", The New Republic, December 14, 1998, 14.
- 293 "Artificial spectrum scarcity has, in..." Columbia Broadcasting System v. Democratic National Committee, 412 U.S. 94, 154, May 29, 1973.

Conclusion

- 296 "As Sun Microsystems CEO Scott McNealy..." Polly Sprenger, "Sun on Privacy: 'Get over it," Wired, January 26, 1999. www.wired.com/politics/law/news/ 1999/01/17538.
- 297 "It is the mother of revolution." Chapter 24. www.online-literature.com/victor hugo/hunchback notre dame/24/.
- 298 "In the same letter quoted..." Jefferson to Isaac McPherson, August 13, 1813, Writings, 13:333–35.
- 298 "But Fox News Channel went..." www.publicknowledge.org/node/1247.
- 298 "That's what Uri Geller, the..." Rob Beschizza, "Creationist vs. atheist YouTube war marks new breed of copyright claim," Wired, September 25, 2007.

Appendix

- 310 "A variety of higher-level..." The Internet Hourglass was first laid out in Section 2 of Realizing the Information Future, a 1994 report by the National Academy of Sciences (www.nap.edu/readingroom/books/rtif/). A later important report that also appeals to the hourglass model is The Internet's Coming of Age, the report of the Committee on the Internet in the Evolving Information Infrastructure, Computer Science and Telecommunications Board, Commission on Physical Sciences, Mathematics, and Applications, National Research Council (The National Academies Press, 2001), p. 36.
- 311 "Instead, Internet technology developers and..." "The fallacy of short-term thinking about the Internet," Network World, October 17, 2007.
- 313 "End to End,' in the..." J.H. Saltzer, D.P. Reed, and D.D. Clark, "End-to-end arguments in system design," ACM Transactions on Computer Systems, 2(4), 277–288 (1984).
- 313 "Stupid Networks" For a very clear explanation of the advantages of what are called "stupid networks," see David S. Isenberg, "The dawn of the stupid network," ACM Networker 2.1, February/March 1998, 24–31. Available online at isen.com/papers/Dawnstupid.html.
- 315 "In the Internet world, consider..." Peter Svensson, "Comcast blocks some subscriber Internet traffic, AP testing shows," Associated Press, October 20, 2007.
- 315 "In other words, the idea..." "Should AT&T police the Internet?," CNET News.com, January 17, 2008. http://www.news.com/Should-ATT-police-the-Internet/2100-1034-6226523.html?part=dht&tag=nl.e703.