Book Review

A GAUDIER FUTURE THAT ALMOST BLINDS THE EYE

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A Review of

THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD, by Lawrence Lessig (Random House, 2001).

> I need only recall the recent mergers of electronics companies with book publishers, mergers that join masters of the new projection techniques with traditional holders and acquirers of the intellectual matter to be projected. Such changes of methods and of industrial alignments, though unsettling, are as yet interstitial; but they may be signposts to a gaudier future that almost blinds the eye. Here is my own bedtime story or pipedream which you are at perfect liberty to disbelieve.
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> You must imagine, at the eventual heart of things to come, linked or integrated systems or networks of computers capable of storing faithful simulacra of the entire treasure of the accumulated knowledge and artistic production of past ages, and of taking into the store new intelligence of all sorts as produced. The systems will have a prodigious capacity for manipulating the store in useful ways, for selecting portions of it upon call and transmitting them to any distance . . . .

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> Conceived as conduits or highways for the transmission of signals, the systems will have intense responsibilities of a "public utility" type enforced by law—if indeed the systems (or some of them) will not come under direct government ownership and control. Horrors of Orwellian dimensions lurk in far-reaching official regulation of the communications pattern; but to say that is merely to sound a summons to wise regulation.
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> —Benjamin Kaplan[1] (1966)

INTRODUCTION

In *The Future of Ideas*,[2] Professor Lawrence Lessig argues compellingly that the Internet has proven value as a commons for innovation, and that we are in the process of destroying that value.[3] In a sort of reverse tragedy of the commons, he argues, extending private property rights over the Internet's constituent parts will stifle—or outlaw—the very creativity that built "cyberspace" in the first place.[4] Lessig, a preeminent legal scholar and attorney, here follows up on the foundation laid in his important first book, *Code*.[5]

The Internet's potential as a platform for innovation, Lessig argues, ultimately depends on how free access and private control over the network's underlying resources are configured. Lessig outlines actual and possible property regimes in Internet resources using Professor Yochai Benkler's three-layer model.[6] He conceptually divides the

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1. BENJAMIN KAPLAN, AN UNHURRIED VIEW OF COPYRIGHT 119–20 (1967) (publishing the 1966 Carpentier Lecture at Columbia Law School).

2. LAWRENCE LESSIG, THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD (2001).

3. Throughout this Review I use the words "we" and "our" in the sense in which Lessig uses them in *The Future of Ideas*, as a broad reference both to policymakers and theorists, and to citizens and consumers generally.

4. LESSIG, *supra* note 2, at 23 (suggesting that our inability to appreciate the Internet as an "innovation commons" will cause us to ignore the changes in its norms and architecture, thereby resulting in a loss of potential innovation).

5. LAWRENCE LESSIG, CODE: AND OTHER LAWS OF CYBERSPACE (1999).

6. LESSIG, *supra* note 2, at 23–25. Professor Benkler's model is developed in several pieces. *See, e.g.*, Yochai Benkler, *From Consumers to Users: Shifting the Deeper Structures of Regulation Toward Sustainable Commons and User Access*, 52 FED. COMM. L.J. 561, 568–75 (2000) (describing regulations at each layer that were intended to provide incentives to producers of information, but in effect hampered innovation and public discourse); Yochai Benkler, Property, Commons, and the First Amendment: Towards a Core Common Infrastructure 50–84, *at* http://www.law.nyu.edu/benklery/WhitePaper.pdf (Mar. 2001) (White Paper for the First Amendment Program, Brennan Center for Justice at NYU School of Law) (on file with the

Internet into a layer of physical infrastructure, a layer of logical coordinating protocols or code, and a layer of content conveyed over the Internet. The Internet's potential as a platform for continuing innovation, he argues, depends on the balance of public access and private control over each of these three layers. The property regime that we have known so far, Lessig says, has preserved sufficient access to ensure a space for innovation. A regime that upsets the balance by expanding property rights and private control at the expense of the commons, though, will stifle innovation. We are rapidly moving, Lessig argues, toward a regime that sacrifices opportunities for innovation in favor of private control.

The Future of Ideas is timely, disturbing, and persuasive. Lessig convincingly illustrates the danger of applying economic lessons learned from real property or widgets to the novel communications resource that is the Internet. He synthesizes the traditional concerns of communications law (who has access to the communications infrastructure?) with those of intellectual property law (to what extent can forms of information themselves be owned?), and demonstrates that the two fields are converging significantly with respect to the Internet. His argument for preserving the innovation commons suggests that, as a matter of resource management and property theory, the two sets of questions have been closely connected all along. In both fields, the law accounts for the unusual characteristics of communications resources by adjusting the usual rules of private property.

At times, however, Lessig's argument is snarled by the complexity of the Internet's underlying resources. The Internet includes both resources that are nonrivalrous (meaning that they are capable of being shared by all without depletion) and resources that are rivalrous (meaning that they are congestible or exhaustible by overuse). The property law that best takes advantage of nonrivalrousness may be inappropriate for rivalrous resources, and vice versa. Similarly, lawmakers might arrive at different optimal property regimes for the Internet, depending on whether they prioritize the network's role as a platform for human communication or its foundation in physical components built by costly private investment. The three-layer model for the Internet would seem to resolve these tensions by allowing different property rules for different constitutive resources: economic-value-maximizing rules for finite physical layer resources and partici-

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Duke Law Journal) [hereinafter Benkler, Property] (proposing a series of changes to law and a "core common infrastructure that would support . . . a free information environment").

pation-maximizing rules for those nonrivalrous resources at the code and content layer which are more directly linked to speech and democratic participation. Yet the neat division set forth at the start of *The Future of Ideas*, in which physical resources such as wires and cables are controlled private property while resources at the Internet's code layer are commonly accessible, does not quite play out in the book's more detailed discussions. Lessig ultimately defines the code layer so expansively that he undermines any fully independent property regime in the physical layer.

Some of Lessig's ambiguities arise from his nonacademic language. *The Future of Ideas* is lucid, chatty, and often eloquent, but largely eschews the technical terminology of law and economics theory or communications or intellectual property jurisprudence. Legal academic readers may find themselves wishing for more liberal use of terms like "network effects"[7] or "liability rules"[8] or "widest possible dissemination of information from diverse and antagonistic sources."[9]

Lessig does not use those terms, or mostly does not, perhaps because the language of academia is not the language that will sway his intended reader. Reading *The Future of Ideas*, I developed a rather detailed image of this reader. She is a highly placed government employee in Washington, D.C., but she is not anyone well known. She probably bought *The Future of Ideas* at Kramerbooks,[10] and she is reading it on the Red Line between Dupont Circle and Gallery Place. She is smart and well intentioned and probably has a law degree, but she has not really looked at academic legal theory since law school. Maybe she is a trusted staffer for a Federal Communications Commissioner, or an antitrust litigator at the Department of Justice (DOJ). She is implicated in two major problems that Lessig identifies

7. *See generally* Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CAL. L. REV. 479 (1998) (discussing the significant legal aspects of the network effects theory that a good becomes more valuable to a purchaser as more purchasers buy it).

8. *See generally* Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089 (1972) (analyzing the distinctions between property rules and liability rules).

9. Turner Broad. Sys. v. FCC, 520 U.S. 180, 192 (1997) (quoting Turner Broad. Sys. v. FCC, 512 U.S. 622, 663–64 (1994)).

10. Kramerbooks is a Washington, D.C., bookstore perhaps most famous for fighting independent counsel Kenneth Starr's subpoena of the store's records of Monica Lewinsky's purchases. *See* Doreen Carvajal, *Testing of a President: The Investigation; Book Industry Vows to Fight 2 Subpoenas Issued by Starr*, N.Y. TIMES, Apr. 2, 1998, at A20 (reporting Starr's subpoena of Kramerbooks and Barnes & Noble and the bookstores' assertions of First Amendment rights).

in *The Future of Ideas*: political capture and an uncritical preference for managing resources as private property. And as part of the problem, this reader is potentially also part of the solution. Lessig is preaching to her, and not to the pale and weary devotees of law reviews. His project is not to offer the academy a rigorously theorized model for open access property rights in communications resources. Instead, it is to persuade *her* that in this instance, right now, abandoning open access rights to the Internet is a terrible mistake.

The Future of Ideas lays out a persuasive claim that changing this reader's thinking about the Internet is a more pressing concern than outlining a thorough theory of property law. If the threats that Lessig identifies are real—and I think they are—we should all hope that his claim gets her attention.

I begin this Review, in Part I, by laying out Lessig's overall argument and detailing his claims about each of the Internet's layers. In Part I.A, I discuss Lessig's argument for common access to resources at the Internet's code layer. In this part of the book, Lessig develops his primary argument: that certain resources should be subject to nondiscriminatory access to maximize their value as platforms for innovation. The argument, or its analogs, reappears in application to the Internet's physical and content layers as well.[11] In Part I.B, I briefly lay out Lessig's claims about the physical layer. In Part I.C, I focus on the content layer as intellectual property law affects it. It is in his discussions of the content layer that Lessig best illustrates the closing of the commons, and the potential harms of that enclosure.

In Part II, I introduce broader critiques of *The Future of Ideas*. First, I attempt to isolate the component elements of Lessig's arguments about the commons and private property regimes. I suggest that although he identifies numerous reasons to resist privatization of particular resources, it is difficult to discern the exact parameters of his claims about property regimes generally. It remains unclear exactly what combination of attributes makes a resource eligible for a common-access property regime. In particular, it is hard to discern whether Internet property entitlements should ultimately be tailored to promote maximization of financial value, or maximization of the Internet's potential as a platform for information exchange, cultural production, and democratic participation. Second, I suggest that Lessig's application of a layered model to the Internet's physical and

11. LESSIG, *supra* note 2, at 45–46, 71–72, 84.

technological underpinnings introduces troubling inconsistencies. Two definitions of the Internet's "code layer" seem to operate in *The Future of Ideas*. Following one of these definitions, the free access that Lessig advocates for the code layer may be logically incompatible with the private control that he advocates for parts of the physical layer. Finally, I suggest that some of these tensions regarding rivalrous and nonrivalrous resources might have been resolved through greater use of the "bundle of rights" model of property and more emphasis on the role of government regulation in defining common-use resources.

I. LESSIG'S ARGUMENT

According to Lessig, some resources are most valuable when held in common such that all people have equal access, while other resources are best managed as private property. The Internet, he argues, contains resources of both kinds, and has been a source of valuable innovation because of a property regime that combined common access to some resources (such as technical protocols) with private control over others (including part or all of the Internet's physical infrastructure).[12] *The Future of Ideas* develops a careful model of this mixed, innovation-maximizing property regime, using a three-layer model. The book's aim, Lessig writes, "is to understand how this mix produced the innovation that we have seen so far and why the changes to this mix will kill what we have seen so far."[13]

Lessig structures his analysis around two conceptual divisions. First, the property regime governing any resource is classified as either one of "freedom" or "control." Second, resources within the Internet's communications network are sorted into one of three functional categories, as part of the network's "content" layer, "code" layer, or "physical" layer.

The distinction between freedom and control is central to Lessig's argument. In the terminology of *The Future of Ideas*, a resource is "in the commons" or "free" if it is accessible to anyone on equal terms, whether or not access depends on monetary payment.[14] By contrast a resource is "controlled" if someone, usually an owner, has the power to exclude other users: "[c]ontrolled resources are those for

12. *See infra* Part I.B.
13. LESSIG, *supra* note 2, at 25.
14. *Id.* at 12–14, 20.

which the permission of someone is needed before the resource can be used."[15]

Lessig's definitions of the terms "free" and "commons" are distinct from some more economically conventional uses of the same terms. In *The Future of Ideas*, a commons may be a paid-access resource, so long as the terms of access are neutrally imposed; this varies from the widely used definition of the commons as a regime of pure privilege, in which the resource may be used by any person free of charge.[16] Similarly, for Lessig, "free" resources include both those which are available without payment *and* those which are available subject to liability rules, under which some form of collective valuation determines a fair and neutrally imposed price.[17] As Professor James Boyle has pointed out, this focus on "freedom *from the will of another*, not freedom from the background constraints of the economic system," diverges from other accounts of the Internet's commons as requiring costless access to some resources.[18]

Some resources, Lessig argues, should be free in this sense. Other resources are best left in the hands of private property owners with full rights to exclude, so that the resources can be brought to their optimal value through the normal operation of the market.[19] The Internet blends resources of both sorts, and should, according to Lessig, be managed through a property regime that combines free access to certain resources with private control over others. Lessig argues that we may understand and improve the property regime for Internet resources by applying Professor Benkler's three-layer model and then analyzing the impact of free access versus control at each layer.[20]

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15. *Id.* at 11–12.

16. *See, e.g.*, Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621, 623–24 & n.9 (1998) ("In a commons, by definition, multiple owners are each endowed with the privilege to use a given resource, and no one has the right to exclude another." (citing Frank I. Michelman, *Ethics, Economics and the Law of Property*, 24 NOMOS 3, 9 (1982))).

17. LESSIG, *supra* note 2, at 12 & n.13.

18. James Boyle, *The Second Enclosure Movement and the Construction of the Public Domain*, 66 LAW & CONTEMP. PROBS. (forthcoming Winter 2003) (manuscript at 31–32, on file with the *Duke Law Journal*).

19. LESSIG, *supra* note 2, at 88–89 (noting that privatization maximizes some resources' value by giving owners incentives to sell the resources to more productive managers). It should be noted that, in *The Future of Ideas* resources classified as "free" are not completely outside of commerce, because under Lessig's definition a resource can be "free" and still provide an income stream to its owner, who shares the resource in exchange for "compensation without control." *Id.* at 20, 201.

20. *See supra* note 6.

Professor Benkler's model is one of a number of layered models for the Internet, used by developers, communications theorists, and policymakers as heuristic devices for understanding the network.[21] This model is relatively simple, dividing the Internet into three layers. At the bottom is the *physical layer*—the machines, wires, cable, spectrum, or other real-world media that actually carry communication. At the top is the *content layer*—the message being carried, be it an e-mail or a pop-up advertisement. In between is the *logical* or *code layer*—the technical protocols or rules that enable content to move along the wires. Of course, the three-layer model applies to other communications networks, too. If one thinks of language as a model network, the physical layer would include sound waves and ink; the content layer, sonnets and shopping lists; the code layer, vocabulary and grammar rules.

Following Lessig's description, the Internet's property regime can be vertically divided into physical, code, and content layers; and horizontally divided into property regimes of freedom or control. The property regime which has allowed the Internet to flourish so far, he says, combined freedom at some layers with control at other layers, like this:[22]

TABLE 1: THE INTERNET'S PROPERTY REGIME

	Controlled	Free
Physical layer	x	
Code layer		x
Content layer	x	x

Code layer resources such as the TCP/IP protocols for data packet transmission have so far been free—anyone could use them, on equal terms, without permission.[23] Some content, including most copyrighted material, has been controlled, although other content,

21. One of the most important layered models is the Open Systems Interconnect (OSI) model, used by network developers, which defines seven layers based on functionality. MARTIN P. CLARK, NETWORKS AND TELECOMMUNICATIONS: DESIGN AND OPERATION 194–99 (2d ed. 1997). Another influential layered model is the four-layer model used by the National Research Council in framing its policy analysis. NAT'L RESEARCH COUNCIL, REALIZING THE INFORMATION FUTURE: THE INTERNET AND BEYOND 47–65 (1994).

22. LESSIG, *supra* note 2, at 25.

23. *Id.* at 23, 25.

such as open-source software, has been free.[24] Lessig's empirical claim about the physical layer is a little less clear. Although the Internet's physical layer is initially characterized as "controlled,"[25] later arguments emphasize that "free" access to telephone wires, and telephone companies' inability legally to exclude users, was critical to the Internet's development as well.[26]

The Internet has flourished so far, Lessig argues, not because of freedom or control alone, but rather, because of "the way it mixes freedom with control at different layers."[27] In particular, free access to Internet code and content has enabled innovators to experiment and build on the Internet as a platform for technology and communication. But these free, open-access resources are being displaced by privately controlled ones. Property is expanding at the expense of the commons. As free access diminishes, Lessig argues, so too will the innovation benefits that we have seen so far.

Policymakers will skew their cost-benefit calculations dangerously, he suggests, if they take account only of the benefits of privatization, and fail to consider corresponding costs to the innovation commons. In particular, they should be wary of granting any entity, public or private, the power to exclude users or uses. The power to exclude is the power to block innovation.[28] And policymakers should be particularly reluctant to grant exclusionary rights to entities whose own self-preservation may depend on maintaining established business models or technologies and blocking rival innovation.[29]

But it is too late, or nearly so. *The Future of Ideas* ominously concludes that we are rapidly dismantling the Internet commons, and destroying the platform for online innovation. Through the extension of property control at each of the Internet's three layers, we already

24. *See id.* at 25, 50 (differentiating free content from controlled content and noting that much of the Internet's content layer was originally free). Copyrighted content is not necessarily "controlled" content in Lessig's terminology. Open-source software, for example, is copyrighted but is still free for anyone to reuse under the terms of a license such as the GNU General Public License. Free Software Found., Inc., *The GNU General Public License (GPL)*, Open Source Initiative, *at* http://www.opensource.org/licenses/gpl-license.html (last visited Aug. 20, 2002) (on file with the *Duke Law Journal*).

25. LESSIG, *supra* note 2, at 25.

26. *Id.* at 45–46, 149.

27. *Id.* at 25.

28. *Id.* at 236.

29. *Id.* at 175–76.

"are remaking cyberspace, and these remakings will undermine the innovation we have seen so far."[30]

A. The Innovation Commons at the Internet's "Logical" or "Code" Layer

A central theme of *The Future of Ideas* is what I call the innovation commons argument: that some resources should be in the commons because they are most valuable as platforms for innovation, open to all comers. This argument is developed most clearly with respect to end-to-end design principles at the Internet's code layer.

If a software developer wants to build a new application for the Internet, she will need a computer, access to the Internet, and skills. But she will not need anyone's permission, because the network is incapable of excluding any compatible application.[31] If she builds it, it will run. This, to Lessig, is part of the genius of the Internet and perhaps the single most important factor accounting for its success.[32] The code layer of the Internet, the protocols which set terms and conditions for content to flow across the network, could have been architected to permit exclusion (by keeping certain users or applications off the network) or discrimination (by giving certain users or applications slower or more expensive service, for example).[33] Instead, the

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30. *Id.* at 99.

31. The network does, of course, exclude incompatible applications. As long as everyone is permitted to build compatible applications, however, this does not undermine end-to-end principles. Compatibility requirements at the code layer are technically unavoidable if a digital communication network, or indeed *any* communication network, is to function.

The analogy to spoken language is again instructive: speakers need a shared "code layer" of vocabulary and grammar to communicate. Once this compatibility requirement is met, however, they may use language in any way they want. With language, as with the Internet, the commons depends on ensuring all users equal opportunity to use the code layer.

At the Internet's code layer, TCP/IP protocols impose formal compatibility requirements for the transmission of data packets. For example, following the Internet Protocol (IP), each packet must have a header containing routing and control information in a specific format. If this header information is absent or improperly formatted, the packet will not be delivered. As long as the packet's header complies with IP requirements, however, it will be delivered regardless of the packet's content. Info. Scis. Inst., Univ. of S. Cal., Request for Comments (RFC) 791, *Internet Protocol: DARPA Internet Program Protocol Specification* 2–3, http://www.faqs.org/rfcs/rfc791.html (John Postel ed., Sept. 1981) (on file with the *Duke Law Journal*).

32. LESSIG, *supra* note 2, at 35, 40.

33. As Professor Benkler points out, discriminatory access terms for end users may also come in the form of more advertisements or content controls such as "clean" language requirements. Yochai Benkler, *Siren Songs and Amish Children: Autonomy, Information, and Law*, 76

original code layer established the Internet as a commons open to any who wish to use it.

This technical inability to exclude or discriminate was a conscious design choice by the Internet's earliest developers, Lessig claims, implementing a design principle now known as end-to-end.[34] Following end-to-end design, the "dumb" machines at the center of the network, such as routers, perform only the minimal, simple functions necessary to transfer data between "smart" machines. Complex functionality is relegated to the edge of the network—to machines that serve web content, for example, or reassemble that content in a browser window. The simplicity and flexibility of the underlying Internet protocol for "dumb" data transmission has important consequences for innovation, Lessig argues.[35] New applications, including applications unforeseen by the Internet's earliest developers, can run without any adjustment to the machines making up the network's center. And, crucially, the end-to-end Internet is a neutral platform—it cannot exclude or discriminate against any application built to run on the Internet.[36] Anyone—from a highly paid programmer in Redmond to a child at her parents' computer in Jakarta—can try something new and share it with the rest of the network. The productivity of this innovation commons has been nothing short of astonishing, as decentralized crews of technological, cultural, and economic innovators have converged online to create everything from Apache server software to ebay. End-to-end design "renders the Internet an *innovation commons*, where innovators can develop and deploy new applications or content *without the permission of anyone else* . . . . The system is built—constituted—to remain open to whatever innovation comes along."[37]

Code layer end-to-end principles, as embodied in the Internet, provide Lessig's model for innovation commons on an open network. He has a countermodel, too—an innovation graveyard on a closed network, as it were. This model is the telephone system as administered by AT&T for much of the last century. While its monopoly lasted, AT&T had legal authority to accept or reject any devices

N.Y.U. L. REV. 23, 65–66 (2001). Professor Benkler calls these nonprice requirements "influence exactions" and argues that they potentially threaten users' autonomy. *Id.* at 68–69.

34. LESSIG, *supra* note 2, at 35.

35. *Id.* at 34–35.

36. *Id.* at 36–37.

37. *Id.* at 40.

added to the telephone network.[38] The company's own labs were responsible for remarkable developments, but at the same time AT&T was a bottleneck for all evolution of the telephone system. As Lessig notes, "there was nothing one could do with one's innovation unless AT&T bought it."[39] In fact, one innovation rejected by AT&T was a proposed digital packet-switching technology much like that eventually made successful by the Internet.[40] These two models, the Internet and the AT&T phone system, respectively represent extremes of freedom and control at the code layer.

Comparing innovation in the two systems, Lessig draws a lesson: we may expect more productive innovation from systems that lack centralized control over creative tinkering.[41] Thus, *if we expect a resource to be most valuable as a platform for innovative new uses*, as is the case when future uses of a technology are uncertain, then the most productive property regime is one of open access. "Plasticity—the ability of a system to evolve easily in a number of ways—is optimal in a world of uncertainty."[42] Moreover, entities interested in preserving the status quo should not be given control over a resource most useful as a platform for new developments.

Several sections of *The Future of Ideas* anticipate and respond to the argument that strong private property rights and a free market will bring about the most efficient allocation and use of the Internet's resources. If an owner cannot put a resource to its best use, the argument goes, in a perfect market he will profitably sell the resource to the person best able to maximize its value. Lessig does not contest this logic as a general matter—indeed, he describes himself as "fanatically pro-market, in the market's proper sphere."[43] But he does argue that the market's usual mechanism of bringing resources to the user who can best maximize their value will not function properly in the case of code layer Internet resources. If private owners manage resources at the Internet's code layer and can exclude or discriminate against certain uses, he argues, they are unlikely to facilitate the

38. *Id.* at 30.

39. *Id*.

40. *Id.* at 31–34.

41. *See id.* at 44 ("One network centralizes creativity; the other decentralizes it. One network is built to keep control of innovation; the other constitutionally renounces the right to control. One network closes itself except where permission is granted; the other dedicates itself to a commons.").

42. *Id.* at 39.

43. *Id.* at 6.

cheap and speedy technological evolution that we collectively value. Nor, Lessig argues, will they necessarily transfer control to more productive managers.

A private owner with exclusive use rights may fail to innovate simply because he fails to recognize opportunities for innovation which, in a common access regime, would eventually have been spotted by someone.[44] Moreover, Lessig argues, the people *least* likely to recognize or exploit opportunities brought on by disruptive technologies are managers of established business interests, because prudent corporate managers are particularly likely to forego risky ventures when they are satisfied with their existing markets.[45]

A rational business entity might also quite deliberately refuse to make its own resources available for the development of disruptive technologies or other innovations that can benefit the public but threaten its own rents.[46] This is a particularly great concern in cases of vertical integration among cable owners (who can use "code layer" control to speed or slow transmission of particular content) and content providers (who want their content to reach users first). Such a vertically integrated concern would have good reason to tweak the code layer and give preferential treatment to its own content, and to resist equal network access for competing content.[47]

Such breakdown of end-to-end neutrality is already evident in emerging technical protocols designed to allow some content to travel over the Internet faster than other content. The Internet Engineering Task Force's Multiprotocol Label Switching (MPLS) standard, for

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44. *See id.* at 89 (arguing that when "there is no clear option for using the resource . . . there is more reason to leave it in common, so that many can experiment with different uses").

45. *See id.* at 89–90 (describing the theory of management that Clayton M. Christenson lays out in *The Innovator's Dilemma*). *See generally* CLAYTON M. CHRISTENSON, THE INNOVATOR'S DILEMMA: THE REVOLUTIONARY NATIONAL BESTSELLER THAT CHANGED THE WAY WE DO BUSINESS (1997) (arguing that leading companies in a particular market are better at perfecting technology within the existing market than outside companies, but are unable to develop radically new technologies that rely on unidentified or underdeveloped markets).

46. *See* LESSIG, *supra* note 2, at 91–92 (suggesting that a company with some monopoly privilege might understand how a new technology would increase social value, and, realizing that it cannot capture this increase, resist the new technology to preserve its own monopoly power); *id.* at 92 (discussing the line of work by Professors Carliss Baldwin and Kim Clark); *see generally* 1 CARLISS Y. BALDWIN & KIM B. CLARK, DESIGN RULES 11 (2000) (examining the relationship between innovation and the Internet's architectural structure, and using IBM as an example of how competition might decrease the value of a monopolist, but increase the value of an industry by a greater margin).

47. LESSIG, *supra* note 2, at 159–60, 166.

example, would allow data packets to be labeled for a particular "class of service" when they are sent over the Internet or an intranet.[48] Data packets so labeled could then be given higher priority by routers, and thus reach their destinations sooner.[49] Lessig cites alarming examples of cable Internet providers already acting as gatekeepers, restricting both customers' access to certain kinds of content[50] and customers' ability to distribute their own content over the Internet, either by barring such use or by creating artificial bottlenecks on outbound data transmission.[51]

Consumer preference is unlikely to force vertically integrated cable and content providers to behave differently, Lessig argues. If discriminatory access terms at the code layer cause one website—such as Time Warner's—to load on a user's browser more quickly than another website—such as the National Rifle Association's—the user is unlikely to realize the code layer reasons for this unequal access to content.[52] So we should not expect her to express a preference for free access at the code layer, or to switch to a different access provider because of this preference. Even if she did develop and express such a preference, it is not clear that the access provider would respond by facilitating access to competing content. When the provider's income depends, like network television's, on selling users' at-

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48. Data sent over the Internet is broken up into packets. The packets pass from one router to the next in the course of transmission from sender to receiver. Routers examine the "header" information on each packet to determine where to send the packet next. As one document specifying the architecture of MPLS explains, MPLS could instruct routers to give preferential treatment to certain packets:

> Some routers analyze a packet's network layer header not merely to choose the packet's next hop, but also to determine a packet's "precedence" or "class of service." They may then apply different discard thresholds or scheduling disciplines to different packets. MPLS allows (but does not require) the precedence or class of service to be fully or partially inferred from the label.

Eric C. Rosen et al., The Internet Society, *Multiprotocol Label Switching Architecture* 5, *at* http://www.ietf.org/rfc/rfc3031.txt (Jan. 2001) (on file with the *Duke Law Journal*).

49. Technologies for prioritizing some data transmission would be useful for high-bandwidth transmissions such as video, and might help speed the delivery of critical data such as emergency medical information. Lessig argues, however, that introducing an ability to discriminate in packet transmission could have negative effects that outweigh these advantages. *See* LESSIG, *supra* note 2, at 46–47, 229 (predicting that two negative effects would be that developing a new application would be more complex and that the network could market the feature of discriminating for or against certain kinds of content).

50. *Id.* at 156–57 (explaining limitations on the number of minutes that a customer may use a "streaming video" connection); *id.* at 157 (describing the practice of filtering out data packets usable for file sharing).

51. *Id.* at 157.

52. *Id.* at 160.

tention to advertisers, then advertisers—and not users—are the customers whose preferences will shape the access provider's behavior. For a rational advertiser—and hence for a rational access provider—the best audience may be a captive audience, not one with easy access to competing content.[53]

Given these considerations, the rational code layer property owner who is also in the content business would not cheaply sell equal-access rights to the network. That owner would put a still steeper price on stable, guaranteed equal-access rights for the future.[54] A prospective innovator with a plan to use the resource more productively would have to be backed by serious venture capital to even acquire tinkering rights. This kind of expensive access for the few is not the property regime that built the Internet, Lessig argues.[55] It is instead a regime that will raise barriers to innovation and put brakes on technological evolution. If private owners acquire sole power to permit or exclude innovative efforts, he maintains, we should expect to see far less innovation than has so far emerged on a common-access code layer.

B. Commons and Control at the Physical Layer

Lessig's argument about the Internet's physical layer in part repeats the innovation commons point, that free access to the communication platform enables innovation. His analysis of the physical layer varies, however, with the particular physical medium being discussed. He reiterates the Internet commons argument in strong form for the wireless spectrum, a resource not built by human investment and potentially subject, in the future, to nonrivalrous use. His argument is more ambiguous with respect to the man-made, rivalrous resources that have historically made up the Internet's physical substrate—wires, cables, servers, routers, and other tangible components.

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53. *See id.* (recognizing that consumers will access specific content less frequently when more content is available).

54. *See id.* (discussing private control over cable Internet access and noting the risk to innovation when a cable owner can initially grant access but can, "down the road, simply change its mind"); *see also* Mark A. Lemley & Lawrence Lessig, *The End of End-to-End: Preserving the Architecture of the Internet in the Broadband Era*, 48 UCLA L. REV. 925, 945 (2001) (emphasizing that the possibility of discriminatory access terms in the future "increases the risk an innovator faces when deciding whether to design for the Internet").

55. *See* LESSIG, *supra* note 2, at 160 (discussing private control over cable Internet access and arguing that such control will result in different innovation than the innovation that would be "devoted to a free, neutral platform").

These stubbornly tangible resources complicate Lessig's argument because they are essential to current Internet communications—the network functions as a commons only if users have access to all three layers, including the physical base. Yet the innovation commons argument, which is beautifully straightforward when applied to the code layer, becomes economically complex when applied to the physical layer.[56]

In the chapters of *The Future of Ideas* devoted expressly to the Internet's physical layer,[57] Lessig focuses on the wireless spectrum. The majority of the electromagnetic spectrum is currently allocated by the Federal Communications Commission (FCC) for use by government and private licensees.[58] In an argument that mirrors his code layer innovation commons point, Lessig claims that the current licensing regime overprotects current stakeholders and systematically stifles innovation by denying potential innovators access to the physical platform for experimentation.[59] Control over the wireless spectrum may currently be thwarting a uniquely valuable innovation, he argues: emerging spectrum-sharing technologies, if successfully developed, would allow many more users to share the available spectrum, potentially providing a nonrivalrous physical platform for Internet communications.

Reviewing possible property regimes for the wireless spectrum, Lessig discusses the argument that private property rights and free market exchange would lead to optimal allocation of spectrum resources; offers counterarguments for a technology-enabled commons in wireless spectrum; and ultimately concludes that there is currently no need to choose between the commons and the market.[60] The spec-

56. *See infra* Part II.

57. The physical layer chapters are Chapter 5, "Commons, Wire-less," at 73–84, and Chapter 12, "Controlling Wire-less (and Hence the Physical Layer)," at 218–33.

58. *See* STUART MINOR BENJAMIN ET AL., TELECOMMUNICATIONS LAW AND POLICY 32–34, 62–63 (2001) (stating that the FCC and the National Telecommunications and Information Association (NTIA) reserve certain frequencies for government use, and the FCC allocates private licenses). Professor Stuart Benjamin argues persuasively that regulation which results in underuse of spectrum should be subject to intermediate First Amendment scrutiny. *See generally* Stuart Minor Benjamin, *The Logic of Scarcity: Idle Spectrum as a First Amendment Violation*, 52 DUKE L.J. 1 (2002).

59. LESSIG, *supra* note 2, at 219–21 (arguing that development of new, spectrum-based technologies is thwarted when not enough spectrum is available for experimentation); *see id.* at 223–24 (noting that established FM broadcasters successfully lobbied for restrictions on low-power radio broadcasters despite the FCC's determination that low-power broadcasts would not cause signal interference).

60. *Id.* at 226–30.

trum is roomy enough to experiment with a little of each: commons here, market there. There are strong theoretical arguments for each solution, and either an actual commons or a near-enough-to-perfect market could potentially "produce the feature of the commons that is most salient here: that strategic action by the resource owner would not be possible."[61] Any solution, Lessig suggests, will be an improvement over the current system of regulatory allocation among entrenched interests.[62]

Lessig's discussion of spectrum-sharing raises the tantalizing prospect of an Internet built on a nonrivalrous substrate, free for use by all without congestion. In the absence of revolutionary spectrum-sharing technology, however, Internet property policy is inseverably tied to a rivalrous physical infrastructure. It is not entirely clear how the innovation commons argument should affect management of rivalrous resources, including wires and cable. *The Future of Ideas* persuasively demonstrates the value of a free code layer, yet code is of little use without access to the network's physical substrate. Lessig proposes public investment as a partial solution, suggesting that government should invest in development of its own common-access physical infrastructure, much as it invested in highway development.[63] As to existing, privately funded outlays of wire and cable, including the expensive "last mile" to consumers' homes, however, his position is unclear. At times he excludes them from his general innovation commons argument, and concludes that wires and cables laid by private firms should be private property rather than paid-access commons—that they should be, in the terminology of *The Future of Ideas*, controlled.[64] At other points, Lessig seems to reach the opposite con-

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61. *Id.* at 222.

62. *See id.* at 222–23 (rejecting both the commons and market regimes as single solutions, and instead advocating the simultaneous use of both).

63. *Id.* at 244–45. This investment, he suggests, would both provide a common-access portion of the physical network and help to stimulate competitive Internet access provision in a market otherwise at risk of domination by a small number of access providers, with no competitive pressure to provide open access. *See id.* at 159–60, 173 (observing that leading companies could prevent outsiders from entering the market because they control new technologies and set rules for the system).

64. *Id.* at 174:

> Indeed, some increase in control may well be necessary if investment to build a network is to proceed. . . . [C]able companies today may rightly argue that control is needed if the return is to be enough.
>
> . . . My argument cannot begin to resolve the question of whether or not the cable companies are right in their defense. If this infrastructure is to be built without public support, then protected monopoly may well be necessary.

clusion, suggesting that the Internet's wires and cables should be available to any paying user on an equal basis—that they should be free.[65]

This ambiguity about physical commons arises both in characterization of the Internet's history and in proposals for its future. Thus in some sections, Lessig points out that it was government-mandated open access to the telephone wires that allowed the early Internet to flourish.[66] And in some proposals for the future, he suggests that maintenance of the code layer commons could necessitate open access requirements for the physical medium of cable.[67] These discussions indicate that the Internet's physical layer has historically been, and should continue to be, protected by liability rules—"free," in Lessig's terminology. But elsewhere Lessig states that the wires on which the Internet was born were "fundamentally controlled,"[68] and that private investments in rolling out wires (and presumably also cable) "deserve the reward of private property."[69] "Access to . . . the wires of AT&T[] should not be free," he writes in a section detailing his concrete policy proposals.[70]

The ambiguity regarding property rights in the Internet's physical layer goes very deep indeed. It is rooted in one of the most confounding questions Lessig raises: how can a single, coherent property regime be tailored to account both for the Internet's value as a communicative platform for potentially endless cultural, political, and technical innovation *and* as a finite, exhaustible set of physical objects created by human investment? *The Future of Ideas* is ultimately unclear about how the innovation commons argument maps on to the physical layer, and whether rivalrous, privately built resources at that

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Id. at 241 ("[M]ost of these [physical] elements are owned—and with one exception, [wireless spectrum], I think properly so. . . . These private investments deserve the reward of private property.").

65. *See id.* at 248–49 (listing open access requirements as a means of protecting innovation at the Internet's code layer); *id.* at 148–49 (describing the "obligation on the Baby Bells to be neutral about how their lines would be used" as a foundation for the Internet's evolution). Ambivalence regarding the application of the innovation commons argument to tangible, physical resources recurs in Lessig's discussion of the machines that make up the web. Discussing application of trespass law to web servers, for example, Lessig suggests that both pro- and antitrespass arguments have merit. *See id.* at 168–171 (indicating a preference for an open Internet without trespass rules).

66. *Id.* at 45, 149.

67. *See id.* at 247–48 ("[T]he values of the Internet should trump the control of cable.").

68. *Id.* at 25.

69. *Id.* at 241.

70. *Id*.

layer should be free (protected by liability rules) or controlled (protected by property rules).

C. Commons and Control at the Content Layer

In his discussion of the Internet's content layer, Lessig reiterates his argument that resources that serve as platforms for innovation can be most valuable when placed in the commons. In sections concerning this layer, Lessig most compellingly supports *The Future of Ideas*'s dark claim that lawmakers are "chang[ing] the rules within which the Internet revolution lives," and that "[t]hese changes will end the revolution."[71] The discussion of intellectual property law and control over creative content—online and off—also strongly develops a major theme of the book, by illustrating how misconceptions about property can lead to mismanagement of communications resources.

At the content layer, as at the code layer, Lessig suggests, innovators' freedom to build on common foundations is critical.[72] The commons are equally central to new creative output, whether the commons are "code" (Internet protocols, English grammar and vocabulary) or "content" (a basic piece of software, the common cultural reference points invoked in "The Wasteland"). Creativity in the development of new content, Lessig argues, "depends fundamentally upon a rich and diverse public domain."[73]

The functional similarity of free access to common platforms at the code and content layers is illustrated in Lessig's discussion of open-source software. The open-source movement provides remarkable support for the empirical claim that freedom to copy and change predecessors' works, combined with widespread, networked access to those works, is a potent recipe for innovation.[74] Open-source developers freely distribute software source code to users, encourage those users to develop and share improvements to the code, and thus harness the talent of every interested and capable contributor on the

71. *Id.* at 5.

72. *See. id.* at 57–58 ("[F]ree code at the content layer builds a commons in innovation . . . . [and] assures that innovation cannot be chilled.").

73. *Id.* at 50.

74. *See id.* at 49–72 (describing how GNU/Linux, Apache, Perl, and the Berkeley Interface Name Domain (BIND) arose from open-source management, and chronicling how Microsoft developed its closed system).

Internet.[75] Through multiple iterations and incremental improvement by untold numbers of authors, open-source development produces some of the most reliable and versatile software in the world, including much of the underlying software that keeps the Internet running.[76] Open source provides a remarkable model of the innovation commons at work: a rich supply of free content as building blocks, plus negligible barriers to entry for innovators, yields remarkable productivity. It creates, Lessig says, "the opportunity, kept open to anyone, to innovate and build upon the platform of the network."[77]

At the content layer, as at the code layer, Lessig argues that property owners' rights to exclude can, in situations of technological uncertainty, stifle development. In the area of patent, he cites economic predictions that, where downstream developments are highly unpredictable, patent-holders are less likely to grant licenses for add-on innovation. Lessig observes, "[i]f we don't know which direction an improvement is likely to take, then licensing may not occur, and patents here may actually do harm."[78] The problem is particularly acute when, as often happens, many different rights-holders could potentially use their patents to veto innovation.[79] Lessig's conclusion here mirrors that developed in his discussion of Internet protocols at the code layer:[80] if only innovators with a recognized high probability

75. *See generally* Open Source Initiative, *at* http://www.opensource.org/ (last visited Aug. 25, 2002) (on file with the *Duke Law Journal*) (advocating the use of open-source software to spur innovation and to improve existing software); Eric S. Raymond, *The Cathedral and the Bazaar*, Eric Steven Raymond's Homepage, *at* http://www.tuxedo.org/~esr/writings/cathedral-bazaar/ cathedral-bazaar (last modified Sept. 11, 2000) (on file with the *Duke Law Journal*) (describing open-source software). Open-source software is freely distributed to users—many of whom are themselves developers—along with its source code, non-binary code used by a developer to build the software. With source code in hand, any user can get "under the hood" of the program—check out how the code works, tinker with it, and introduce improvements or changes. The development model thus draws on the collective talent of software developers around the world, loosely affiliated by a desire for robust running code, and perhaps in some cases by hostility to dominant software providers.

76. *See* Keith W. Porterfield, *Information Wants to Be Valuable: A Report from the First O'Reilly Perl Conference*, NetAction, *at* http://www.netaction.org/articles/freesoft.html (last visited Aug. 20, 2002) (on file with the *Duke Law Journal*) (comparing the development and support services of commercial software and free software, and arguing that without free software, over half of all websites would not exist, site content would decrease, most e-mail would not work, and commercial software development would slow).

77. LESSIG, *supra* note 2, at 49; *see also id.* at 50 ("Code here is content . . . .").

78. *Id.* at 205.

79. *Id.* at 214–15 (discussing James M. Buchanan & Yong J. Yoon, *Symmetric Tragedies: Commons and Anticommons*, 43 J.L. & ECON. 1 (2000), and Heller, *supra* note 16).

80. *Id.* at 39.

of success can afford the owner's asking price for access to a technology with unknown uses, overall innovative gains will suffer. Therefore, the argument follows, when we expect that tinkering will produce innovation but do not know in advance which tinkering will be productive, we should structure our property regime to maximize affordable tinkering.

Emerging legal threats to the commons may be particularly grave at the content layer. As Lessig observes, intellectual property rights both on and off the Internet are undergoing unprecedented expansion. "The distinctive feature of modern American copyright law," he notes, "is its almost limitless bloating."[81] Term limits have stretched from the fourteen to twenty-eight year period known to the Framers to well over a hundred years;[82] laws that once affected only publishers now constrain every user and every desktop;[83] abstract ideas once considered unownable are now the subject of patent;[84] control that is constitutionally impermissible under copyright law may be achieved backhandedly by legally reinforced technological measures or by contract.[85] Lessig argues persuasively that this expansion of property

81. *Id.* at 106.

82. LESSIG, *supra* note 2, at 107. C*ompare* Sonny Bono Copyright Term Extension Act, Pub. L. No. 105–298, § 102(b)(1), 112 Stat. 2827 (codified as 17 U.S.C. § 302(a)) (allowing copyrights to run for a term of life plus seventy years), *with* Act of May 31, 1790, ch. 15, § 1, 1 Stat. 124 (allowing copyrights to run for a term of fourteen years with one renewal), *amended by* Act of Feb. 3, 1831, ch. 17, § 16, 4 Stat. 439 (allowing copyrights to run for a term of twenty-eight years with one renewal).

83. *See* Suntrust Bank v. Houghton Mifflin Co., 268 F.3d 1257, 1266 n.19 (11th Cir. 2001) ("[The term] copy . . . . was intended to be a term of art, indicating a reproduction of a work for publication. Failure to understand and apply this distinction has confused many courts (assisted by overzealous advocates) into too expansive a view of the scope of the copyright monopoly."); LESSIG, *supra* note 2, at 180–183 (identifying as examples student dorm rooms and OLGA, an online guitar archive).

84. *See* State St. Bank & Trust Co. v. Signature Fin. Group, 149 F.3d 1368, 1370 (D.C. Cir. 1998) (upholding a patent for "a data processing system . . . for implementing an investment structure . . . [for the] administrat[ion] and accounting . . . of mutual funds"); LESSIG, *supra* note 2, at 207–10 (discussing the recent extension of patent protection to software invention and business methods).

85. New legal reinforcement for digital content encryption provides civil and criminal penalties for users who breach encryption, even if they do so to make fair use of the copyrighted work. *See* 17 U.S.C. § 1201 (2000) (prohibiting the circumvention of copyright protection technologies and prohibiting trafficking in circumvention devices). In some cases, content owners can prevent fair use with legally enforceable "click-wrap" contracts. *See* UNIFORM COMPUTER INFORMATION TRANSACTIONS ACT § 202(a) (1999) ("A contract may be formed in any manner sufficient to show agreement, including . . . operations of electronic agents which recognize the existence of a contract."); *cf.* ProCD v. Zeidenberg, 86 F.3d 1447, 1452 (7th Cir. 1996) (enforcing a shrink-wrap license because the buyer had an opportunity to inspect and reject the goods).

rights, and corresponding diminution of the public domain, harms important creative processes.[86] Innovation is chilled when intellectual property law creates excessive barriers to intellectual tinkering, incremental and cumulative development, and recombinant use of cultural and technological common foundations. At the content layer, as at the code layer, property rights expand at the cost of the innovation commons.

Our mismanagement of information resources through extension of excessive property rights over the Internet's content layer, Lessig suggests, is driven by two major factors. Both factors are relevant to all three Internet layers, but are particularly evident in the world of intellectual property law. The first is discouragingly familiar: political capture.[87] The interest groups that Lessig identifies as having the most to lose from the Internet's innovation commons, including many entertainment industry interests, are highly organized and funded presences in Washington. Those with the most to gain from the innovation commons—future innovators and the public beneficiaries of their innovation—may have interests so embryonic that they are unrecognizable. Even where these parties do recognize the threat to their interests, they typically lack the organization and funding necessary to make their voices heard in Washington. These potential beneficiaries are model Public Choice victims.[88]

The second culprit is not Washington but ideology—our uncritical assumption that because private property is sometimes, or even mostly, better than collective ownership, private property rights provide the best way to manage *every* resource. We race to give private actors the power to exclude rivals from the innovation commons, Lessig writes, because "[o]ur single, overriding view of the world is that only property matters."[89] Our faith in property is so robust and unexamined that it systematically blinds us to the value of that which is not property—the commons.

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86. *See* LESSIG, *supra* note 2, at 177–83 (proposing a balance between protecting property rights and protecting the access and use rights that are critical to innovation).

87. *Id.* at 237. *See generally* WILLIAM N. ESKRIDGE, JR., DYNAMIC STATUTORY INTERPRETATION 26–27, 157–158 (1994) (discussing political capture).

88. *See generally* JAMES M. BUCHANAN & GORDON TULLOCK, THE CALCULUS OF CONSENT: LOGICAL FOUNDATIONS OF CONSTITUTIONAL DEMOCRACY (1962); Richard A. Posner, *Economics, Politics, and the Reading of Statutes and the Constitution*, 49 U. CHI. L. REV. 263, 265–68 (1982) (examining the Interest Group Theory, which states that legislation is a good that flows, through supply and demand, "to those groups that derive the greatest value from it, regardless of overall social welfare").

89. LESSIG, *supra* note 2, at 236.

As Lessig notes, the logic and rhetoric of physical property can distort understanding of the nonphysical goods protected by intellectual property law.[90] We are, he argues, "allowing an idea about 'property' to overrun the balance that grants access"[91] to the raw materials necessary to new creation. Lessig joins a long scholarly tradition in naming our assumptions about physical property as the basis for our miscalculations about intellectual property. Professor Benjamin Kaplan pegged this problem neatly in 1966, noting that copyright "suffers from excessive reification, the assumption that because a copyright behaves like ordinary personal property for one or more purposes, it must so behave for all."[92] For both economic and legal reasons, the informational goods protected by intellectual property law often do not "behave" like physical property. These special attributes of information are well recognized within intellectual property law; in *The Future of Ideas*, Lessig illustrates how the "behavior" of information might affect the value of the Internet at all layers.[93]

The goods protected by intellectual property law are fundamentally different from most tangible goods because they are nonrivalrous—everyone can use a poem or a technique for building a fire at once, and we will not run out of the resource.[94] In addition, information is recombinant—new informational goods are always to some extent "made out of" old informational goods.[95] Unlike builders of

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90. *Id.* at 217, 237.

91. *Id.* at 217.

92. KAPLAN, *supra* note 1, at 77–78.

93. *See infra* Part II.A.

94. LESSIG, *supra* note 2, at 94–97 (distinguishing the nature of tangible goods from intangible ideas and techniques). Although information is often deemed nonrivalrous, the value of some information changes with the number of people using the information. The complicated relationship between scarcity and the economic value of informational goods is beyond the scope of this Review. It is worth noting, however, that some informational goods (stock tips) can be most valuable when used by few; others (standard commercial software) most valuable when used by many; and still others (high status logos) most valuable with a consumer base of not too few, but not too many either. For the most part, however, increases in the dissemination of information neither increases nor decreases its value. In Thomas Jefferson's oft-quoted words,

> If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea . . . . Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me.

Id. at 94 (quoting Letter from Thomas Jefferson to Isaac McPherson (Aug. 13, 1813)).

95. *See* Jessica Litman, *The Public Domain*, 39 EMORY L.J. 965, 966 (1990) ("[T]he very act of authorship in *any* medium is more akin to translation and recombination than it is to creating Aphrodite from the foam of the sea.").

houses or widgets, the creators of works protected by intellectual property law necessarily build on prior works or elements of prior works as raw materials. (Notably, both Internet code and content are "made of" information and thus are subject to nonrivalrous and recombinant use—the two are distinguishable into categories of code and content only because of their different functional roles in the network.)

Recognition of these unique characteristics of informational goods has historically shaped American law of intellectual property, from the Copyright Clause to detailed legal doctrines. Copyright and patent law reflect the nonrivalrous and recombinant nature of information by preserving common access to such foundations as ideas, facts, expressive conventions, tropes, logical principles, laws of nature, and the like.[96] And the law further ensures that entire works can eventually become foundations for future innovators—property rights in inventions and creative works expire, allowing the *Odyssey* to become raw material for *Ulysses*,[97] or gas turbine engines to become the basis for jet aircraft propulsion.[98] For copyright, too, the fair use doctrine allows certain reuses of even copyright-protected expression.[99] Intellectual property law has thus historically ensured that the public domain commons is richly stocked with raw materials to reuse as platforms for further innovation.

Among other things, the preservation of the content commons through legal limitations on property rights over informational goods smoothes the otherwise uneasy relationship between copyright and the First Amendment.[100] The limitations are also mandated by the Copyright Clause, which imposes both an originality requirement[101]

96. *See id.* at 968 (noting that courts have gradually come to deny copyright protection to certain categories).

97. *See generally* JAMES JOYCE, ULYSSES (Danis Rose ed., Picador 1997) (1922) (using Homer's *Odyssey* as a literary foundation).

98. *See* BRUCE WETTERAU, THE NEW YORK PUBLIC LIBRARY BOOK OF CHRONOLOGIES 221 (1990) (noting that the first jet aircraft was powered by improved gas turbine engines).

99. *See* 17 U.S.C. § 107 (2000) (defining the factors for the fair use doctrine); Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 574–94 (1994) (applying the fair use doctrine in the context of 2 Live Crew's parody of Roy Orbison's *Oh, Pretty Woman*).

100. *See* Harper & Row, Publishers, Inc. v. Nation Enters., 471 U.S. 539, 560 (1985) (rejecting a fair use claim in light of "the First Amendment protections already embodied in the Copyright Act's distinction between copyrightable expression and uncopyrightable facts and ideas, and the latitude for scholarship and comment traditionally afforded by fair use").

101. *See* Feist Publ'ns, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 345–46 (1991) (describing the originality requirement); Graham v. John Deere Co., 383 U.S. 1, 17–19 (1966) (describing the requirement of nonobviousness).

and a copyright term limit requirement.[102] The constitutionally defined purpose of these exclusive rights is to "promote the Progress of Science and useful Arts."[103] In other words, to enable innovation. This constitutional grounding, as well as the unique economic attributes of informational goods, gives particular weight to Lessig's argument that we dangerously impoverish the innovation commons when we overextend property rights.

II. SOME CRITIQUES OF LESSIG'S ARGUMENT

A. The Unclear Relationship Between Lessig's Arguments for Common Access to Internet Resources

At the root of our tragic mismanagement of the Internet, Lessig says, is an analytical error about how property works. In this Section, I isolate threads of Lessig's argument for common access to Internet resources and suggest that it is not always clear how these threads mesh together. As I read *The Future of Ideas*, it leaves open important questions about whether or how procommons arguments pertaining to the code and content layers should be extended to rivalrous resources at the Internet's physical base. Answers to these questions may depend on underlying policy goals: a property regime that maximizes economic efficiency might allocate access rights to the Internet's infrastructure differently from a property regime that maximizes opportunities for information exchange and democratic participation.

If, as I have speculated, Lessig's goal is to convince us—or to convince my hypothetical reader in her seat on the Red Line—of the immediate threat to the Internet commons, it may be quite reasonable that he throws in every persuasive claim available. But this approach potentially obscures his precise argument about what kinds of resources belong in the commons, and in particular the relation between arguments for a commons in physical layer resources and arguments for a commons in the Internet's other layers.

The optimal allocation of any resource to private ownership or the commons should, Lessig suggests, rationally depend on "the char-

102. *See* U.S. CONST. art. I, § 8, cl. 8 (granting Congress the power to "promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors exclusive Right to their respective Writings and Discoveries").

103. *Id*.

acter of the resource and how it relates to a community."[104] But we are not being rational about property. Despite the prosperity made possible by a property regime combining freedom and control at different layers of the Internet,

> a set of ideas about a central aspect of this prosperity—"property"—confuses us. This confusion is leading us to change the environment in ways that will change the prosperity. Believing we know what makes prosperity work, ignoring the nature of the actual prosperity all around, we change the rules within which the Internet revolution lives. These changes will end the revolution.[105]

Lessig argues powerfully against the indiscriminate presumption that "the whole world is best managed when divided among private owners."[106] He does not depart from one central tenet of mainstream property theory, that privatization typically maximizes resources' value by giving owners incentives to invest work and the ability and incentive to transfer ownership to those who can make better use of the resource.[107] However, he identifies a number of resource characteristics that warrant exceptions to this economic presumption.

Lessig does not expressly list the characteristics weighing in favor of a common access regime for any given resource, but they can be derived from his discussions and sorted roughly as follows: (1) whether the resource substantially promotes democratic participation; (2) whether the resource is subject to network effects; (3) whether the resource is nonrivalrous; and (4) whether the resource can be used most productively as a platform for innovation.

1. *A Resource May Belong in the Commons if Common Access Significantly Promotes Democratic Values*. Although Lessig's arguments are largely predicated on economic efficiency, he also identifies democratic, scientific, and cultural values as a reason to place some resources in the commons, stating that "[e]fficiency is not the end of the reasons why free resources might prove valuable."[108] When a re-

104. LESSIG, *supra* note 2, at 21 (emphasis omitted).

105. *Id.* at 5.

106. *Id.* at 13 (quoting Carol Rose, *The Comedy of the Commons: Custom, Commerce, and Inherently Public Property*, 53 U. CHI. L. REV. 711, 712 (1986)).

107. *Id.* at 89 ("By assigning a strong property right to the owners . . . we can rely upon them to maximize their own return from this resource by seeking out those who can best use the resource at issue."); RICHARD POSNER, ECONOMIC ANALYSIS OF LAW 28 (2d ed. 1977) (asserting that property rights create incentives to use resources efficiently).

108. LESSIG, *supra* note 2, at 92.

source such as a forum for public assembly and protest or the right to vote "becomes foundational to participation in a society," he suggests, then we should not permit it to be bought or sold but should instead preserve uniform access rights.[109] Noneconomic considerations sometimes trump economic efficiency in these cases—not only for broad normative reasons, but also for Constitutional ones. That document may require lawmakers in some instances to limit private property rights to preserve public opportunities for free expression or political participation,[110] or to serve the Intellectual Property Clause's stated goal of "promot[ing] the Progress of Science and useful Arts."[111]

Such goals are not expressly emphasized throughout much of *The Future of Ideas*, but they have been a focal point for some of Lessig's past writing. In *Code*, he emphasized the substantive significance of choices about network architecture, arguing that "the original Net protected fundamental aspects of liberty—free speech, privacy, access to content, freedom from excessive regulation," but that changes in the Internet's architecture could threaten these values.[112] Although *The Future of Ideas* largely moves away from these normative and constitutional arguments, instead favoring relatively hardheaded economic points about efficient use of resources, an underlying concern for democratic and participatory considerations remains palpable in the newer book.

Lessig's enthusiasm for new modes of human cultural participation, outside of the passive consumer model of much pre-Internet media, is unmistakable throughout *The Future of Ideas*. "The critical feature of the Internet that sets it apart from every other network before it is that it could be a platform upon which a whole world of activity might be built," he writes.[113] Lessig celebrates the Internet's

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109. *Id.* at 93.

110. For example, Congress in enacting copyright laws may not assign private property rights to ideas, only to particular expressions of ideas. The Supreme Court has stated that "First Amendment protections [are] embodied in the Copyright Act's distinction between copyrightable expression and uncopyrightable facts and ideas." Harper & Row, Publishers, Inc. v. Nation Enters., 471 U.S. 539, 560 (1985). Similarly, neither governments nor company towns may exclude unpopular speakers from the public sidewalk. Marsh v. Alabama, 326 U.S. 501, 509 (1946).

111. U.S. CONST. art. I, § 8, cl. 8.

112. LESSIG, *supra* note 2, at 238; *see generally* LESSIG, *supra* note 5 (emphasizing society's ability to choose the freedoms that cyberspace will guarantee).

113. LESSIG, *supra* note 2, at 174.

"freedom to feed back, to feed creativity to others,"[114] and the possibility that

> [t]echnology could enable a whole generation to *create*—remixed films, new forms of music, digital art, a new kind of storytelling, writing, a new technology for poetry, criticism, political activism—and then, through the infrastructure of the Internet, *share* that creativity with others.
>
> This is the art through which free culture is built.[115]

Networked digital technology, he concludes, offers "potential for making human life more, not less, human."[116]

Lessig's enthusiasm for the Internet's democratic and human potential is matched by a deep pessimism about the looming enclosure of the Internet commons. With enclosure, he suggests, "[t]he promise of many-to-many communication that defined the early Internet will be replaced by a reality of many, many ways to buy things."[117] The Internet may become "cable television on speed, addicting a much more manageable, malleable, and sellable public."[118]

But it is unclear exactly what weight these assessments of the Internet's cultural and communicative value bear in Lessig's overall argument about optimal property regimes. As a strictly legal matter, *The Future of Ideas* does not take on the thorny issue of potential First Amendment limitations on Internet privatization.[119] As a policy matter, the book evinces great concern for speech and democratic

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114. *Id.* at 7.

115. *Id.* at 9.

116. *Id*.

117. *Id.* at 7.

118. *Id*.

119. Some scholars have argued that First Amendment-inflected participatory values should be the primary concern in structuring Internet property regimes. Professor Benkler, in a White Paper developed in part with Lessig's input, wrote:

> This freedom for all users to participate in building our informational and cultural environment is the greatest promise of networked communications. It is a freedom tied directly to the core values of democracy and autonomy that underlie the American commitment to freedom of speech and a free press. To secure this freedom, however, we must build a core common infrastructure that will allow commercial and noncommercial, professional and amateur, commodified and noncommodified, mainstream and fringe to interact in an environment that allows all to flourish and is biased in favor of none.

Benkler, Property, *supra* note 6, at 3. Professor Benkler concludes that these "core values of democracy and autonomy" themselves compel preservation of the commons and prevention of a property "bottleneck" at any of the Internet's three layers. *Id.*

values, but ultimately does not clarify how to resolve conflicts between preservation of "many-to-many communication" and maximization of economic value. Rather, Lessig's analysis seems primarily driven by economic efficiency arguments, despite his unmistakable concern for democratic access. The precise balance, and the terms of any possible compromises, between economic and noneconomic concerns remains unclear.

2. *A Resource May Belong in the Commons if Network Effects Exist*. Another major element of Lessig's argument for common access to Internet resources is the existence of network effects. Network effects achieve a sort of reverse tragedy of the commons by making a resource *more* valuable when more people use it.[120] A classic example is the telephone network: although my telephone would be useless if it were the only one in the world, it becomes more valuable with each additional telephone connected to the network. The same is true of the Internet, as long as bandwidth congestion remains manageable. The more people who are online and the more applications that connect using TCP/IP, the more valuable both that data transmission standard and the network in general become. By adding value to the networked resource, network effects can also make exclusion from the network particularly harmful. An innovator excluded from use of the telephone network or the "network" of English language would be at a serious disadvantage, despite her freedom to create and use a new—and even potentially a better-designed—network.

Lessig nowhere uses the term "network effects," but he uses the concept, arguing that open access property regimes may be justified where

> the value from increased participation outweighs any cost from increased utilization. The value, in these cases, comes from the convergence of many upon a common use, or standard, or practice. And in these cases, keeping the resource in the commons is a way to assure that that value is preserved for all.[121]

In this section, Lessig chooses not to cite or discuss economic literature about network effects. Instead, he focuses on Carol Rose's

120. Lemley & McGowan, *supra* note 7, at 483.

121. LESSIG, *supra* note 2, at 88.

1986 article *The Comedy of the Commons*[122]—a source that, like *The Future of Ideas*, incorporates both economic and noneconomic considerations. Professor Rose suggests that customary commons, such as roads, had both economic and social value: "customary doctrines suggest that commerce might be thought a 'comedy of the commons' not only because it may infinitely expand our wealth, but also, at least in part, because it has been thought to enhance the sociability of the members of an otherwise atomized society."[123] In our own century, too, Professor Rose concludes,

> there may be other versions of the comedy of the commons, and other practices that share with commerce the power to enhance our sociability. We might even think that properties devoted to such noncommercial uses as recreation or speech could achieve their highest value when they are accessible to the public at large.[124]

The quoted passages—like Lessig's discussion of network effects in *The Future of Ideas*—do not draw strong distinctions between economic and noneconomic considerations. Indeed, both works suggest that the two may go hand in hand.[125] The history of the Internet—like the history of physical public spaces—illustrates how linked these two considerations may be in practice. The conflation of these two considerations, however, makes it harder to discern precisely which attributes make a resource more worthy of being placed in the commons in Lessig's analysis.

3. *A Resource May Belong in the Commons Because It Is Nonrivalrous*. Another argument for a common-access property regime may arise from a resource's nonrivalrousness. Nonrivalrous resources such as code and content are good candidates for the commons because they cannot be depleted by use[126]—although property rights

122. Carol Rose, *The Comedy of the Commons: Custom, Commerce, and Inherently Public Property*, 53 U. CHI. L. REV. 711, 723 (1986).

123. *Id.* at 723.

124. *Id*.

125. The network effects-based argument for moving resources into the commons is potentially a very far-reaching one. An argument based on network effects alone might support, for example, the claim that standard software such as Microsoft Word (or its source code) should be made available to the public. Lessig does not take the argument so far—indeed, he writes that "Microsoft should have the right to control access to its source code." LESSIG, *supra* note 2, at 14.

126. Subject to reservations summarized *supra* note 94.

provide necessary incentives for private investment in the creation of some nonrivalrous resources.[127]

Lessig's innovation commons argument applies most straightforwardly to nonrivalrous resources, for which scarcity is not an issue. The argument for a commons on the Internet is likewise simplest if we presume that wireless spectrum-sharing technology can make the network nonrivalrous all the way down—content, code, and physical layers all capable of sustaining nearly unlimited use.[128] Arguments for and against extension of common-access property rules to the Internet's existing, rivalrous physical base are more complicated. (And it is not entirely clear which argument Lessig supports.)[129] Common access to a congestible resource only makes sense if other characteristics of the resource make it so commons-worthy as to outweigh the "tragedy of the commons" factor.

Lessig suggests at some points that the wires, cables and machines at the Internet's physical layer may be resources of this sort: rivalrous, yet so critical to a productive commons that general access is warranted. He argues persuasively for public funding of some Internet infrastructure,[130] and suggests measured sharing of bandwidth through technical protocols—much like the system of traffic laws which enable us peaceably to share another congestible commons, the

127. The state's grant of limited monopoly rights over the nonrivalrous resources protected by intellectual property law is conventionally explained on these grounds. *See, e.g.*, Twentieth Century Music Corp. v. Aiken, 422 U.S. 151, 154–56 (1975) (explaining that the immediate effect of copyright is to secure a fair return for the author or artist, but the ultimate aim is to stimulate artistic creativity to benefit the public). Lessig's analysis incorporates this economic consideration for nonrivalrous resources generally. *See* LESSIG, *supra* note 2, at 95–96 (asserting that some form of control over nonrivalrous resources will often be required to assure adequate incentive to supply the resource). It bears repeating, however, that within Lessig's schema, economic compensation for property owners is possible whether a resource is controlled (protected by a property rule) or free (free of charge or protected by a liability rule). In addition, the nonrivalrous resources for which he most strongly advocates a commons regime are resources that already exist, and for which no property rights are needed as incentives to creation: the wireless spectrum and existing core Internet protocols. Spectrum "was given to us pre-built by Mother Nature," *id.* at 221, while the Internet's core protocols were, for a variety of reasons, dedicated to the commons by their human creators. *See* Boyle, *supra* note 18, at 12–13 (discussing the "random distribution of incentive structures," ranging from desire for prestige to satisfaction of species-being, which motivate free software developers).

128. Even if the wireless spectrum were truly nonrivalrous, the physical layer would still not be perfectly nonrivalrous, because nodes in the physical network, such as routers and servers, would remain congestible.

129. *See supra* Part I.B.

130. *See* LESSIG, *supra* note 2, at 47, 245 ("The best response to scarcity may not be a system of control. The best response may simply be to remove the scarcity [by funding additional cable rollout].").

public streets.[131] And in a passage expressly addressing the issue of rivalrousness, he suggests that the benefits of an Internet commons as a platform for innovation and communication may be so great as to outweigh concerns about scarce physical resources.

"[T]o the extent a resource is physical—to the extent it is rivalrous—then organizing that resource within a system of control makes good sense," he begins. "This is the nature of real-space economics; it explains our deep intuition that shifting more to the market always makes sense."[132] But the Internet is different, merging a rivalrous base with nonrivalrous code and content to create a whole that

> is closer to ideas than things, but still it is not quite there. It is not quite true that the stuff in cyberspace is perfectly nonrivalrous in the sense that ideas are. Capacity is a constraint; bandwidth is not unlimited. But these are tiny flaws that cannot justify jumping from the largely free to the perfectly controlled. . . . That cyberspace has flourished as it has largely because of the commons it has built should lead us to ask whether we should tilt more to the free in organizing this space than to the controlled that organizes real space.
>
> Put differently: These imperfections in the capacity of cyberspace—that together may make it more rivalrous than ideas are—should not by themselves force us to treat the resources that cyberspace produces as we would treat real-space resources. If by resisting the model of perfect control we gain something important, then we should do so.[133]

The logical and policy issue here is a deep one. Our historical property systems give us one set of rules for informational goods—rules from intellectual property law and First Amendment law that are logically tailored to nonrivalrousness, and that reflect policy goals of disseminating information for the promotion of art, science, and democratic participation. We have another set of rules for physical goods—rules derived from the law of tangible property that are logically tailored to rivalrousness, and that generally reflect a policy goal of maximizing economic value.

The Internet, as Lessig describes it, requires a body of property law that merges these considerations. In many cases, the two sets of policy goals coincide; but there is no reason to believe that they will

131. *Id.* at 77–78.
132. *Id.* at 115.
133. *Id.* at 116.

always coincide. And the economic characteristics of rivalrousness and nonrivalrousness, of course, will never coincide. As long as the Internet's nonrivalrous superstructure of information—code and content—rests on a finite, congestible, physical base, tension between these logical and policy imperatives will likely affect legal allocation of access rights over elements of the communications network.[134]

4. *A Resource May Belong in the Commons Because Its Most Productive Use Is as a Platform for Innovation*. Lessig's innovation-based argument for an Internet commons blends economic considerations with noneconomic considerations regarding information sharing, culture, and democracy. The application of the innovation commons argument to rivalrous resources such as wires and cables may vary depending on which consideration is paramount.

To recap, Lessig's central argument is that when we expect a resource to be a productive platform for innovation,[135] then the best property regime may be one that ensures that people with incentives to innovate have access to the resource, and cannot be excluded by

134. Lessig does not emphasize excludability in his analysis of property rights. Conventional property theory tells us that certain resources are "public goods," defined by two attributes: nonrivalrousness (meaning everyone can use the resource at once) and nonexcludability (meaning it is impossible to stop anyone from using the resource). Inge Kaul et al., *Defining Global Public Goods*, *in* GLOBAL PUBLIC GOODS: INTERNATIONAL COOPERATION IN THE 21ST CENTURY 2–3 (Inge Kaul et al. eds., 1999). The national defense system is a classic example of a public good. It is nonrivalrous because we are equally shielded by it no matter how many people are in the country; it is nonexcludable because it cannot leave anyone out of the protection, whether they paid their taxes or not. Public goods may be best managed through mechanisms other than private property, because no private, profit-seeking entity will have incentives to produce them. But if it is possible to exclude users, the theory goes, excludability may be reason enough to shift back to the default of a private property regime. *See generally* Robert C. Ellickson, *Property in Land*, 102 YALE L.J. 1315 (1993) (describing the theoretical foundations of several regimes of property ownership). Excludability is significant because it gives an owner both the capacity for better custodianship—he can police and maintain his property—and the incentive to better custodianship—he can profit from the resources by selectively granting access to those who pay. And it is excludability that makes private property regimes possible for nonrivalrous resources: novels, for example, have in the past been effectively managed as private property because their physical medium—books—allowed excludability.

Lessig does not directly discuss the role of excludability in defining optimal property rights. To the extent that excludability comes up in *The Future of Ideas*, it appears as a technological threat to open Internet access, rather than as a potential reason to create private property rights: if Internet access providers can exclude or discriminate among users, then the Internet's value as a commons for innovation will decline.

135. *See* LESSIG, *supra* note 2, at 89 (arguing that if the use of a resource is unclear, there is more reason to maintain common access to the resource).

those who benefit from the status quo.[136] As Lessig puts this point with regard to the Internet's physical layer, "[u]ntil innovators are free to use a communications resource (now spectrum, before the wires) innovation will be slowed."[137] Readers may interpret the innovation commons argument as a straightforward empirical claim about how best to identify and develop economically efficient uses of resources, an argument "that *property* flourishes best in an environment of freedom."[138] But on the other hand, it can also be a broader claim about innovative means of democratic and cultural participation: the relevant innovation, Lessig explains at one point, is "[n]ot just the innovation of Internet entrepreneurs (though that is an extremely important part of what I mean), but also the innovation of authors or artists more generally."[139]

Lessig's argument for access to nonrivalrous code and content as platforms for innovation is compelling. Indeed, the Constitution itself supports Lessig's argument that intellectual property rights over these resources should be tailored to promote innovation.[140] But access to Internet code and content depends on access to the underlying physical layer, and the arguments for a commons at this layer are far more complicated. Earthbound economic concerns about scarcity and resource congestion must be factored into the equation. The resulting collision between policy considerations relevant to a revolutionary communications system, and considerations relevant to exhaustible physical resources, underlies Lessig's ambiguity about whether wires, cables, and Internet machines should be free or controlled resources.

One seemingly minor concern arising from the physical, congestible nature of the Internet's substrate relates to Lessig's innovation argument in particular. This concern may highlight the larger tensions between informational property and physical property systems.

Lessig argues that the optimal allocation of a resource depends in part on how much we know about possible future uses of the re-

136. *See id.* at 35, 175–76 (describing Lessig's focus as on "the relationship between architecture and innovation" and the "tragedy of the innovation commons") (emphasis omitted).

137. *Id.* at 221. Lessig reiterates this point with respect to all three layers of the network. *See id.* at 71–72, 84 (discussing the need for access to all layers of the Internet to promote innovation).

138. *Id.* at 236 (emphasis added).

139. *Id.* at 6.

140. *See supra* notes 100–03 and accompanying text.

source. For resources with known uses, he endorses the conventional economic argument for privatization:

> Where a resource has a clear use, then, from a social perspective, our objective is simply to assure that that resource is available for this highest and best use. . . . By assigning a strong property right to the owners of such resources, we can then rely upon them to maximize their own return from this resource by seeking out those who can best use the resource at issue.[141]

Following this logic, resources with relatively clear value-maximizing uses, such as farmland, are best managed through a system of private property rights.[142] But, Lessig proposes, conventional arguments for privatization do not apply to certain resources *if the optimal uses of those resources remain uncertain*. This departure from conventional economic analysis is at the heart of his argument, and it has been hailed by one respected critic as a groundbreaking challenge to our understanding of prosperity's origins.[143] Lessig explains that

> [i]n at least some cases, [control of resources] certainly would be better [than free access]. But from the perspective of innovation, in some cases it would not. In particular, when the future is uncertain—or more precisely, when future uses of a technology cannot be predicted—then leaving the technology uncontrolled is a better way of helping it find the right sort of innovation. Plasticity—the ability of a system to evolve easily in a number of ways—is optimal in a world of uncertainty.[144]

Framed this way, the innovation argument would apply to the Internet's rivalrous physical layer only as long as the technology's possible uses remain uncertain enough to justify a property regime designed to maximize opportunities for innovation. The purely economic claim for a commons in the Internet's physical layer could thus diminish over time. As our knowledge improves, the optimal property

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141. LESSIG, *supra* note 2, at 89.

142. Environmentalists, who propose a precautionary principle, have raised a significant challenge to this argument: if we do not know the best use for a resource, we should leave it alone.

143. *See* Marc Rotenberg, *Internet Liberation Theology*, Salon.com, *at* http://archive.salon.com/tech/review/2001/11/07/lessig/print.html (Nov. 7, 2001) (on file with the *Duke Law Journal*) ("Lessig's effort to bind innovation to prosperity is as big an idea, perhaps, as Adam Smith's rebuke to the mercantilists in [*The Wealth of Nations*].").

144. LESSIG, *supra* note 2, at 39. This passage appears in a chapter discussing the nonrivalrous technical protocols at the code layer, but it is used to describe the terms of access to the rivalrous physical network, analogized by Lessig to the highway system.

regime would shift from a commons to privatization. Lessig at times seems to endorse this logic: "Where we have little understanding about how a resource will be used," he writes, "we have more reason to keep that resource in the commons. And where we have a clear vision of how a resource will be used, we have more reason to shift that resource to a system of control."[145]

Following this logic, if the innovation commons argument depends on maximizing economic value of physical resources, then it may also be historically contingent. The argument may apply to the technology of the Internet in 2002 but not in 2020.[146] If, on the other hand, the Internet's value is as a platform for human communication broadly defined, and if it is valuable because it enables production and exchange of information, then the innovation commons argument need not weaken over time.

At one point in *The Future of Ideas*, Lessig writes, "[t]he Internet could be a platform for innovation across the full range of social and political life. Its possible uses are, even this far into its growth, unknowable."[147] The tantalizing possibility raised here is that the Internet's possible uses will *remain* unknowable. That equal and indiscriminate access to the network is valuable because the potential for innovation on this platform is, and will remain, incalculable. This optimistic conclusion is attractive if we view the Internet as a human communications network first and as a set of physical resources second. As a communications network, like written language or Arabic numerals, the Internet could be a platform on which expressive, technical, or political innovation do not plateau or decline, because the diversity of human communication and invention enabled by the platform is so broad. If this noneconomic innovation is what is at stake,

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145. *Id.* at 88–89.

146. Versions of this objection can even be leveled against Lessig's arguments for commons at the code and content layers. My colleague, William J. Friedman, suggests that the open-source movement may eventually be stifled by its own success. Once the nuts and bolts software of the Internet has reached a certain robustness, no one will bother to tinker with it and only ideologues will care if the code is open or closed source, owned or unowned. This hypothesis is lent some support by Eric Raymond's observation about his fetchmail project:

> [T]he list was beginning to lose members from its high of close to 300 for an interesting reason. Several people have asked me to unsubscribe them because fetchmail is working so well for them that they no longer need to see the list traffic! Perhaps this is part of the normal life cycle of a mature bazaar-style project.

Eric Raymond, *When Is a Rose Not a Rose?*, Eric Steven Raymond's Home Page, *at* http://tuxedo.org/~esr/writings/cathedral-bazaar/cathedral-bazaar/ar01s06.html (last visited Aug. 21, 2002) (on file with the *Duke Law Journal*).

147. LESSIG, *supra* note 2, at 175.

then passages in *The Future of Ideas* dismissing rivalrousness as a subordinate consideration and urging use of liability rules and government spending to preserve the commons are highly persuasive. If the innovation at stake is defined by economic value maximization, then a long-term shift to privatization of the Internet's physical resources may be reasonable, and Lessig's more moderate passages accepting private property rights in the Internet's physical resources carry the day.

When the economic and noneconomic interests coincide, then the argument for open access is easy. When the two interests are at odds, the argument for open access is hard. The objection outlined above suggests that the two interests could conflict—there could come a time when collective *economic* benefit is best served by privatization, while collective cultural, expressive, or democratic benefit is best served by open access. Lessig favors both kinds of benefit (who does not?) but does not explain how to make the hard decision between the two.

B. Problems with the Layered Model of Internet Property Regimes: The Incompatibility of Liability Rule Protection at the Code Layer with Property Rule Protection at the Physical Layer.

Lessig uses two conceptual divisions to frame his discussion of property regimes in the Internet's components. First, resources can be identified as belonging in one of three layers (physical, code, or content) following Professor Benkler's model of communications networks. Second, each of those resources is subject to a property regime of either "freedom," in which anyone can use the resource on equal terms, or "control," in which some entity has the power to exclude users. Lessig uses these two divisions to frame his discussion of property regimes in Internet resources, explaining that "[e]ach of these layers in principle could be controlled or could be free. Each, that is, could be owned or each could be organized in a commons."[148]

But Lessig's more detailed discussions blur both the distinctions between Internet layers and distinctions between control and freedom in subtle but significant ways. In particular, Lessig at times defines the code layer so broadly that free access for users at that layer cannot be reconciled with exclusive private control for owners at the

148. *Id.* at 23; *see supra* Table 1 (setting forth the Internet property regime as described by Lessig).

physical layer. As a result, it is not clear what property regime Lessig endorses for wires, cables, and other tangible resources at the physical layer. Nor is it clear exactly how his proposals fit within the neat schema set forth at the book's start.

The breakdown of distinctions between the Internet's layers arises largely from subtle shifts in the definition of "code." One definition is the same as that employed in Lessig's article *The Law of the Horse*[149] and again in his first book *Code*.[150] In those works, Lessig discussed freedom and constraint on the Internet in part by comparing cyberspace to real space.[151] In the real world, he argued, four things effectively regulate our behavior: laws, social norms, market forces, and "architecture"[152]—physical laws that prevent us from flying unaided and walking through walls. On the Internet, the same four forces constrain our behavior. There, however, software or *code* makes up the architecture. It is the constraint of code that most directly shapes our possible actions online. Code determines with inescapable finality whether we need permission to access certain information, whether our own statements can be read, and whether our actions are anonymous or identifiable.[153] (It determines our possible actions, that is, unless we are hackers and can change the code itself.)

In *Code*, Lessig drew careful distinctions between software code and law. Legal constraints can be breached, can be protested in court, and can be adjusted by judges. Code simply stops us from acting.[154] "Code is not law," he explained, "any more than the design of an airplane is law."[155] Thus, although he played with the pun on the term, calling software "west coast code" and laws "east coast code,"[156] Les-

149. Lawrence Lessig, *The Law of the Horse: What Cyberlaw Might Teach*, 113 HARV. L. REV. 501, 509–10 (1999).

150. LESSIG, *supra* note 5, at 86–90.

151. I am indebted to Professor Boyle for drawing my attention to the narrower definition given to "code" in *Code and Other Laws of Cyberspace*.

152. LESSIG, *supra* note 5, at 87.

153. *See generally id*. at 24–60 (examining the impact of code architecture on cyberspace control mechanisms). Strictly speaking, Lessig defined code to include software and hardware-based constraints. *See id*. at 6 (referring to software and hardware as examples of "code"). He also emphasized application space code—browser design, etc.—rather than lower level code such as TCP/IP protocols. *Id*. at 101–02. The technical code addressed in *The Future of Ideas* largely consists of protocols rather than applications. Both, however, would be "code" within the definition employed in *Code*.

154. *Id*. at 136.

155. *Id.* at 221.

156. *Id*. at 53.

sig maintained a relatively strict technical definition of the term "code" for purposes of analysis in that book.

This narrow technical definition of "code" is also the one Professor Benkler employs. For Professor Benkler, code layer or logical layer constraints are those created by technical aspects of software.[157] This narrower meaning, too, is the one initially advanced in *The Future of Ideas*. The code layer is defined as "the code that makes the hardware run [including] the protocols that define the Internet and the software upon which those protocols run."[158] In some parts of the book, Lessig adheres to this narrower technical definition.[159]

Throughout much of the book, however, "code" takes on a broader meaning. The category of code layer constraints on use of the network comes to include legal constraints on access to the Internet's physical infrastructure. This shifting definition undermines the three-layer model as a device for explaining property regimes, by making the property regime of the physical layer vary with that of the code layer.

This second, more expansive meaning of "code" is perhaps most evident in a discussion of creativity outside of the Internet. "The core constraint on artistic creativity in real space," Lessig writes, "is at the code layer—the constraint on whose work gets produced and distributed where . . . . No one has a right to enter Basic Books and steal access to its printing presses."[160] This constraint is not—in the narrow sense of *Code* and Professor Benkler—a constraint created by code. Rather, it is one created by legal controls over access to a physical object, the printing press.[161] The code layer constraint in this example thus appears to include property rights over, and terms of access to, a resource at the physical layer. In other words, the code layer is in part a legal property regime for the physical layer. But for purposes of *The*

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157. *See, e.g.*, Benkler, Property, *supra* note 6 (citing the Digital Millennium Copyright Act's regulation of decryption technology as an example of regulation at the logical or code layer).

158. LESSIG, *supra* note 2, at 23.

159. *See id.* at 150 (contrasting constraints created by software code with less effective constraints created by contract law); *id.* at 156 (distinguishing between technical and legal threats to end-to-end); *id.* at 221 (distinguishing between law and technology as sources of AT&T's control over wires).

160. *Id.* at 111. In the same section, Lessig even briefly implies that market constraints should be treated as part of the code layer: "Only the deeply ill informed waste their time translating Adam Smith's work to the silver screen. The author is constrained by the expectation of how the code layer will respond." *Id.*

161. In the sense used in *Code*, a constraint created by the code layer would be, "no one can use Basic Books' printing presses because the presses are locked inside a building."

Future of Ideas, the code layer is itself the object of a legal property regime, and the law governing code layer property is independent of the law governing physical layer property. Lessig announces his project as an analysis of the separate property regimes at each of the Internet's three layers.[162]

A broad definition of the code layer as including not only technical protocols but also legal constraints on access to the physical layer appears throughout the book. The code layer of cable television is owned, Lessig writes, because "only the cable companies get to decide what runs into your house."[163] And the code layer of the telephone system was historically controlled by AT&T because the company determined "how and who you could connect."[164] This control exercised by telephone and cable providers is largely a product of legal rights over physical property—it is not a product of code, in the narrow sense of technical constraints. Such control can also be a product of code in the narrower technical sense, if it is accomplished through proprietary protocols that make interoperability impossible. But this does not seem to be Lessig's intended meaning. Here and elsewhere in the book, he categorizes network owners' legal power to exclude users from physical resources as code layer control. Hence, in the chapter contrasting AT&T's code layer control to the code layer freedom of end-to-end, AT&T's control is illustrated in part by its ability legally to block use of the Hush-a-Phone, a plastic noise-blocking attachment for the telephone receiver's mouthpiece.[165] And in a final chapter on maintaining freedom at the *code* layer, Lessig includes proposals for legally requiring open access to the net's *physical* underpinnings.[166] Both of these discussions pertain to legal control over access to the physical layer—not to control over technical protocols.

This shift in the definition of "code" is not a problem with the network model—the model is a heuristic device; its precise delinea-

162. LESSIG, *supra* note 2, at 25 ("The Internet thus mixed both free and controlled layers . . . . Our aim is to understand how this mix produced the innovation that we have seen so far and why the changes to this mix will kill what we have seen so far.").

163. *Id.* at 24.

164. *Id*.

165. *Id.* at 30.

166. *See id.* at 248 (suggesting that, in the absence of sufficient competition in broadband provision, code layer freedom might be maintained by extending open access requirements to cable broadband providers).

tion should be whatever best facilitates analysis.[167] Nor—for much the same reason—need Lessig maintain perfect terminological consistency from one book to the next. But *The Future of Ideas*'s expansive definition of code complicates Lessig's project of defining independent property regimes at each layer of the network.

If the network's three layers are fully distinct, then separate access rights can be defined for each. If access to one layer depends on access to another—as appears to be the case with the code and physical layers in *The Future of Ideas*—then the property regimes at each layer cannot be isolated. When "control at the code layer" includes the legal right to exclude users or uses from the physical layer, then control at the code layer is control at the physical layer as well. Conversely, if one meaning of end-to-end principles and freedom at the code layer is, as Lessig suggests at one point, that "no permission to use the bandwidth is required,"[168] then free access at the network's code layer necessitates free access at its physical layer.

This broad definition of the code layer as including the legal access rules governing the physical layer complicates the characterization of the Internet's historic code layer as "free" but its physical layer as "fundamentally controlled."[169] Indeed, although Lessig says more than once that "[t]he Internet was born on a controlled physical

167. There are very good reasons to treat the code and physical layers as separate resources, though.

For one thing, to the extent that a network's logical or code layer is defined as a discrete bundle of software like the TCP/IP stack, while the physical layer consists of wires, cables, and radio spectrum, the two layers really do encompass different "things."

Moreover, the value created by an open standard at the code layer does not strictly depend on free access at the physical layer. A closed network's users may benefit from an open-access standard like TCP/IP regardless of whether other potential users are excluded from the network's physical layer (although the standard would become more valuable to everyone if more people used it, as a result of network effects). So as a platform for innovation, an open code layer has a value logically distinct from an open physical layer.

Similarly, there are good grounds for independent analysis of the physical layer. Optimal regulatory or property regimes in a network may vary depending on the physical properties of a particular substrate—copper wires versus glass versus wireless spectrum, etc. The best management for an exhaustible physical resource may be different than that for an inexhaustible one; the best management for a naturally occurring resource may be different from that for a resource made by human effort and investment. *See id.* at 95 (contrasting goals of regulation for rivalrous and nonrivalrous sources). And, material properties aside, different physical communications media are subject to wildly different regulatory regimes. A proposal for regulating or sharing access to telephone wires faces very different legal hurdles from an identical proposal for cables or for wireless spectrum.

168. *Id.* at 40.

169. *Id.* at 25.

layer,"[170] his more detailed discussions of telecommunications regulation reflect and even emphasize the fact that, in important ways, the Internet's historic physical layer was not controlled. Lessig twice discusses regulations that, among other things, required that AT&T and the Baby Bells allow competitors to use their lines.[171] He notes that "AT&T did not control how its wires would be used, because the government restricted that control."[172] Through this regulation, "[t]heir wires in a sense became your wires,"[173] and "[t]his imposed neutrality about how the wires would be used left the field open for others to use the wires in ways no one ever expected."[174]

The odd characterization of AT&T's wires as both publicly accessible ("your wires") and privately owned ("fundamentally controlled") complicates Lessig's structurally important division between free and controlled resources as well. Lessig says that resources protected by a liability rule—the rule, in Calabresi and Melamed's classic formulation, that "someone may destroy the initial entitlement if he is willing to pay an objectively determined value for it"[175]—are "free" in Lessig's terminology.[176] At several points he suggests that "compensation without control,"[177] or liability rule protection, can ensure compensation for creators of intellectual property while keeping the resource free for public access.[178]

But a significant resource protected by a liability rule is characterized as controlled, not free. Federal common carrier requirements for telephone companies—the regulations that compelled AT&T to permit Internet developers to use their wires—are liability rules.[179]

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170. *Id.* at 48.

171. *Id.* at 45, 149.

172. *Id.* at 45.

173. *Id.* at 149.

174. *Id*.

175. Calabresi & Melamed, *supra* note 8, at 1092.

176. Lessig uses the term "liability rule" only once in the text, LESSIG, *supra* note 2, at 110, and twice in the footnotes, *id.* at 12 n.13, 110 n.21. But in a footnote expanding on his definition of "free" resources, he specifies that resources protected by liability rules are "free." *Id.* at 12 n.13.

177. *Id.* at 201.

178. *See, e.g.*, *id.* at 109 (noting statutory compulsory license rights for player pianos and cable television); *id.* at 201 (suggesting application of compulsory license scheme to Napster); *id.* at 254–55 (contrasting anti-Napster rhetoric with the general acceptance of cable television). *See also id.* at 160 (implying that Lessig favors liability rules for wires and cable, as well).

179. *See, e.g.*, Richard A. Epstein, *A Clear View of the Cathedral: The Dominance of Property Rules*, 106 YALE L.J. 2091, 2118 (1997) ("The owner of the property dedicated to service as

And the telephone wires, according to Lessig, are controlled.[180] Thus in this particular historical instance, property ownership without the right to exclude—ownership subject to a liability rule—is characterized as "control," not freedom.

This confusion about what it means for code to be free, and what it means for wires and cables to be controlled, is the greatest weakness of *The Future of Ideas*. Lessig's starting proposition—that the Internet's strength arises from the combination of freedom at the code layer, control at the physical layer, and mixed free and controlled resources at the content layer—is an attractive one. For readers concerned about economic incentives, this formulation reassuringly places the rivalrous resources of wires and cables in private hands. For the FCC or DOJ lawyer reading *The Future of Ideas* on the Red Line, this initial overview may also be reassuring. Leaving existing property entitlements alone is a politically appealing route to progress. As a well-meaning young regulator, she may appreciate the simplicity of this model: the Internet commons can be preserved without disturbing current property rights over cable and other physical resources, as long as we all have access to the code layer, defined as "the code that makes the hardware run."[181]

But the more detailed discussion of code layer control in *The Future of Ideas* disrupts this model by implying a far broader definition of the code layer. Following this second definition, owners' exercise of exclusionary rights over physical property is itself an aspect of code layer control: cable companies are said to control the code layer when they "decide what runs into your house."[182] This expanded definition makes freedom at the code layer incompatible with exclusive control over the physical layer. It forces odd inconsistencies in Lessig's discussion of liability rules, freedom, and control. And for regulatory purposes, it makes legal access to physical resources like cable a central consideration. Thus, for the Red Line reader, the first definition of code may suggest an appealingly simple policy choice, while the second definition reveals the issues raised by *The Future of Ideas* as politically thorny and vexingly complicated.

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a common carrier is protected by a liability rule: Those who want its services must pay fair value for them.").

180. LESSIG, *supra* note 2, at 24–25, 48.

181. *Id.* at 23.

182. *Id.* at 24.

C. Resolving Lessig's Ambiguities: The Bundle of Rights Model of Property and the Role of Government Regulation

Unraveling the intellectual knots within a rich and ambitious work like *The Future of Ideas* is far beyond the scope of this review. There are, however, two analytical tools that might prove useful in considering property policy for the complex resources that make up the Internet. First, the logical difficulty of reconciling freedom at the code layer with control at the physical layer may be avoidable through a more finely detailed conception of property rights. Rather than classifying entire *resources* as free or controlled, it may be productive to classify specific *uses* of each resource as free or controlled—as, for example, a city park is free for picnicking, but controlled for logging.

The second point builds on the first. Defining and managing property rights and terms of access to complicated, partially shared resources is the kind of thing that governments and regulators do. Indeed, the FCC is charged with such regulation of the very communications resources at issue in *The Future of Ideas*. Despite the well-founded skepticism of the FCC which Lessig expresses in this book, federal regulatory oversight seems a likely—and perhaps necessary—element of a sustainable Internet commons if that commons is to be built on a privately owned physical platform.

Neither of these points is entirely missing from *The Future of Ideas*.[183] Indeed, the second point—that regulations ensuring open access to the Internet's physical layer may be necessary to sustain the innovation commons—is one which Lessig has developed in other publications.[184] But in *The Future of Ideas*, perhaps out of deference to a popular readership, his discussion steers clear of complex hybrid property regimes and federal regulatory schemes. Further development of both topics could be one way of resolving inconsistencies between the code layer freedom and physical layer control described in the book. Moreover, the legal history and policy debates behind federal regulation of communications resources can provide a framework

183. *See, e.g.*, *id.* at 76–77, 83 (noting that wireless spectrum sharing would still require some regulation, such as certification of technology for spectrum sharing); *id.* at 44–45, 148–49 (discussing the role of telephone open access requirements in the development of the Internet); *id.* at 219 (noting that the effect of spectrum licensing is "not so much to regulate a resource (spectrum) as it is to determine who has the rights to engage in certain kinds of businesses").

184. *See* Lemley & Lessig, *supra* note 54, at 945–46 (2001) (arguing that allowing broadband cable to control internet service provision may stifle innovation); Lawrence Lessig, *Innovation, Regulation, and the Internet*, THE AM. PROSPECT, Mar. 27–Apr. 10, 2000, at 26 (same).

for assessing the potential tensions between market-oriented policy goals, and goals relating to speech and dissemination of information.[185]

The Future of Ideas is structured around a broad classification, in which resources are either free or controlled.[186] But—as Lessig himself notes at some points—resources are often free for some purposes but controlled for others.[187] Indeed, mixes of free and controlled uses within a single resource are familiar from received property law.

185. Communications law, too, provides a developed body of law balancing economic policy considerations against considerations of free speech and access to information. Communications law offers a legal and conceptual toolkit for addressing "speech versus markets" policy concerns at the Internet's physical layer—much as intellectual property law provides tools for weighing the same concerns at the code and content layers. Although communications regulation deals intensively with matters of economic competition, it is also "a basic tenet of national communications policy that 'the widest possible dissemination of information from diverse and antagonistic sources is essential to the welfare of the public.'" Turner Broad. Sys., Inc. v. FCC, 520 U.S. 180, 192 (1997) (quotation marks omitted) (quoting Turner Broad. Sys., Inc. v. FCC, 512 U.S. 622, 663–64 (1994)); *see also* Nat'l Citizens Comm. for Broad. v. FCC, 555 F.2d 938, 949 (D.C. Cir. 1977) ("The 'public interest' standard necessarily invites reference to First Amendment principles." (quotation marks omitted) (quoting Columbia Broad. Sys., Inc. v. Democratic Nat'l Comm., 412 U.S. 94, 122 (1973))), *aff'd in part*, 436 U.S. 775 (1978). The FCC balances "market" and "speech" considerations through regulation including must-carry rules, *see* Red Lion Broad. Co. v. FCC, 395 U.S. 367, 400–01 (1969) (upholding the fairness doctrine in the name of securing public access to diverse voices), and broadcast licensing requirements, *see* NBC v. United States, 319 U.S. 190, 226–27 (1943) (upholding licensing requirements in the public interest); Benkler, *supra* note 33, at 55–56 (noting that the must-carry rules serve First Amendment interests in providing information from "diverse and antagonistic sources" (quoting Associated Press v. United States, 326 U.S. 1, 20 (1945))), as well as through its "public interest" standard of merger review. *See, e.g.*, Applications for Consent to the Transfer of Control of Licenses and Section 214 Authorizations from Tele-Communications, Inc., Transferor To AT&T Corp., Transferee, 14 F.C.C.R. 3160, ¶14 (1999) (contrasting the Justice Department's antitrust analysis, which "focuses solely on whether a proposed merger will harm competition" with the FCC's public interest analysis, which "also encompasses the broad aims of the Communications Act").

The difficulty of balancing "speech" and "market" concerns in communications regulation is illustrated by the Supreme Court's split in *Turner*. 520 U.S. at 191–93. The Court ultimately upheld regulations compelling owners of physical communications resources (in that case, cable) to share those resources for particular uses (in that case, carriage of local broadcast stations). *Id.* at 185. The Court, however, split over the justification for such regulation, with four Justices finding the regulation permissible based both on competition policy and on Congress' "independent interest" in broadcast diversity and access to information, *id.* at 194, Justice Breyer, as the fifth vote, concurring only with the speech-related justification, *id.* at 226, and four dissenting Justices opining that the regulation could not constitutionally be justified unless as a measured response to anticompetitive behavior, *id.* at 229–58 (O'Connor, J., dissenting).

186. *See* LESSIG, *supra* note 2, at 23 ("Each of these layers could be controlled or could be free.").

187. *See id.* at 77 (contrasting regulation of devices allowed to use roads with freedom to choose a destination); *id.* at 83 (contrasting regulation of technologies allowed to use spectrum with freedom of use and content of allowed technologies).

Many ostensibly "private" resources are free commons for certain designated uses: you may exclude trespassers from your land, for example, but it remains a commons for emergency firefighting or observation from a public vantage point,[188] and may even be a commons for leafleting[189] or for delivery of legal aid.[190]

Similarly, many resources traditionally designated as "commons" are governed by restraints on certain activities, which render the commons free for certain uses and controlled for others. On the common grassy field, medieval European peasants were free to graze their livestock, but not to hunt their neighbors' livestock[191] or to erect buildings. Indeed, in some instances users of the commons were not even free to graze their livestock in patterns of their own choosing.[192] In modern commons, too, the law tailors public access so as to maximize productive shared use: the freeway is a commons for driving but not for tossing a Frisbee; the park a commons for Frisbee but not for driving. Sustainable commons, these examples suggest, may be commonly accessible for some but not all uses; terms of access to the shared resource may be to some extent—by law or by norms—regulated.

These examples of successful mixed-access resources suggest that a more fine-grained analysis of property rights, focused on uses rather than goods, may be appropriate for the Internet commons as well. The "bundle of rights" conception of property ownership is helpful in this regard, defining ownership not as an all-or-nothing proposition, but rather as a variable set of rights over a resource.[193] The bundle of rights model allows us to delineate the owner's imperfect control, and

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188. *See* Florida v. Riley, 488 U.S. 445, 450 (1989) (holding that warrantless aerial observation of fenced-in backyard within the curtilage of the home was permissible under the Fourth Amendment); California v. Ciraolo, 476 U.S. 207, 213–14 (1986) (same).

189. PruneYard Shopping Ctr. v. Robins, 447 U.S. 74, 88 (1980) (upholding the constitutionality of a state decision requiring owners of shopping malls to permit reasonable leafleting on the premises).

190. State v. Shack, 277 A.2d 369, 374 (N.J. 1971) (concluding that legal aid attorneys did not violate New Jersey's trespass statute by visiting migrant farmworkers in their living quarters on their employer's property).

191. "The law locks up the man or woman / Who steals the goose from off the common." Anonymous, Untitled (c. 1764), *reprinted in* Boyle, *supra* note 18, at 1.

192. Some medieval European commons permitted, not free grazing, but only grazing in designated patterns. (Among other things, this ensured equal distribution of manure over land later to be used for crops). Ellickson, *supra* note 134, at 1390.

193. *See*, *e.g.*, Kaiser Aetna v. United States, 444 U.S. 164, 176 (1979) (describing an owner's right to exclude other people as a stick in "the bundle of rights that are commonly characterized as property").

the public's imperfect access, to both "private" property and "commons." Following this model, we may imagine a perfect property regime as one in which each resource is privately controlled for uses where private control makes sense, and publicly accessible for uses where public access makes sense.

In the case of the Internet's physical layer, Lessig's innovation commons argument suggests that the use for which public access makes sense is the exchange of communication over the network. Extracting this "stick" from an owner's bundle—or protecting that stick with a liability rule rather than a property rule—the owner would retain a diminished bundle of exclusive rights. She would have the right to alienate the physical resource, as well as the right to enjoy, and exclude other users from *some* uses of the resource—uses for purposes other than network communications. A user who took Time Warner's cable for use as a belt or a clothesline would confront a property owner armed with the full Blackstonian panoply of rights. But the owner could not exclude users from using the physical resource as a communications medium. In its capacity as part of the communications network, the resource would be a commons.

Such a hybrid of liability rule protection for certain uses of a resource and property rule protection for others has several advantages relevant to my criticisms of Lessig's discussion of the Internet's physical layer.[194] A hybrid regime makes Lessig's arguments for both freedom and control at the Internet's physical layer easily reconcilable.[195] And the difficult relationship between the code and physical layers—in which "code" at times includes terms of access to the physical layer, and free access to code depends on free access to the physical layer—is far less problematic if we assume that the physical layer is in fact free for some uses.

Hybrid liability rule and property rule protection for physical communications resources is of course far from hypothetical—it is very like the existing law for telephone companies, under which common carriers must grant access to their wires for "communication service" but need not grant access for uses of the belt or clothesline

194. *See supra* Parts II.A–B.

195. Indeed, in light of the book's overall thrust and Lessig's other writing on the topic, it is plausible that his inconsistency on this point in *The Future of Ideas* reflects a preference for a hybrid liability rule / property rule regime for cable. *See supra* note 184 and accompanying text. But I could find no reference to such hybrid regimes in this book, nor is a hybrid consistent with the book's analytic framework, in which resources at each layer of the Internet are either controlled or free. LESSIG, *supra* note 2, at 23.

variety.[196] Other owners of communications infrastructure, too, are legally compelled to share otherwise private resources for specific uses.[197] Indeed, the example of existing telecommunications regulation may have shaped Benjamin Kaplan's assumption—in the remarkably prescient 1966 speech excerpted as the epigraph to this Review—that the Internet, when it came to exist, would be regulated as a sort of public utility.[198]

Current management of communications resources under hybrid liability and property rule regimes depends on substantial federal regulation and oversight. An expanded hybrid regime for the Internet's physical layer would similarly come at the cost of extensive federal regulation—a topic which does not at first seem to be at the heart of *The Future of Ideas*. Lessig builds his argument around the broader categories of freedom and control, and argues powerfully for the value of "freedom, both freedom from state control and freedom from private control."[199] His discussion does not read as an argument about details of regulation, and Lessig is, in this book, carefully even-handed on the particular and touchy question of cable open access requirements.[200] But issues raised by *The Future of Ideas* regarding the transmission of information and culture over a network of privately owned physical components are close to issues confronted by lawmakers in regulating other twentieth century communication technologies. Earlier regulatory responses to these issues, as well as broader legal, economic, and policy concerns of communications law,

196. 47 U.S.C. § 201 (2000).

197. For example, cable operators must share cables for the transmission of local broadcast signals, but not for most other uses. 47 U.S.C. § 534 (2000).

198. KAPLAN, *supra* note 1, at 120–22. Kaplan's prediction missed one extremely significant aspect of the Internet: he imagined that Internet content would be selected by editors. He did note, however, that "[o]ne energetic mind has conceived that the cost of introducing works into a system may finally run so low as to justify inclusion, in earmarked 'compartments,' of works rejected by the editors: an authors paradise!" *Id.* at 121.

199. LESSIG, *supra* note 2, at 236. Note that, following Lessig's terminology, a resource that is made available to the public under a liability rule is free from state control. He notes that "at least within our tradition . . . the most important commons have been supported by state intervention." *Id.* at 228.

200. Lessig notes many advantages to cable open access, *see id.* at 163–68 (distinguishing the interests of America Online and other corporations from the interests of the Internet), and lists open access requirements as one of several possible regulatory strategies in his list of possible changes to the law, *id.* at 248. But he also says that his "argument cannot begin to resolve the question of whether or not the cable companies are right" in arguing that they cannot profitably grant open access. *Id.* at 174.

may be highly relevant to the newer communications resource of the Internet.

CONCLUSION

Lessig's discussion of property rights in Internet resources is persuasive, insightful, and a highly enjoyable read. It is, moreover, alarming—he convincingly demonstrates a pattern of errors in our management of the Internet, and the danger of those errors. The very sophistication and detail of his analysis, however, introduces complexity that seems not to be fully accounted for by dividing the Internet into physical, code, and content layers, and distinguishing between free and controlled resources. A communications network with a nonrivalrous superstructure built on a rivalrous physical base, the Internet forces property theorists to merge analysis of informational resources with analysis of physical ones. The optimal resulting property regime would likely be, as Lessig suggests, a blend of freedom and control. But it is unclear if that blend can be defined strictly through the three-layer division he uses. Rather, a blend that takes account of the unique attributes of the network, that recognizes the value-maximizing function of private property, but that is not thereby blinded to the tremendous potential of the innovation commons, may best be achieved by technical and detailed regulation. My hypothetical reader on the Red Line may have something to do with the development of such regulation. Beset as she is by political capture and undertheorized conceptions of property, she needs all the guidance she can get. In *The Future of Ideas*, Lessig has lucidly and intelligently provided it for her.