Dinosaurs should die. This lesson we have learned over and over again. And innovators should resist efforts by dinosaurs to keep control. Not because dinosaurs are evil; not because they can't change; but because the greatest innovation will come from those outside these old institutions.1 - Lawrence Lessig

I. INTRODUCTION

Lawrence Lessig, a Stanford Law School professor, is indisputably one of the greatest American theorists thinking and writing about the new challenges of digital technologies.2 In recent years, Lessig has done more than simply observe cyberspace from the rarified air of the ivory tower. On an increasingly frequent basis, he has saluted forth as a cyberspace freedom fighter in a war where courtrooms are battlefields.3 His foe: the "dinosaurs" of Hollywood and the recording industry.4


2 Lessig, a former law clerk to U.S. Supreme Court Justice Scalia, as well as to the influential Judge Posner on the U.S. Court of Appeals for the Seventh Circuit, has taught at four of the law schools that are currently ranked in the top six law schools by U.S. News and World Rep. (Harvard, Stanford, Chicago and Yale). Schools of Law: The Top Schools, U.S. News & World Report, Apr. 15, 2002, at 64; see also Lawrence Lessig, Curriculum Vitae, at http://lessig.org/bio/cv/ (last visited Apr. 11, 2002).


4 LESSIG, supra note 1, at 176 (making the stark statement that "[d]inosaurs should die").
the fight against the “dinosaurs.” Lessig views his “dinosaur” opponents as an ancien régime benightedly using law as a weapon against innovation and creativity, the lifeblood of the Internet’s technological revolution. Blithely disregarding the historical realities of the period when the real dinosaurs roamed the globe, Lessig employs the somewhat pejorative phrase “dark ages” to refer to the time when the “dinosaurs” held sway (the period before the Internet became mainstream). Selection of this historical analogy suggests that Lessig views himself as a crusader. Accordingly, The Future of Ideas is liberally sprinkled with activist language like “resist” and “the struggle.”

Lessig’s struggle against the dinosaurs is heating up. The latest front is the United States Supreme Court. The Court granted certiorari on Feb. 19, 2002 in Eldred v. Ashcroft, argued by Lessig before the U.S. Court of Appeals for the District of Columbia. The Court’s decision to review Eldred v. Ashcroft makes The Future of Ideas an extremely timely and important book for anyone with an interest in the future of cyberspace. The Justices of the highest court in the land will rule on the validity of at least some aspects of the argument set out in The Future of Ideas. Any Supreme Court ruling on the regulation of cyberspace will set a course that will be hard to undo.

This review’s brief summary of The Future of Ideas will undoubtedly fail to do justice to its elegance and eloquence. In keeping with its populist aim of recruiting supporters for the “struggle,” The Future of Ideas eschews the dense prose that too often bloats the pages of law reviews. Lessig employs a refreshingly simple and hip style, helpfully providing clear intermediate summaries for each step of his reasoning.

Lessig’s argument in the Future of Ideas is ambitious and complex. It builds on the argument set out in Lessig’s 1999 book Code and Other Laws of Cyberspace. In Code, Lessig argued that the “nature” of cyberspace was not immutable or absolute, but was dependent on its architecture, or computer code. He also contended that the design of this architecture had profound effects for liberty in cyberspace. In Code, Lessig chronicled a shift in the Internet’s architecture toward an “architecture of control.” He argued that the result of this shift has increasingly reduced liberty in cyberspace. Now, in the Future of Ideas, Lessig shifts his focus away from the problem of liberty to consider the impact of the architecture of cyberspace upon innovation and creativity. He maintains that the evolution in the Internet’s architecture toward technologies of increased control has been supported by both law and policy makers and threatens the innovation and creativity that flourished as a result of the Internet’s original architecture. Of special concern to Lessig is the deployment of technical controls by broadband Internet access providers, especially cable providers. He is also concerned about the expanded scope of intellectual property law applicable to Internet content. Lessig believes that too many people are oblivious to these threats to innovation. He urges his readers to join his crusade to take action, warning that it will soon be too late to respond.

Lessig’s attempt to develop a unified theory for the regulation of something as intangible and conceptually unwieldy as cyberspace is truly impressive. Yet, as Lessig himself admits, his theory is, at least to some extent, a prediction of the future and as such, lacks empirical support. After reading The Future of Ideas, a number of nagging questions remain, for this reviewer at any rate. One such question is whether the entities deploying technologies of control will in fact ultimately succeed in consolidating their hold over the market so that user choice to bypass those
controls is lost. At a time when the future market landscape for broadband is quite uncertain, it seems to make sense to let the invisible hand of the market have a chance. It also seems wise to wait for more convincing evidence of clear market failure before imposing regulation that may not prove necessary.

Another question is the extent to which the controls decried by Lessig will actually cause harm to innovation or creativity, especially given that the Internet has in fact been subject to more control over its brief history than Lessig admits in *The Future of Ideas*. Lessig concedes that his account is incomplete in that it fails to fully investigate all the factors that may spur innovation and creativity. Although this is a difficult area in which to conduct empirical research, it does seem somewhat premature to make the decision to still the invisible hand while disregarding other factors affecting innovation.\(^{17}\) Moreover, Lessig’s account of the increased control afforded by recent expansions to intellectual property law fails to give much regard to the growing problem of the law’s lack of enforceability.

We are now living in an age of exploding technological developments that pose a serious threat to the fundamental principle of the rule of law. New technologies are providing more and more ways to evade the reach of the law. As it has become increasingly clear that the law is unable to fully control behavior in cyberspace, it also appears that many netizens do not respect or obey the rule of law.\(^{18}\) Lessig’s argument seems to be premised on the notion that intellectual property law is an effective system of control, but that premise is open to question.

Perhaps even more significantly, Lessig’s argument fails to give due regard to the ethical dimensions of innovation. He seems to assume that all innovation is inherently good, and never really pauses to consider whether some kinds of innovation may not prove beneficial to society. Indeed, in describing innovations like Napster or My.MP3, Lessig focuses entirely on their positive aspects and freely admits that his theory ignores concerns about their darker, potentially harmful uses.\(^{19}\) This approach seems unwise, when some innovations are clearly likely to cause serious harm to humanity. If we had now had the choice to invent the atomic bomb for the first time, one would hope that we would give more consideration to its potential harm than was apparently given at the time it was actually invented.\(^{20}\) Although the innovative digital technologies that Lessig lauds in *The Future of Ideas* may not prove to be as potentially destructive as the atomic bomb, it seems improvident to promote all such innovation in general without giving serious regard to the potential harm that may be caused by particular new technologies.

A greater focus on the ethical dimensions of innovation also raises questions about the value system underlying Lessig’s theory. Lessig states that his theory is founded on two fundamental values: “law and economics” efficiency and democracy,\(^{21}\) but neither of these justifications pays sufficient attention to the morality of encouraging technological innovation, whether generally or for particular new technologies. Lessig seems to think that a moral basis is too subjective to form an essential justification for his theory of cyberspace regulation.\(^{22}\) That attitude is open to question. One approach to cyberspace regulation that merits serious consideration is based on fundamental human rights. Such an approach is founded on the principle that certain aspects of humanity are universal, not simply personal. Under a human rights approach to law, property rights (including intellectual property rights), are seen as essentially grounded in the duality of the dignity of the human person and the essentially social nature of humankind. Some of Lessig’s ideas about the limited nature of property are apparently consistent with a human rights approach.

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\(^{19}\) Lessig, supra note 1, at 133.


\(^{21}\) Lessig, supra note 1, at 92.

\(^{22}\) Id. at 11.
to law, but questions remain as to whether his entire theory would be justified under such an approach.

Although the limited scope of a book review does not permit final resolution of any or all of the issues raised in the above paragraphs, this review will go on to explore them in a bit more detail, in the context of a survey of Lessig’s argument’s in The Future of Ideas. The survey will follow the basic structure of The Future of Ideas, which is divided into three parts, each becoming progressively bleak. Each part of The Future of Ideas is further subdivided into a tripartite analysis based on the work of the NYU communications scholar Yochai Benkler.23 On Benkler’s analysis of the Internet as a communications system, there is a physical layer of the wires and computers connected to the network, a software (or code) layer of protocols fostering communication of material across the network, and a content layer comprised of the material that travels across the network.24 To Lessig, the extent to which the Internet is controlled at any given time must be considered for each of these layers.

II. THE CYBERSPACE “INNOVATION COMMONS”

Lessig believes that the development and commercial deployment of the Internet amounts to a technological revolution. He makes the sweeping claim that “[t]his revolution has produced the most powerful and diverse spur to innovation of any in modern times.”25 But now, he warns, this climate of innovation is under threat. As the Internet moves steadily towards the architecture of climate of innovation is under threat. As the Internet moves towards the architecture of

In Lessig’s dark vision, the Internet will amount to just another Home Shopping Channel, albeit one that is increasingly personalized. Although Lessig does not offer any firm predictions for what will happen if the dinosaurs are vanquished, he predicts that it will be a far better outcome: “a world of change” where creativity is free from excessively burdensome legal constraints.27 The first part of The Future of Ideas, trendily titled DOT.COMMONS, introduces Lessig’s concept of the original state of the Internet as an “innovation commons.”28 Lessig claims that the original architecture of the Internet was a “space where creativity [could] flourish.”29 He argues that although the physical layer was controlled (by individuals, corporations and government), and the content layer also was, at least to some extent, controlled (by intellectual property law), the code layer was free.30 Unlike the telephone network or cable TV, the original Internet had an end-to-end (“e2e”) design founded on the “end to end argument” of MIT computer scientists Jerome Saltzer, David Reed and David Clark.31 According to Lessig, this e2e principle of network design meant that the original Internet was a network lacking centralized control over its users. The result of an e2e architecture was a network that did not control what data passed across it, nor what applications could be connected to it.32

According to Lessig, when the Internet’s original e2e architecture was combined with government limits on corporate control of the physical layer (as a result of attempts to rein in AT&T’s monopoly power), the result was an environment that fostered both a “commons of code” (software applications built for the Net) and a “commons of knowledge” (knowledge about the Net and code running on it).33 These two commons together amounted to an “innovation commons” that allowed the development of new Net applications without requiring the consent of the network or

23 Id. at 23 (citing Yochai Benkler, From Consumers to Users: Shifting the Deeper Structures of Regulation Toward Sustainable Commons and User Access, 52 Fed. Comm. L.J. 561, 562-63 (2000)).
24 Id.
25 Id. at 5.
26 Id. at 7.
27 Id. at 7-8.
28 See generally id. at 29-99.
29 Id. at 23, 140.
30 Id. at 25.
32 LESSIG, supra note 1, at 36-37.
33 Id. at 45, 49.
any other gatekeeper. As examples of the innovation resulting from this c2c design, Lessig lists the World Wide Web as well as open code projects like the GNU/Linux operating system, the Apache server and the Perl programming language.

It is undeniable that open source projects like GNU/Linux, Apache or Perl are examples of significant innovation. Lessig could have included many other examples of significant open source projects, like the Python programming language or the GNU Emacs text editor. Yet Lessig’s picture of a newborn Internet characterized by an absence of control at the code level ignores the existence of controls on the Internet’s code level for much of its history and thus leaves open questions about the necessary relationship between openness at the code level and innovation.

Lessig is noticeably vague about the exact stage of the Internet’s history he means by the “original Internet.” He uses the phrases “cyberspace at its birth” and the “original Internet” apparently synonymously, but neither phrase provides a precise historical context. It is not clear whether Lessig thinks that the Internet was born in 1969, when four host computers formed the original packet-switched network known as the Arpanet, or in 1983, when the Arpanet fully transitioned to the TCP/IP host protocol, or in 1995, when the Federal Networking Council issued a definition of the “Internet” (as might be indicated by Lessig’s “Net95” moniker used in *Code*), or on some other date. Why this quibble about historical precision? Because the history of the Internet makes clear that, for most of the Internet’s early history, its code level was not totally open. At code level, the early Arpanet was subject to considerable government control. Users of the Arpanet were limited to certain university and industry Department of Defense contractors. Other computer scientists and researchers could not get access to the Arpanet. Demand for network access led to the creation of other networks such as the U.S. Department of Energy’s MFEnet for researchers in Magnetic Fusion Energy, the National Science Foundation’s sponsorship of another network for academic and industrial computer scientists (eventually named NSFnet), Usenet and Bitnet. Apart from Usenet and Bitnet, these networks were all controlled at the code level in that they were closed networks accessible only to certain groups of researchers. In 1985, NSF did open access to NSFnet higher education users beyond computer scientists, but NSF continued to exercise considerable control on NSF at the code level, most notably prohibiting commercial use of NSFnet until 1991.

If, as Lessig claims, technologies of control are now being added to the Internet’s architecture, it is clear that the Internet’s code level has only really been open for a relatively brief period of its history. This is significant because it raises questions as to the causal relationship between openness at the code layer and innovation. Some of the innovations that Lessig cites, such as GNU/Linux, Perl or the World Wide Web were developed, at least in part, at a time when the code layer was not completely open in that access to the Internet was restricted to particular users. Lessig’s theory of an “innovation commons” based on an open code layer is thus somewhat incomplete, leaving unanswered questions about what level of openness is required at the code layer for innovation to occur.

### III. COMPARING THE CYBERSPACE INNOVATION COMMONS TO REAL SPACE

Lessig’s happy picture of the “original” Internet

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34 Id. at 40, 49.
35 Id. at 41, 54-56.
37 Lessig, * supra* note 1, at 44, 121.
39 Michael J. Ferguson & Jean-Charles Grégoire, *A Short
as innovation commons is contrasted with constraints on innovation in real space in the second part of the book.\textsuperscript{45} This part, which Lessig calls DOT:CONTRAST, is the shortest section of the book, at only 38 pages. Its main function appears to be to provide a transition between Lessig’s ideal of the cyberspace innovation commons and his nightmarish vision of its imminent demise. Lessig employs a flashback technique to make this transition. He looks back to the “dark ages” before the Internet became mainstream and describes what he sees as the constraints on creativity and innovation in the arts and in commerce that were then in place.\textsuperscript{46} He charges that in contrast to the happy ideal of the original Internet, “[c]reativity in the dark ages lives in a world largely without a commons.”\textsuperscript{47} To Lessig, the main constraint on both the arts and commerce in the “dark ages” was at the code layer, the layer governing distribution of both artistic works and goods or services.\textsuperscript{48} Big corporate entities largely controlled which of these could be broadly distributed. To Lessig, this was a significant constraint on creativity because, he argues, people would not create or innovate if they could not be sure of a market for their works or goods.\textsuperscript{49} At the content layer, Lessig views copyright law as another constraint on creativity in the “dark ages,” but believes that, in theory at least, the constitutional limitations of the law (such as fair use and the limitations on the copyright term) guaranteed access to some creative works for “dark age” artists who wished to build on them.\textsuperscript{50}

Lessig views these constraints in the real world as basically justified by the physical nature of real space and its scarcity-based economy.\textsuperscript{51} He takes great pains to establish that he is not opposed to the free market or the ownership of private property.\textsuperscript{52} But he does warn that the constraints on creativity in real space are rising due to two ongoing trends. The first development is the spate of big corporate mergers in the media industry (including news, publishing, broadcasting, film and cable), which is leading to increasing constraints at the code level of distribution.\textsuperscript{53} While Lessig does not attack the legality of this increasingly concentrated control of the media industry by fewer and fewer players, he believes that its result is an unfortunate decline in diversity and quality.\textsuperscript{54} The second development is the “almost limitless bloating” of copyright law as it has been expanded in duration, application to different types of subject matter, and the creation of new rights for the copyright owner.\textsuperscript{55}

Lessig contrasts the growing constraints on creativity in the real world with the Internet innovation commons. He catalogues a series of innovations in cyberspace that he sees as examples of the innovation in cyberspace that is attributable to its e2e architecture. Such cyberspace innovations include new products, such as HTML books, digital films or music lyric servers.\textsuperscript{56} Another innovation is the development of new markets, including a market for online poetry, and new distribution methods, such as Napster or My.MP3.\textsuperscript{57} Even more innovative, according to Lessig, are preference matching technologies like those employed by Amazon.com. These can build customer demand for products rather than simply meeting it.\textsuperscript{58} Lessig caps off his list of cyberspace innovations with a technology that he sees as “revolution[ary]”: the development of peer-to-peer technologies like Gnutella.\textsuperscript{59} Yet although it seems fair to describe all of these developments as innovations, Lessig’s argument that innovation in general should be protected by the law seems somewhat incomplete in that it does not fully confront the serious question of whether such innovations are socially beneficial.

Lessig openly admits that he disregards some of the darker sides of the technologies that he lauds as innovations. He acknowledges that many have concerns over the threat to privacy posed by preference matching technologies or the possibilities for piracy posed by peer-to-peer technologies, but he ignores these concerns.\textsuperscript{60} He states that he is focusing only on the positive aspects of these new innovations. But Lessig’s Pollyanna approach will

\begin{itemize}
  \item \textsuperscript{45} Lessig, supra note 1, at 103–41.
  \item \textsuperscript{46} Id. at 104–19.
  \item \textsuperscript{47} Id. at 115.
  \item \textsuperscript{48} Id. at 111.
  \item \textsuperscript{49} Id. at 111, 114.
  \item \textsuperscript{50} Id. at 105–06.
  \item \textsuperscript{51} Id. at 103–04.
  \item \textsuperscript{52} See id. at 6, 86, 115, 202.
  \item \textsuperscript{53} Id. at 117–18.
  \item \textsuperscript{54} Id. at 118.
  \item \textsuperscript{55} Id. at 106; see also id. at 107–10.
  \item \textsuperscript{56} Id. at 122–26.
  \item \textsuperscript{57} Id. at 126–32.
  \item \textsuperscript{58} Id. at 132–33.
  \item \textsuperscript{59} Id. at 134–37.
  \item \textsuperscript{60} Id. at 139, 137.
\end{itemize}
leave many readers with nagging questions. Isn’t it prudent to consider whether the negative aspects of innovative technologies outweigh the positive ones? Should we promote innovation in general even if some innovative technologies may fail this balancing test? Some thoughtful technologists, such as Bill Joy, are increasingly concerned about the ethical aspects of new technologies. Joy warns that some new technologies may pose serious threats to humanity and so we cannot afford to ignore this issue. Lessig too blithely skates over these concerns in *The Future of Ideas*. By focusing on the threats to innovation in cyberspace, he fails to devote enough attention to threats that may be posed by innovation in cyberspace.

IV. Threats to the Cyberspace Innovation Commons

The final section, DOT CONTROL, is the most pessimistic section of his book and contains the meat of Lessig’s argument. Here he chronicles how the “dinosaurs” are increasingly changing the Internet at code level by developing technologies of control. Lessig believes that the addition of these controls is leading to tragic results for the Net by altering its end-to-end design. He calls this the “tragedy of the innovation commons.” Simultaneously, Lessig contends that the “dinosaurs” have also been threatening creativity and innovation by successfully lobbying for more expansive intellectual property laws for digital content. Lessig condemns the support that he thinks Congress and the courts are providing to these “dinosaurs.” He warns that the combination of law and technological control is leading toward a system of perfect control that will undermine the Net’s innovation commons.

According to Lessig, this trend toward perfect control is motivated by increasing market demand for broadband Internet access. Access through telephone lines is too slow for many of today’s Net applications, driving a need for broadband access. Lessig charges that broadband providers, particularly cable companies, are “dinosaurs” that are imposing technologies of control on Internet access. He is concerned about the power of cable companies to close their “fat pipes” by allowing only selected ISPs to access them.

Recent developments at the FCC might seem to bolster Lessig’s concerns about the power of cable companies to close their pipes to competing ISPs. In March, 2001, the FCC voted 3-1 not to force cable operators to open access to their cables, classifying cable broadband as an interstate “information service” rather than a “telecommunications service” or “cable service.” But the FCC’s decision has been challenged by a lawsuit brought by the Media Access Project on behalf of Consumers Union, The Consumer Federation of America and the Center for Digital Democracy. Even assuming that cable companies have the power to restrict access to unaffiliated ISPs, it is not at all clear that they will in fact do so. As noted by the FCC in its recent declaratory ruling, many of the largest cable providers, including AOL Time Warner, Comcast and AT&T, have all opened access to some unaffiliated ISPs, at least in some markets.

Lessig has additional concerns about the power of cable companies to control what passes across their cables. He also accuses cable companies of developing technologies that discriminate in favor of proprietary content. Moreover, he charges that cable companies are already employing gatekeeping technologies that impose controls on what data can be sent or accessed across the Net. Lessig describes these technologies of control by quoting a passage of more than one page in length from a 1999 Internet publication by e2e
designer Jerome Saltzer, “Open Access” is Just the Tip of the Iceberg.73 This passage contains a list of gatekeeping technologies that Saltzer claims are being employed by cable companies: time limits on video streaming connections, filtering, prohibitions on home web servers and home networks and fixed backbone choice.74 However, Lessig himself does not appear to have carried out any supplementary empirical research to ascertain the extent to which cable companies are now imposing these limits for all users. A check with AOL Time Warner Cable, one of the largest providers of cable internet access services, on April 12, 2002, revealed that AOL Time Warner does not impose many of these restrictions, including video streaming limits, prohibitions on home networks and filtering (other than for Spam), on residential customers.75 AOL Time Warner does impose size limitations on web sites for residential customers, normally permitting websites up to 5 megabytes and raising the limit to 10 megabytes for an additional fee.76 However, AOL Time Warner permits individuals to host larger web sites if they switch to commercial service.77 AOL Time Warner’s policy appears to be directly contrary to Lessig’s claim of a trend toward more control at the code layer by cable companies and raises questions about the validity of this claim. Moreover, although it is true that some cable companies have imposed video streaming limits on consumers, many content providers that Lessig would class among the “dinosaurs,” like Disney-owned ESPN, have strongly objected to such limits.78

Moreover, even if cable operators do in fact alter the Internet’s e2e design, the extent to which other types of broadband providers will in fact impose such design-altering controls on their subscribers is currently uncertain, as Lessig himself admits. At the time The Future of Ideas was written, Lessig could not charge that DSL broadband service providers would limit access to their wires to selected ISPs, because they did not legally have the right to do so.79 This looks likely to change. On Feb. 14, 2002, after Lessig’s book came out and shortly before this review was written, the FCC adopted a Notice of Proposed Rulemaking “tentatively concluding” that DSL should be classified as an “information service” rather than a “telecommunications service.”80 This reclassification will effectively deregulate DSL in that DSL providers will no longer have to open their networks to competing ISPs. Lessig would no doubt agree with consumer advocates such as Mark Cooper, research director for the Consumer Federation of America, who has described the FCC’s move as “a drip, drip, drip that may take away the Internet as we know it.”81 But even if the FCC is no longer requiring open access, it is not yet clear that deregulated DSL providers will in fact close their networks to competing ISPs.

As Lessig admits, the crucial issue here is not whether some broadband providers may impose controls in broadband access, but whether there will be a concentration of broadband providers who effectively foreclose user choice by imposing such controls.82 Lessig himself has advocated the principle of “the least invasive regulatory response,” albeit in a slightly different context.83 Applying this principle, serious questions remain as to whether it is wise, in an unsettled broadband market, to impose regulation that may prove unnecessary if the market is left to its own devices. In particular, the recent movement by large cable service providers toward providing unaffiliated ISP service suggests that Lessig’s skepticism about the power of the invisible hand to set things right at the code layer may prove unwarranted.84

Lessig’s concern about excessive control by the “dinosaurs” goes beyond control at the code layer.
In the final section of his book, Lessig also decries changes at the Internet's content layer, namely changes to intellectual property law. It is indisputable that, over the past decade, intellectual property laws applicable to digital content have been broadly expanded.85 Lessig shows how Congress has significantly expanded federal copyright law by enacting amendments such as the new anticircumvention provisions of the Digital Copyright Millennium Act of 1998 and the twenty-year retroactive copyright term extension in the Sonny Bono Copyright Term Extension Act of 1998.86 He also provides a lucid account of how the courts have expanded federal patent law to permit both the patenting of software and business processes.87

To Lessig, the eagerness of both Congress and the courts to widen the reach of intellectual property law was fueled by premature panic on the part of "dinosaur" content owners and neglected property law was fueled by premature panic on the part of "dinosaur" content owners and neglected.88 Lessig argues that the U.S. Constitution clearly provides that intellectual property law is, at its essence, a balance, and that the expansion of these dinosaurs' control has now pushed that balance completely out of alignment.89

Lessig warns:88

[a]nd while one cannot say in the abstract that increased control is a mistake, it is clear that we are expanding this control with no sense of what is lost. The shift is not occurring with the idea of a balance in mind. Instead, the shift proceeds as if control were the only value.90

He stresses that he is no radical hacker seeking the eradication of all intellectual property laws. Rather, he warns that care is needed before piling control upon control. Lessig's allegiance to some intellectual property law is underscored by his choice of Random House as publisher of The Future of Ideas. Random House is owned by Bertelsmann, which as one of the "Big Five" record labels, would surely qualify as one of Lessig's "dinosaurs". When asked about this apparent inconsistency in an interview, Lessig commented: "That's a fair criticism. Here's one way to look at it: [Bertelsmann is] working very hard to spread a book that hopes to undermine their strategy."91

Lessig's account of intellectual property in The Future of Ideas will leave many readers with additional questions beyond his choice of publisher. One issue that Lessig fails to give sufficient attention is perhaps one of the most significant problems for intellectual property law. This is the issue of the enforceability of legal controls in an age of rapidly growing technological power. It is clear that many technologists are effectively thumbing their noses at the courts by taunting them with the power of such technologies to evade the law.92 A notable example is the DeCSS litigation, where the trial judge, Lewis Kaplan, was clearly deeply troubled by this situation. He stated: "Defendants argue that an injunction in this case would be futile because DeCSS already is all over the Internet. They say an injunction would be comparable to locking the barn door after the horse is gone. And the Court has been troubled by that possibility. But the countervailing arguments overcome that concern."93 Yet even after Judge Kaplan's grant of injunctive relief was affirmed by the Second Circuit, a simple Web search confirms that DeCSS is still posted all over the Internet.

Another example is the aftermath of the Napster litigation. Even though Napster itself experienced virtually total defeat in the courts, its soul has risen like a phoenix from the flames in the form of new decentralized peer-to-peer technologies like Gnutella, Kazaa or MusicCity.com that many commentators believe are far less amenable to legal control.94 Even if the corporate entity
loses a legal battle and is shut down, file trading may well continue.\textsuperscript{95} New digital technologies thus pose serious challenges for the rule of law in our society, and it is unfortunate that The Future of Ideas has not devoted more attention to this. Lessig’s assessment of the expansion of intellectual property is not framed in the context of these threats to the rule of law in our society. When considered in this way, the question of whether the proper balance for intellectual property law has become skewed is less obvious.

Because Lessig believes that the current state of intellectual property law is seriously overprotective for digital works, he concludes by offering some suggestions for reform. His copyright law proposals would revive formalities that were removed from federal copyright law by the 1976 revisions. Untroubled by the fact that implementing his suggestions would put the United States in violation of the Berne Convention, Lessig proposes revoking the current rule that copyright rights accrue automatically on a work’s creation and replacing it with a new registration prerequisite for the accrual of copyright rights.\textsuperscript{96} On a valid registration, a copyrighted work would be protected for a five–year term that would be renewable 15 times, each for an additional five years.\textsuperscript{97}

Lessig also advocates changes to intellectual property protection for software. He thinks that the term of copyright protection for software should be a maximum of ten years, and that the deposit requirements for copyrighted software should be changed to require source code to be held in escrow until copyright expires, at which point the source code would become publicly available.\textsuperscript{98} Lessig also advocates the creation of government incentives to spur gifts of copyrighted works to public domain conservancies,\textsuperscript{99} a system of compulsory licenses for digital music distribution,\textsuperscript{100} and limits on state contract laws and laws protecting copyright protection systems if these provide protections greater than would be allowable under federal copyright law.\textsuperscript{101}

Lessig also suggests one major change to the current federal patent scheme, namely a moratorium on “the offensive use” of business method and software patents pending a PTO regulatory review and regulatory impact statement that assesses the harm and the benefit to innovation that is the result of current patent regulation.\textsuperscript{102} Beyond suggestions for the reform of intellectual property law, Lessig also suggests changes to the regulation of Benkler’s physical and code layers of the Internet.

At the physical layer, Lessig suggests building a spectrum regime on the model of the original Internet’s innovation commons. He advocates setting aside bands of spectrum at each spectrum level as a commons, which would coexist with other bands that would continue to be auctioned as property.\textsuperscript{103} Government should no longer be able to hoard spectrum. To Lessig this is “obscenely wasteful.”\textsuperscript{104} He also suggests that the government should spend resources on building an information superhighway on the model of a real highway by, for example, laying “dark fiber” that is not earmarked for a particular service.\textsuperscript{105} He thinks that all of these changes will further the development of competitive broadband providers, and will ultimately further innovation.\textsuperscript{106}

Lessig also has suggestions for change at the code level that he thinks would protect innovation. He advocates government encouragement of open code. This encouragement should not be by force but by example, such as replacing proprietary operating systems like Windows with open source operating systems.\textsuperscript{107} He also advocates regulation requiring open access for broadband Internet service providers.\textsuperscript{108}

Lessig qualifies his proposals for reform as

\textsuperscript{95} Id.
\textsuperscript{96} Lessig, supra note 1, at 250–51.
\textsuperscript{97} Id.
\textsuperscript{98} Id. at 252–55.
\textsuperscript{99} Id. at 255.
\textsuperscript{100} Id. at 254–55.
\textsuperscript{101} Id. at 256–57.
\textsuperscript{102} Id. at 259.
\textsuperscript{103} Id. at 242.
\textsuperscript{104} Id.
\textsuperscript{105} Id. at 244–45.
\textsuperscript{106} Id. at 240.
\textsuperscript{107} Id. at 247.
\textsuperscript{108} Id. at 248.
"neither complete nor certain." He says that he is simply trying to prompt debate. Although a detailed critique of all of these proposals is beyond the scope of a relatively brief book review, there is clearly some question as to whether Lessig’s proposals would in fact bring about the result that he hopes. An example is Lessig’s proposal for the introduction of an initial registration requirement and the reintroduction of a renewal term system, though expanded from one to fifteen renewal terms. An obvious concern is whether a copyright system incorporating these changes would end up favoring Lessig’s despised “dinosaurs” over individual authors and would fail to adequately protect or promote innovation. It seems all too likely that the “dinosaurs” would use the stables of intellectual property attorneys at their disposal to ensure that they were in compliance with the registration and renewal formalities, while individual authors without easy access to good legal assistance would be less likely to successfully protect their works. The imposition of additional formalities also seems likely to fuel an explosion of copyright litigation over whether there has been compliance with these formalities, as well as generating controversy over issues historically litigated but now largely resolved by statute for the original 28-year single renewal term, such as the date of vesting of the expectancy of a renewal term in the author’s grantee. Another potential problem with reintroducing formalistic renewal requirements is that they may cause potential innovators to spend more time and energy on the control of their intellectual property than actually innovating.

But the question of whether a system promotes a larger quantity of innovation should not be the only concern. As suggested above, the ethical dimensions of innovation should not be disregarded. This consideration is relevant to the value system underlying Lessig’s theory of innovation. Lessig states that his theory of innovation is based on twin justifications of efficiency and democracy and is a matter of “fundamental values,” but he does not go on to address whether regulating cyberspace implicates other fundamental values. He dodges away from exploring moral justifications for regulating cyberspace, on the basis that morality is too “personal or private.” But Lessig, seemingly dazzled by the law and economic theory that is so prevalent among American legal scholars, fails to consider whether there may not be other values, more fundamental and universal than efficiency, that form the basis for a system of property rights. One approach that would have merited further exploration is a human rights approach to intellectual property rights in cyberspace. Under this approach, property rights, including intellectual property rights, are seen as essentially grounded in universal human rights, namely the duality of the dignity of the human person and the essentially social nature of humankind. The proper balance of intellectual property rights must be one that, consistent with fundamental human rights, serves the common good. The same requirement should be applicable to the question of the extent to which society should foster innovation.

V. CONCLUSION

Notwithstanding the speculative and prelimi-
nary nature of many of his arguments in *The Future of Ideas*, Lessig is clearly ready to do battle. His battle cry is: "[d]inosaurs should die." At the moment it is not clear whether Lessig will succeed in slaying some dinosaurs when the Supreme Court rules in *Eldred v. Ashcroft*. Nor, given the host of questions and concerns set out above, is it entirely clear that he should succeed. Lessig’s book has not yet convinced this reader that the invisible hand of the market will fail to strangle the dinosaurs without any intervention, or that the market will ultimately fail to protect the Internet’s e2e design. Nevertheless, Lessig’s crusading work is clearly a significant contribution to the debate over how the Internet should be regulated. It warrants careful study and thoughtful debate.

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116 See Lessig, *supra* note 1, at 176.