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Property (and Copyright) in Cyberspace

Trotter Hardy†

Consider the problems of copyright and patents. If a new idea is freely appropriable by all, if there exist communal rights to new ideas, incentives for developing such ideas will be lacking. . . . All problems of externalities are closely analogous to those which arise in the land ownership example. The relevant variables are identical.¹

"Property in Cyberspace" invokes two notions: property and cyberspace. I use the latter term as a shorthand way of referring to computer communications generally. Today, much of that communication takes place over the Internet, the global aggregation of several million computers that all share common communications standards and pass communications like electronic mail and digital files among themselves by adhering to that standard. The usefulness of the term "cyberspace" is precisely that it does not confine us to the Internet, but instead lets us talk more generally in a way that includes the so-called "online services," such as Prodigy, CompuServe, and America Online.

Cyberspace is not a real "place," of course, and tangible objects do not exist "there." But a great deal of valuable stuff currently exists in the form of digital information that can be sent through cyberspace. There are the obvious things like computer software, sound recordings, novels, and pictures. There are also trade secrets, credit-card account numbers, maps, and other reference works like encyclopedias, journals, and the like. In fact, nearly any sort of information, including telephone conversations, television and radio signals, and motion pictures, can be converted to a digital stream of bits and hence can be transmitted through cyberspace.

† Professor of Law, William and Mary School of Law. Thanks for helpful comments to David Post, Michael Froomkin, and Mark Lemley. Special thanks to my research assistant, Anji Plichta. I am responsible for what I say, of course.

¹ Harold Demsetz, *Toward a Theory of Property Rights*, 57 Am Econ Rev 347, 359 (1967).

All of these various things might be subject to limitations on what others may do to and with them, and that brings us to the second notion of this Article: property. A limitation on what others may do with digital information might well take the form of some sort of property right. Indeed, we already have something like property rights for many such "informational works" under the rubric of copyright law, trade-secret law, patent law, and perhaps even trademark and unfair-competition law. For the most part, however, the significant issues center on the protection of "informational works," which are generally considered part of the subject matter of copyright. I will focus on such works and not consider issues better addressed under trademark or trade-secret theories.

Since the topic of this Article is *property* in cyberspace, not *copyright* in cyberspace, the Article analyzes several issues from a perspective broader than copyright alone. Copyright is only one of several incentives that encourage the production of informational works in general, and digital works in particular. Other incentives include technical restrictions on copying, such as satellite-signal "scrambling." Part I puts these various incentives into a taxonomy that will be useful as a framework with which to analyze the incentives that encourage the production of informational works. This taxonomy helps to explain many of the current pressures on Congress to expand copyright rights.

An examination of "property" in cyberspace leads naturally to an examination of property theory generally.² Part II looks at a strain of this theory that derives directly from an influential article by Guido Calabresi and Douglas Melamed.³ This section summarizes their seminal article and its analysis of the various ways that a society can protect "entitlements." As it turns out, the Copyright Act includes all three of the protections that Calabresi and Melamed analyze.

In Part III, I look at a very different strain of property theory: an economic approach. Harold Demsetz wrote the seminal

² As I note in the text, I only examine a few seminal works in property theory. The literature on property theory is far larger than I canvass here. For an overview, see C.B. MacPherson, ed, *Property: Mainstream and Critical Positions* (University of Toronto, 1978); Samuel L. Blumenfeld, ed, *Property in a Humane Economy* (Open Court, 1974). For a discussion of the economics of property rights, see Yoram Barzel, *Economic Analysis of Property Rights* (Cambridge, 1989); Hans-Hermann Hoppe, *The Economics and Ethics of Private Property* (Kluwer Academic, 1993); Henry G. Manne, ed, *The Economics of Legal Relationships* (West, 1975).

³ See Guido Calabresi and A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 Harv L Rev 1089 (1972).

article in this area;⁴ his work has recently been elaborated by Robert Ellickson.⁵ Together, these two writers offer a perspective on property that emphasizes the costs of drawing and monitoring property boundaries, and the costs of bargaining and negotiating over the use of property when it is held in common instead of privately.

In Part IV, I take the Calabresi and Melamed approach and apply it to the protection of informational works in cyberspace. I show that a principal characteristic of property rules—that we rely on them in situations of low transaction costs—applies to cyberspace, because cyberspace lowers the cost of communicating and, hence, of transacting over rights to use private property. To the extent that new forms of transactions arise whose value and costs we cannot foresee, a property rule again makes sense, because it offers the most flexibility.

I then apply the Demsetz-Ellickson analysis to the protection of informational works in cyberspace. Their theories, derived in the context of physically possessed tracts of land, reveal interesting analogues when applied to “property” in informational works in cyberspace. The costs of drawing and monitoring the “borders” of a unit of cyberspace informational property, for example, appear to be no higher than for other informational works, and they may be even lower because of new cyberspace technologies. The cost of group decision making, a significant problem for group ownership of land, also poses a problem for “group ownership” of informational works. The Demsetz-Ellickson economic perspective argues persuasively in favor of a regime of private property in cyberspace. A property regime more narrowly defined than under current copyright laws—more “privatized”—would offer considerable savings in group negotiating and bargaining costs. Though politically difficult to achieve, the resulting savings would be desirable.

I. A TAXONOMY OF INCENTIVES FOR INFORMATIONAL WORKS

To talk of “property” in “cyberspace” is to raise the question: why property? Why do we invoke the notion of property and what good does it do? I take three observations as my starting point in this inquiry. First, in cyberspace we primarily care about digital “information.” Second, one person can make use of information

⁴ See Demsetz, 57 Am Econ Rev 347 (cited in note 1).

⁵ See Robert C. Ellickson, *Property in Land*, 102 Yale L J 1315 (1993).

without depriving another of the same use.⁶ Finally, information frequently is much cheaper to copy than to create, and digital information is often even cheaper to copy than other forms of information.

This latter point merits elaboration. Much of the exploitation of informational works today does not depend directly on "copying." Online information services, such as Westlaw, Nexis, many World Wide Web sites, and, to some extent, America Online and Prodigy, do not sell information in "copies" so much as they sell access to information.⁷ Other ventures also may arise in cyberspace that deliver information in digital streams without permanent fixation at all, such as "music on demand" services. To the extent that these are money-making ventures, they may not charge for "copies," but rather for access or immediate performance. They may be supported by advertising revenue or may evolve into as yet unthought-of means of earning revenue. In short, many commentators argue that a focus on "copying" may be outdated for informational works in cyberspace.⁸

For purposes of discussing property in cyberspace, I disagree. Although I recognize the importance of these other uses of information, I think that commercial information providers do not only fear unauthorized access—a kind of "shoplifting." They also fear the possibility that others will copy large aggregates of information and use these copies to compete against the original provider—a more serious kind of "free riding." Thus, a concern for the production of informational works is still fundamentally a concern about the ease of copying such works.

Conventional wisdom argues that informational works, because they exhibit such a low ratio of copying-to-creating costs, must be protected by copyright, or else no one will take the time or trouble to produce them in the first place. As the Supreme Court has put it, authors need an incentive because "[s]acrificial days devoted to . . . creative activities deserve rewards commensurate with the services rendered."⁹ At best, however, this conclusion is a half truth. It is more accurate to say that informational works—and for that matter, any nontrivial creative ef-

⁶ Thus physical control over a particular tangible embodiment of information may not suffice to control others' uses of the same information. This description identifies information as a "public good." See notes 89-111 and accompanying text.

⁷ Raymond T. Nimmer and Patricia Ann Krauthaus, *Copyright on the Information Superhighway: Requiem for a Middleweight*, 6 Stan L. & Policy Rev 25 (1994).

⁸ See id at 32.

⁹ *Mazer v Stein*, 347 US 201, 219 (1954).

forts—require the existence of an incentive for their creation. Whether the incentive necessarily must be copyright is a different matter. To make that determination, we must look at other types of incentives.

Rather than look at every sort of incentive, however, I will develop a taxonomy of the incentives that apply to most information producers, regardless of whether they are large, small, commercial, not-for-profit, or individual. Because I want a broadly applicable analysis, I will omit from my discussion incentives that apply only to narrow segments of the “authoring” public, such as government or private grants. Few of these types of incentives are given relative to the number of informational works created, and, consequently, they will likely play a very minor role in the future.

I will also omit from this taxonomy incentives that generally cut in favor of broad and unrestricted copying. For example, one type of incentive to create an informational work is that of “personal pride,” “self-fulfillment,” or “desire for self-expression.” A related incentive for university professors is to achieve recognition through widespread distribution of their scholarly work. Both of these incentives remain unaffected by the prospect of widespread copying, and they therefore tend to diminish the need for restrictions on copying. Similarly, the producer of a cyberspace “publication” supported by advertising or by collateral services, such as updates or special types of access, may encourage the copying of the initial publication.

I do not undervalue incentives that favor wide copying, but I do not discuss them here for three reasons. First, personal motivations like “self-expression,” though of obvious importance in the creation of many World Wide Web “home pages” today, are nonetheless far removed from the focus of this Article on “property” in cyberspace.

Second, to the extent that a business depends on informational works of some kind, incentives for unrestricted copying are still not likely to affect the underlying concern that others not copy one’s entire operation and means of doing business. For example, a business entity might give away a certain amount of content as a kind of advertising, but earn revenue by charging for access to an updating database. Though such a company would not try to restrict copying of the “advertising” materials, it certainly would want to prevent the copying of its updating database—the means by which it stays in business.

Third, and crucially important, the availability of a means to limit copying is not a two-way street. If an information producer has a means to restrict copying, but prefers, for whatever reason, not to restrict copying, then the producer can simply not assert or take advantage of that means. In other words, such a means allows those who want and need to restrict copying to do so, and it allows those who do not want to restrict copying to refrain from doing so.¹⁰ But the converse is not true. The lack of a means to limit copying will satisfy those who do not want or need it, but it cannot satisfy those who do. The asymmetry means that we will be less likely to go wrong if we focus on incentives for limiting the copying of informational works than if we focus on contrary incentives.

We can find the typical incentives that face most information producers by asking what information producers need to overcome their fears of cheap copying. The general answer is not "copyright law," because that reflects too narrow a conception. The better answer is that would-be producers of information need *some assurance that copying will be limited*. The notion of "some assurance" rather than "complete assurance" reflects the fact that 100 percent assurance of anything—or zero risk—has never been a requirement of any business. Similarly, I use the deliberately vague notion of "limited" copying rather than "no copying" because the exact amount of copying that an information producer will tolerate will vary widely depending on the type of information being produced, the goals of the producer, and so on.

For example, some products, such as commercial business software, apparently can be profitable even with a fairly large amount of illegal copying, as long as "most" or "many" copies are lawfully purchased. Prices would be lower in the absence of copying, of course, and we accordingly would be better off if all copying could cheaply be prevented. But business-software sellers in fact enter software markets that exhibit some amount of copying—hence they must expect the existence of "limited copying," not "zero copying." Other sellers of software, such as those who produce so-called "shareware" products, tolerate an estimated 90 percent unauthorized copying of their products. For these producers, the "self-expression" or "personal fulfillment" rationales may indeed play a large part. But for my purposes, the shareware

¹⁰ All rights can be waived except those that are protected by a rule of inalienability. Fortunately, such rules play a very modest role in the protection of most information products. See notes 28-30 and accompanying text.

example illustrates that these producers still expect copying to be limited—even if the “limits” are quite modest.

Given, then, that producers of information products need some assurance that copying will be limited, the next question is how producers obtain that assurance. In other words, how do they “limit” copying? This question is best answered by looking at the aggregate combination of four factors: 1) entitlement-like protection; 2) contract-like protection; 3) state-of-the-art limitations; and 4) special-purpose technical limitations.¹¹ Other factors also could be listed;¹² I do not mean that these four are exclusive, but rather that they seem intuitively important enough to merit particular attention. In any event, nothing will be lost by a simplified analysis because my essential points do not depend on the exact number of factors.

I will describe each of these four factors in turn. The first factor is “entitlement-like protection.” By this I mean the wide recognition that informational products have an “owner” and that this owner has some “rights” that would be violated by unauthorized copying of the product. Such rights inhere in the product or the owner and are binding on the world in general; they are not a matter of contract. I could call them “property-like” rights, because in one sense they are just that. But, I want to analyze the issues under the Calabresi and Melamed approach that discusses protecting entitlements through “property, liability, and inalienability rules.”¹³ Calabresi and Melamed use the term “property” in a narrower sense than “entitlement,” and I will stick with their usage for both terms.

¹¹ I first described this taxonomy in print—actually, “in electrons”—in Trotter Hardy, *Contracts, Copyrights, and Preemption in a Digital World*, 1 Richmond J L Tech art 2, paragraphs 6-10 (1995) (available online at <http://www.urich.edu/~jolt/v1i1/hardy.txt>). The Richmond Journal, nicknamed “JOLT,” is the first student-edited law journal, and perhaps the first law journal of any kind, to appear solely in an online format.

¹² Another factor that plays into a publisher’s decision, but that is not so easily characterized as a “limitation on copying,” is the ease with which copying can be detected. Assume two different media or technologies exist for releasing information to the public. Suppose that one medium can be copied without detection and that the other cannot be copied without leaving a “trace” of some sort. If all other aspects are the same, information producers would tend to favor the second form of release.

Still another factor might be lead time. Once a copyable work is released, it may not be possible for others to copy or use it instantly. Thus lead time serves as a limitation on such copying. The amount of lead time so obtained is, of course, a function of the state-of-the-copying art.

¹³ See Guido Calabresi and A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 Harv L Rev 1089, 1089 (1972) (cited in note 3).

The second limitation on copying arises from contract. In contrast to the entitlement regime, a contract regime protects information only because two or more parties have agreed to treat the product as protected. Those who are not a party to any such contract are not bound by its terms. For example, all of the online vendors, such as America Online, CompuServe, and Lexis Counsel Connect, have "terms of service" that specify copyright rights in the materials available on or uploaded to the service. Lexis Counsel Connect even specifies the terms of copyright in users' e-mail, neatly side-stepping many of the otherwise vexing questions about copyright in e-mail.

One might ask whether "entitlement" incentives and "contract" incentives are really separate. After all, the owners of entitlements depend on contracts such as license agreements and publication agreements to exercise their rights of entitlement. But contracts relating to informational works come in two types: those for which an information entitlement serves as consideration for the agreement, and those for which the consideration lies elsewhere. In the first type of contract, the contract is indeed the means by which an entitlement is used to gain remuneration. In effect, such contracts exist to waive or transfer what would otherwise be the owner's exclusive rights. In these circumstances, contracts and entitlements go hand in hand.

In the second type of contract, however, the contract either creates the owner's rights or clarifies them in the event that an entitlement is ambiguous. This happens, for example, when users of an information service such as Lexis or Westlaw sign an access agreement. Much of the information on these services consists of public-domain material: cases and statutes. Without a contract limiting the practice, the user of such a service could copy and resell the material. Contracts with the services provide otherwise, of course, and these contracts are based not on any entitlement to the public-domain information, but rather on the consideration of allowing access to the service. When I say that "contracts" provide a way of limiting information copying that is different from "entitlements," I am referring to this second type of contract—one in which something other than an information entitlement serves as consideration for the contract.

After entitlements and contracts comes a third form of limitation on copying—the state-of-the-copying art. For any medium of expression, making a copy entails costs, yet obviously different media entail very different copying costs. Technological changes affect this cost. For example, if a manuscript must be written out

by hand to make a copy, the cost of doing so—in time, money, and “trouble”—imposes a natural limit on how many copies one will make of the manuscript. Similarly, a glossy magazine like the *National Geographic* can be photocopied on a photocopier, but this fact seems almost irrelevant to the *National Geographic*’s plans for distribution. Readily accessible, inexpensive copy machines only produce black and white copies on poor quality paper. Photographs reproduce especially poorly.

A photocopied *National Geographic* magazine therefore would be vastly inferior to the original. The possibility of widespread photocopying poses little practical risk to the *National Geographic*—and this would be true with or without the existence of copyright. Copyright may help to stop copiers from using more expensive, higher-quality reproduction technologies. But in the present state of the art, producing a copy of comparable quality to the original would likely cost as much or more than the current price of the magazine. Thus, copyright does not seem to play nearly as large a role in the limitation of *National Geographic* copying as does the current state-of-the-copying art.

Finally, special-purpose technological restrictions can limit copying. A typical example of such self-help measures is the use by cable companies of signal “scrambling.”¹⁴ For a home viewer to have access to certain channels, the viewer must pay the cable company for a piece of electronic equipment that will “descramble” the signal and render it viewable. This has nothing to do with the state-of-the-cable art: cable companies are able

¹⁴ Another example of special-purpose technical restrictions now appears in the Copyright Act itself, added by the Audio Home Recording Act. 17 USC § 1002 (1994) (describing the Serial Copy Management System). The Clinton Administration’s Working Group on Intellectual Property Rights describes this technical restriction in the following way:

This Act requires that manufacturers of digital audio recording devices and digital audio interface devices incorporate features that limit serial copying. The hardware is programmed to read certain coding information contained in the “digital subcode channel” of digital sound recordings and broadcasts. Based on the information it reads, the hardware circuitry will permit unrestricted copying, permit copying but label the copies it makes with codes to restrict further copying, or disallow copying. The serial copy management system allows unlimited first generation copying—digital reproduction of originals (such as CDs distributed by record companies), but prevents further digital copying from those reproductions.

United States Department of Commerce, Information Infrastructure Task Force, *Intellectual Property and the National Information Infrastructure: Report of the Working Group on Intellectual Property Rights* 179 (Sept 1995) (footnotes omitted) (“White Paper”).

with present technology to send a signal down the cable wire for viewing. Rather, it is the result of individual effort by the information owner (or transmitter) to overcome what otherwise might be too little limitation from entitlement-like rules, unenforceable contracts, or a state-of-the-art that permits ready copying.

The four-part taxonomy of incentives, then, consists of entitlements, contracts, the state-of-the-copying art, and special-purpose technical restrictions. This way of looking at incentives shows several things. First, the existence of several limitations means that assurances of limited copying can come from a variety of sources—copyright law is by no means the only one. Technical restrictions can also matter a great deal. In some situations, such as when online vendors deal with paying customers, contract restrictions can be effective as well.

Second, the four-part taxonomy reveals that what matters to information producers is the *aggregate amount of assurance* of limited copying—not “copyright” or technology or contracts alone. Moreover, this aggregate amount will vary in its individual components with different informational products. The producers of the WordPerfect word-processing program surely have different views about the relative importance of copyright and the state-of-the-copying art than does the *National Geographic* magazine. The state-of-the-art permits a quick and perfect copying of the WordPerfect software; it permits only a crude and ineffective copying of the *National Geographic* magazine.

It is helpful to think of this four-part “aggregate assurance” of limited copying in the form of a pie chart. One slice of the “pie” represents the limitations inhering in the “state-of-the-copying art,” another represents “entitlement-like” protection, and so on. The overall size of the pie—the sum of all four factors—is what matters to information producers, because the overall size determines how limited the unauthorized copying of their product will be.

A third consequence of using this four-part taxonomy is perhaps the most significant. The taxonomy implies that if one of the “slices” of the pie grows or shrinks, other slices must shrink or grow proportionally if the producer is to preserve the same overall assurance of limited copying.

The relative size of a slice can change for several reasons. One reason is technological development. Such developments obviously affect both the state-of-the-copying art and special-purpose technological restrictions. Return to the *National Geographic* example and suppose that the technology of color copying

advances tomorrow to the point that high-quality color copies, complete with heavy covers, glossy pages, and automatic binding, are possible at very low cost.¹⁵ This would represent a sharp change in the current state-of-the-copying art. In view of this change, *National Geographic* might well change its views about the importance of the other slices. In order to assure the same aggregate amount of limitation on copying, *National Geographic* might, for example, do what the Treasury Department currently does with paper money¹⁶ and introduce special-purpose technical restrictions to make copying more difficult.¹⁷

Let's take another illustration, this time of changing legal developments. Suppose a business enterprise started up some years ago offering printed compilations of factual information. Let us suppose that this enterprise had good reason to rely on the copyright law at that time to prevent others from copying and selling its products.¹⁸ In short, the "entitlement-like" slice of the protection pie that arose from copyright law was significantly large. Now, move forward in time to a point after the Supreme Court decided *Feist Publications, Inc. v Rural Telephone Service Co.*,¹⁹ which held that compilations resulting solely from the "sweat of the brow" are not original enough for copyright protection.²⁰ Suddenly, the "copyright" slice of limitation for our seller of factual information has shrunk to the vanishing point. The enterprise, in order to stay in business, will have to turn to some other form of copying limitation—perhaps contract or technological restrictions such as using paper that does not photocopy well.

Thus, the four-part taxonomy reveals the relationship of the different forms of limitations on copying to each other and illus-

¹⁵ Ironically, I am writing this paragraph the day after Hewlett Packard introduced a new and very low-cost, color copy machine. The machine lacks the quality and features I hypothesize in the text, but it does illustrate how rapidly technology can change the landscape.

¹⁶ The Treasury Department recently announced a new one-hundred dollar bill. Design changes to the bill will make it harder to copy. For example, the bill will feature, among other things, lines so fine and so close together that they will not reproduce well on ordinary copying machines. *\$100 Question: Will Ben's New Look Stop Counterfeits?* NY Times D19 (Sept 28, 1995).

¹⁷ The Treasury Department's increased special-purpose restrictions can similarly be seen as a reaction to the evolution in the state-of-the-photocopying art toward better and cheaper color copies.

¹⁸ See, for example, *Leon v Pacific Telephone & Telegraph Co.*, 91 F2d 484, 486-87 (9th Cir 1937); *National Business Lists, Inc. v Dun & Bradstreet, Inc.*, 552 F Supp 89, 92-93 (ND Ill 1982).

¹⁹ 499 US 340 (1991).

²⁰ Id at 359-60.

trates the importance of their aggregate protection to information producers. Cyberspace shrinks—very dramatically—the slice of limitation represented by the “state-of-the-copying art.” This shrinking follows, in part, from the increasing digitization of information, a development that has proceeded rapidly for years independent of developments in the Internet.

But the dawn of cyberspace puts renewed emphasis on digital information by opening huge doors to access from every corner of the globe.²¹ Cyberspace’s current state-of-the-copying art seems to be one of both easy individual copying and easy mass distribution.

With this particular slice of the limitations pie narrowing rapidly, information producers naturally will try to increase the size of the other slices in order to preserve their aggregate assurance against copying. One of these slices consists of special-purpose technical limitations on copying, such as encryption technologies. Indeed, the recent increased attention to encryption technologies²² can be explained as a consequence of the shrinking “state-of-the-art” part of the aggregation of limitations on copying.²³

Finally,²⁴ attention these days also turns naturally to the “entitlements” slice of the taxonomy. We can learn much about entitlements in cyberspace from others who have examined entitlements in different contexts. I will look at two different analyses of property rights, both developed for contexts other than cyberspace: 1) Guido Calabresi and A. Douglas Melamed’s famous discussion of property, liability, and inalienability rules;²⁵ and 2) economic analysis of property rights begun by Harold Demsetz²⁶ and expanded by Robert Ellickson.²⁷ These two bodies of work have different focuses. Calabresi and

²¹ Though of obvious future importance, I do not directly address the question of how informational works can or should be protected internationally. The principles I espouse—essentially economic—should hold for most other cultures, but the likelihood that they will be adopted will vary widely.

²² See, for example, A. Michael Froomkin, *The Metaphor is the Key: Cryptography, the Clipper Chip, and the Constitution*, 143 U Pa L Rev 709 (1995).

²³ Contract law is another slice that information producers may try to increase. See Robert L. Dunne, *Deterring Unauthorized Access to Computers: Controlling Behavior in Cyberspace Through a Contract Law Paradigm*, 35 Jurimet J 1 (1994).

²⁴ Contract restrictions are an important part of the taxonomy, but I will confine my attention to the remaining three.

²⁵ Calabresi & Melamed, 85 Harv L Rev 1089 (cited in note 3).

²⁶ Harold Demsetz, *Toward a Theory of Property Rights*, 57 Am Econ Rev 347 (1967) (cited in note 1).

²⁷ Robert C. Ellickson, *Property in Land*, 102 Yale L J 1315 (1993) (cited in note 5).

Melamed start with the assumption that there exist "entitlements" that society wants to protect. They note that society tends to protect such entitlements in one of three ways—"property" rules being one such way. Demsetz and Ellickson look more specifically to ownership of land, and they examine the question of when society creates privately owned parcels of land. Demsetz pioneered the economic approach to this question, putting the analysis in terms of minimizing negative externalities. Ellickson analyzes the question further and considers the circumstances under which societies hold property in the form of group ownership, versus those with which they hold property in the form of individual (or family) ownership. His analysis focuses on the relative ease of individuals in monitoring trespasses, compared to the difficulty that groups have in controlling shirking.

II. CALABRESI AND MELAMED: THREE TYPES OF RULES

Calabresi and Melamed assert that society protects entitlements through one of three ways: 1) "property rules"; 2) "liability rules"; or 3) "rules of inalienability."²⁸ This three-part analysis has proven to be an extraordinarily-useful and widely-applicable paradigm.

A rule of inalienability states that an entitlement exists, but that it cannot be sold or bargained away under any circumstances. An example of such a rule outside the realm of informational works is the right to personal freedom. One may not sell this entitlement—that is, one may not, however willingly, sell oneself into slavery. In most, perhaps all, states there is a similar prohibition on selling body parts or babies.²⁹

Surprisingly, copyright law also features an inalienability rule: the rule that prohibits authors from selling their "right of termination." Essentially, authors who contract to sell or license their works may, between thirty-five and forty years after the sale, "terminate" the contract and recover their copyright

²⁸ Guido Calabresi and A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 Harv L Rev 1089 (1972) (cited in note 3).

²⁹ For prohibitions against selling body parts, see, for example, DC Code § 6-2601 (West 1981); Va Code § 32.1-289.1 (West 1993). For prohibitions against selling babies, see, for example, Fla Stat Ann § 63.212(d) (West 1995); 11 Del Code Ann § 1100 (West 1994).

rights.³⁰ This right of "termination" (more accurately termed a right of "recision") may not, however, be waived or sold.

Inalienability rules generate fascinating questions: why not allow people to sell body parts or babies? Nevertheless, for the purpose of considering property issues in cyberspace, inalienability seems an unlikely attribute to apply to informational works.³¹ Such works do not seem to be laden with moral concerns comparable to those surrounding slavery or baby selling. So apart from the rather minor copyright provision about "termination" rights, no compelling reason presents itself for other rules of inalienability regarding informational works. I will therefore ignore such rules.

Rules of property and rules of liability are more important for informational works. A "property" rule, according to Calabresi and Melamed, protects an entitlement by requiring that would-be users or licensees of the entitlement reach a voluntary bargain with the owner.³² Use of the owner's property without such a voluntary agreement allows the owner to sue for damages and, significantly, for an injunction against further unauthorized use.

A liability rule, in contrast, protects an entitlement by allowing the owner to sue for damages after an unauthorized use, but it does not require that a voluntary bargain first be struck.³³ A "rule of liability" explains cases like *Ploof v Putnam*.³⁴ In *Ploof*, a boat owner tied his boat to a stranger's dock in a severe storm, but the dock owner's agent forcibly untied the boat and cast it loose, causing it and its crew to suffer damage in the storm. Under normal circumstances, the dock owner would have a "property" entitlement that would permit him to act just as he did. The boat owner could only use the dock after voluntary negotiation; absent such agreement, the dock owner would be free to cast the boat loose.

³⁰ 17 USC § 304(c) (1994).

³¹ Patent law, alas, sees its share of these issues when questions arise as to the patentability of artificially modified—or created—living creatures or medical procedures. See, for example, *Diamond v Chakrabarty*, 447 US 303, 309 (1980) (upholding patentability of petroleum-eating bacteria); Rebecca S. Eisenberg, *Proprietary Rights and the Norms of Science in Biotechnology Research*, 97 Yale L J 177 (1987) (addressing the application of patent law to biotechnology); Robert P. Merges, *Intellectual Property in Higher Life Forms: The Patent System and Controversial Technologies*, 47 Md L Rev 1051 (1988). See also *Special Equipment Co. v Coe*, 324 US 370, 383-84 (1945) (Douglas dissenting) (expressing concern that the court should uphold a provision of the patent system allowing a patent holder to withhold his invention).

³² Calabresi & Melamed, 85 Harv L Rev at 1092 (cited in note 3).

³³ Id.

³⁴ 71 A 188 (Vt 1908).

But in the presence of an emergency, such as a severe storm, Calabresi and Melamed note that we temporarily convert property rules into a liability rule. The dock owner has no right to insist that the boat owner voluntarily bargain over the use of the dock. Indeed, the boat owner has an absolute right to remain tied to the dock to preserve life and limb. Yet, had the dock owner not cast the boat loose, and had the boat caused damage to the dock, the boat owner would have been liable to the dock owner for the damage—a “liability rule.”³⁵

A. Low Transaction Costs Lead to Property Rules

Calabresi and Melamed’s essential point about property rules—a point that is as applicable in cyberspace as anywhere else—is that they are most appropriate when the transaction costs of bargaining over the entitlement are low. In other words, when bargaining is feasible, a rule that requires “permission” ahead of time to use an entitlement will create voluntary exchanges that are more likely to bring about mutually beneficial results. This is simply another way of looking at the economic presumption that voluntary exchange promotes economic efficiency and is desirable in the absence of some affirmative reason to disallow it.

Everyday forms of “property,” such as cars, houses, washing machines, and stereos, fit this description. In Calabresi and Melamed’s terms, the transaction cost incurred in buying and selling such items is very modest: the parties are easily identifiable ahead of time and few in number. A property entitlement for such items seems sensible.

B. High Transaction Costs Lead to Liability Rules

Liability rules, in contrast, are most suitable when transaction costs are high, often because the parties are numerous or unidentifiable ahead of time. Automobile-accident cases are perhaps the most straightforward example. All drivers have an “entitlement” to be free from other drivers crashing into them. But this entitlement is not a property right. That is, we do not insist that all drivers get together before they drive to bargain over what risks they will expose each other to, or the amount of compensation they will pay should any of them violate another’s

³⁵ See *Vincent v Lake Erie Transportation Co.*, 124 NW 221, 109 Minn 456 (1910).

rights. The number of drivers makes it thoroughly impractical to impose such a requirement. Consequently, we use a liability rule. After the accident, a fact finder determines what the "entitlement" to be free of accidents was worth, and payment will be compulsory. We adopt this approach because it is practical and the property rule is not. Thus, one can explain emergency situations, such as *Ploof v Putnam*, as special occasions where the costs of transacting are likely to go sky-high for the duration of the emergency.

C. Copyright Law Includes Property Rules and Liability Rules

Generally, both property and liability rules can apply to informational works. The Copyright Act, for example, consists of a mixture of both kinds of rules. Copyright rights provide that the author of a copyrightable work has a kind of property right in that work. Authors may license their novels' publication and distribution, or they may not; it is entirely voluntary on their part. They may refuse to license a would-be publisher, for whatever reason, and the law will protect their expectations with injunctive relief if necessary. Indeed, injunctions, even preliminary injunctions, are a common outcome in garden-variety copyright-violation cases.³⁶

Yet the Copyright Act also includes strong threads of liability-like rules. These take the form of "compulsory licenses" that govern certain uses of copyrighted materials. A compulsory license of long standing, for example, provides for the making of "cover records" of musical works. A "cover record" is a remake of an already recorded song or tune. Artists often rerecord popular tunes originally recorded by other artists. Such a rerecording and subsequent sale would ordinarily infringe the rights of the song's copyright owner to control reproduction and distribution.

But under the detailed rules of section 115 of Title 17 United States Code,³⁷ the rerecording artist need not seek permission to make the cover record at all. Rather, the artist merely must notify the copyright owner and submit a statutorily prescribed fee. The copyright owner, in other words, has a right to "damages" in the form of the fee specified by Congress, but no right to insist on voluntarily negotiated terms.

³⁶ See Paul Goldstein, 2 *Copyright* §§ 11.0, 11.2.1 (Little, Brown, 2d ed 1996).

³⁷ 17 USC § 115 (1994).

Similar "liability" rules apply to a cable television station's retransmission of broadcast-television signals;³⁸ to a jukebox's playing of recording music;³⁹ to the public performance of digital music;⁴⁰ and, in a sense, to the fair-use provision.⁴¹ Interestingly, Congress justified the copyright liability rules for cable television on the ground that Calabresi and Melamed would have predicted: they were necessary to overcome high transaction costs.⁴²

The fair-use copyright provision exempts certain activities, otherwise infringing, from being an infringement. Typically, such activities include copying small portions of a work for purposes of criticism; spontaneous "last minute" copying of a news article for distribution to a school class; or taping a televised movie to watch at a later time.

Fair use, for our purposes, can be seen as a kind of compulsory license—albeit one for which the payment required is exactly zero dollars. Here too, one can justify the fair-use doctrine on grounds that Calabresi and Melamed would have argued: fair use applies when transaction costs make it impractical for parties to negotiate ahead of time.⁴³

³⁸ The rules applicable to cable television are horrendously complicated, change frequently, and are more a matter of telecommunications law under the aegis of the Federal Communications Commission ("FCC") than copyright law. But the Copyright Act eliminated any requirement that cable stations negotiate on a voluntary basis with the owners of copyrighted television programs, and it established a compulsory-license scheme. The license scheme required the cable station to place a percentage of its revenues in a copyright "pool" of such revenues. At the end of the year, a government agency (the now-discontinued Copyright Royalty Tribunal) would divide the pool among various claimants. 17 USC § 111(d) (1994).

³⁹ The Copyright Act sets up a system of compulsory licensing for "coin-operated phonorecord players." 17 USC § 116. This system is administered similarly to the cable retransmission compulsory license.

⁴⁰ The Copyright Act now provides that certain digital studio transmissions of sound are noninfringing uses. A royalty is collected for such transmissions and paid to "featured musicians," although a small percentage is reserved for "non-featured musicians." 17 USC § 1006(b) (1994).

⁴¹ See 17 USC § 107 (1994).

⁴² In fact, transaction costs in cable-television licensing are not particularly high. Moreover, the market is quite good at overcoming such transaction costs, as music collective licensing societies like the American Society of Composers, Authors, and Publishers ("ASCAP") and Broadcast Music International ("BMI") have shown. Nonetheless, even as a purported justification, the argument that we must meet transaction costs with liability rules instead of property rules is wholly consistent with the Calabresi and Melamed formulation.

⁴³ Wendy J. Gordon, *Fair Use as Market Failure: A Structural and Economic Analysis of the Betamax Case and Its Predecessors*, 82 Colum L Rev 1600, 1628 (1982).

Thus, entitlements can be protected by rules of property or liability. Property rules are the "default" and are most suitable when transaction costs are modest, and liability rules are typically invoked when transaction costs are significant. In addition, these principles fit quite comfortably with our current rules for protecting "information entitlements"—that is, copyrights.

III. DEMSETZ AND ELLICKSON: PRIVATE PROPERTY WHEN THE COST OF DRAWING AND MONITORING BORDERS IS LOW

A. Private Property Versus Public Property

Demsetz and Ellickson are not interested in distinguishing property rules from liability rules to enforce entitlements. Rather, they are interested in discovering the circumstances that give rise to private-property interests as opposed to "community" or group-held property. Ellickson, for example, distinguishes "private property" from group-held or "horde-owned" property. He argues that we turn to private-property rules when the cost of drawing and monitoring borders is low relative to the value of the property and relative to other means of enforcing socially desirable (efficient) outcomes.⁴⁴

Demsetz argues that private property arises when it is "worth it"—that is, when the institution of privately held property is a cost-effective way for land users to internalize the costs and benefits of their use of the land.⁴⁵ Both Demsetz and Ellickson also stress that private-property regimes function well to minimize deadweight losses for "small events." Small events are those with relatively few externalities, such as the planting and harvesting of crops. For such events, "public-property" regimes would require substantial coordination among members of the public, sharply raising transaction costs. Even if small events have some negative externalities, a private-property regime reduces the number of individuals who are negatively affected

⁴⁴ Robert C. Ellickson, *Property in Land*, 102 Yale L J 1315, 1327-1330 (1993) (cited in note 5). Ellickson uses the term "property" in a broad sense, to include "publicly held" property. He uses the term "private property" to mean individual or household-held land in contrast to "public property." *Id.* at 1322. This use is consistent with Calabresi and Melamed's use of the term "property" in contrast to "liability." See Guido Calabresi and A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 Harv L Rev 1089, 1092 (1972) (cited in note 3).

⁴⁵ Harold Demsetz, *Toward a Theory of Property Rights*, 57 Am Econ Rev 347, 350 (1967) (cited in note 1).

and hence operates to keep transaction costs below what they would be with group ownership.⁴⁶

Moreover, a public-ownership regime would require close monitoring of group members in order to prevent "shirking," another increase in costs.⁴⁷ A private-property regime eliminates the need for expensive monitoring of shirking. In effect, it "converts" this costly activity into a much cheaper one: monitoring the simple act of "trespassing" across a boundary line.⁴⁸

Private property in land also puts the detection responsibility into the hands of a motivated party: the owner of the property. Private-property monitoring thus also solves a problem of external benefits. Under a public-property regime, the group might develop rules about trespassing precisely to avoid the need for expensive monitoring. The group would have to appoint some sort of monitoring agent. But this agent would only bear a small portion of any losses from an unprevented trespass, and would thus face a diminished incentive to monitor. With a single property owner, however, all of the losses fall on that one owner, who then has the proper incentive to monitor. This rationale for the existence of private property holds true even when the property owner hires other employees, for example, to raise crops, a point that Ellickson does not mention. Even though monitoring is expensive in this latter case—because the owner must guard against the shirking of his own employees—the owner fully internalizes the gains and losses from such monitoring.

Inexpensive monitoring does not result solely from the simple fact of drawing the boundary. The owner often must employ technologies to identify the boundary line unambiguously—through surveying, for example—and to detect and remedy trespasses. The cost of a fence can be one of the costs of preventing a trespass. All other things being equal, one would expect that cheaper "fencing" technologies would increase fencing activity. Or as Ellickson puts it, as the costs of drawing, monitoring, and preventing entry to property fall, one can predict an increase in the amount of "parcelization" of property.⁴⁹ This type of increase followed the invention of barbed wire in the United States in the nineteenth century—more property was divided up into

⁴⁶ Id at 354-56; Ellickson, 102 Yale L J at 1327, 1332 (cited in note 5).

⁴⁷ Ellickson, 102 Yale L J at 1327-28 (cited in note 5).

⁴⁸ "A key advantage of individual land ownership is that detecting the presence of a trespasser is much less demanding than evaluating the conduct of a person who is privileged to be where he is." Id at 1327 (emphasis in original).

⁴⁹ Id at 1328-30.

smaller parcels.⁵⁰ Future cyberspace technologies likely will accomplish an analogous result for informational works.⁵¹ These results will take the form of control over access to small units of information like paragraphs or pages, rather than entire books or magazines.

IV. THE JUSTIFICATIONS FOR "PROPERTY" APPLIED TO CYBERSPACE

We have looked at two broad circumstances that justify society's reliance on some form of private-property rights when entitlements need protection: low transaction costs and low costs of drawing and monitoring boundary lines. We can now ask how these general considerations that argue for a property entitlement apply in cyberspace.

Briefly, the considerations argue strongly for a property entitlement. First, under a Calabresi and Melamed type of analysis, trends in computer communications point to lower transaction costs overall, and hence favor a property regime for informational works. Second, under the private versus group-owned property approach used by Demsetz and Ellickson, the costs of drawing and monitoring the boundaries of informational works in cyberspace seem no higher than for works outside of cyberspace. In some regards, they may even be cheaper. Again, this fact argues strongly for a regime of private property.

A. Transaction Costs

To see how the justifications for a property regime apply to cyberspace, we can start by applying the general justifications for property rules. Calabresi and Melamed argue that property entitlements are most appropriate when transaction costs are low. Are they low in cyberspace? We might not think so at first because cyberspace is so huge: millions of people, distributed over much of the world's physical surface, are engaged in communication that spans vast distances. Ordinarily this situation would suggest that transaction costs for any sort of bargaining would be enormous. But this is plainly wrong: cyberspace easily and cheaply connects all these people together—people who previously

⁵⁰ Id at 1330 n 54 (citing Terry L. Anderson and P.J. Hill, *The Evolution of Property Rights: A Study of the American West*, 18 J L & Econ 163, 172 (1975)).

⁵¹ See notes 53-54 and accompanying text.

could not or would not have been in communication because of communication costs.

If anything, cyberspace permits bargaining over distances and time that never before could have been possible. Cyberspace lowers the absolute amount of transaction costs relative to the costs of the same transaction undertaken through some other means. This lowering occurs in three ways: 1) lower cost of communicating between people; 2) lower cost of computer recording of transaction data; and 3) lower communication costs facilitating institutional innovations like rights clearinghouses.

I have experienced this cost lowering myself. When teaching a course in "The Law of Cyberspace,"⁵² I found an article by John Perry Barlow that I wanted to distribute to the class. If I had had to find a mailing address for Mr. Barlow and send a request through the U.S. mails, I doubt that I would have bothered to ask for permission—and absent permission, I would not have reproduced the article for the class.⁵³ As it was, however, the article listed his e-mail address, and accordingly, I sent an e-mail request. Within a day or two, I received an answer authorizing me to make the reproductions I had requested. For this all-too-familiar situation of requesting permission to make copies, cyberspace functioned as one might hope to reduce transaction costs and facilitate a beneficial transaction.

Of course, this single observation does not tell us that all future online transactions will entail lower costs relative to the "real" world. But cyberspace certainly appears to provide a cheaper means of communicating information than previous methods.⁵⁴ Consequently, cyberspace should be at least as much, if not a more hospitable environment for transacting over property rights than "real" space, making a reliance on property rights even more suitable.

⁵² The course was taught—of course—over the Internet with students from several universities.

⁵³ I am familiar with the guidelines for educational photocopying and am aware that the reproduction I contemplated may have been a fair use.

⁵⁴ One of the hard-to-foresee facets of the problem is whether greater privatization—or for that matter, nationalization—of the Internet may result in higher costs. I can only guess that, as between lower and higher costs, the technological revolution that cyberspace represents seems more likely to continue the trend toward lower costs.

1. *Transaction costs from computerization.*

Computers digitize and process all communication in cyberspace, either during a transmission or at the "end" point of a connection such as a Web site. Computers can record information very accurately, and they can do it quickly. They can track small units of time, such as milliseconds and nanoseconds. They are therefore good at recording very brief transactions that might not be worth the time and trouble to record in the absence of computers. With computer monitoring, the transaction costs of record keeping can be trivially low. In principle, therefore, all transactions in cyberspace could be logged and recorded⁵⁵ at low cost.

Suppose, for example, the owner of a Web site wanted to charge money for users' access to the site and for reading or interacting with the information stored there. A charge could easily be levied on a per-second basis or on the basis of the display of a screenful of information. It would not matter that the briefest such visit might generate only a few pennies. These pennies could be aggregated over thousands of users and days, they could be recorded, and the funds (however small in quantity) could be transferred to the site owner's account automatically.

The idea of paying a charge for reading only one page of a book may strike many people as odd. But per-page charges are a natural consequence of the use of computer technology to lower the cost of "parcelizing" information—computer monitoring is a cheaper form of "fencing" than the printing press.⁵⁶

The ability to record very fine-grained information about very fleeting transactions is yet another reason that transaction costs overall appear to be driven down in cyberspace. And again, falling transaction costs indicate a situation well-suited to a property regime for the protection of informational works.

2. *Transaction costs depend on organizational innovation.*

Finally, we should note a crucial fact about transaction costs: they do not depend solely on technological changes, such as the Internet or computers. They also depend on institutional and organizational innovations.⁵⁷ The obvious past examples are the

⁵⁵ This fact gives pause to those who worry about invasions of privacy. I worry about it too, but this Article is about property, not privacy.

⁵⁶ The low cost of computer monitoring of very brief transactions has a parallel to land. Ellickson points out that with cheaper fencing, we should expect more "parcelized," or more finely subdivided, land. See Robert Ellickson, *Property in Land*, 102 Yale L J 1315, 1330 (1993) (cited in note 5).

⁵⁷ See generally Robert P. Merges, *Of Property Rules, Coase, and Intellectual Prop-*

American Society of Composers, Authors, and Producers ("ASCAP") and Broadcast Music International ("BMI"). These organizations arose to arrange for music licensing and royalty payments between thousands of composers and thousands of music-playing establishments.⁵⁸ Similarly, the Copyright Clearance Center ("CCC") arranges licences for textual and other materials, exemplifying an organizational response to what would otherwise be high transaction costs.⁵⁹ Already, organizations have arisen to attempt to handle licensing transactions for digital materials circulated in cyberspace, including the CCC and others.⁶⁰

3. *New transaction types.*

The "absolute" amount of transaction costs, however, does not provide a complete picture. We really care about "high" or "low" costs relative to the value of the contract undertaken. That is, the important figure is the ratio of the transaction costs to the value of the rights being sought. For example, it would be ridiculous for someone to spend \$100 negotiating the rights to copy two pages from *Time* magazine for personal use; no reasonable person would value the right at \$100, so transaction costs of that magnitude would be considered "high." But if one were going to reproduce the two pages in a text book and sell them to hundreds of thousands of students, then spending \$100 to negotiate the rights would be considered quite low—because "low" would mean low in relation to the value of the rights being sought.

Part of the problem of property in cyberspace is that the technology affects many variables. Clearly "transaction costs" in some cases will go down. But the "rights being sought" are also likely to change, because many new types of transactions are

erty, 94 Colum L Rev 2655, 2661-63 (1994).

⁵⁸ See Robert Merges, *Intellectual Property Rights and Bargaining Breakdown: The Case of Blocking Patents*, 62 Tenn L Rev 75, 106 (1994); Paul Goldstein, *The Brendan Brown Lecture: Copyright in the New Information Age*, 40 Cath U L Rev 829, 835 (1991).

⁵⁹ See Note, *Multiple Photocopying by Educators and the Fair Use Doctrine: The Court's Role in Reducing Transaction Costs*, 1994 U Ill L Rev 387, 406-07.

⁶⁰ See *The Author's Registry*, <http://www.webcom.com/registry>. The Chronicle of Higher Education reports that some twenty companies and organizations are working together to ensure that whatever methods eventually are adopted for selling copyrighted material online are compatible with each other. The Electronic Rights Management Group hopes to enlist the support of hundreds of software developers, entertainment companies, and publishers in their efforts to protect copyrighted material from unauthorized retransmission and to provide a way for copyright holders to collect payments for material distributed electronically. *Online*, Chronicle Higher Educ A23 (Nov 10, 1995). See also the CCC site at <http://www.copyright.com>.

likely to be undertaken—or at least, many new uses of informational materials are likely to be made, whether transacted for or not. And that means that we will see a wide variety of ratios of transaction costs to the value of the rights sought.

For example, it is already common today for individuals to copy e-mail messages or downloaded newspaper articles and circulate them to a hundred or a thousand others over an Internet “discussion list.” Making and sending such copies would once have required time and thought, not to mention an expense for photocopying and mailing. But today, people do this literally with the push of a button. When this type of circulation was more costly, no one would do it unless it were worth the cost. Thus, such copies would not be made unless doing so brought the copier a fairly high value for the transaction. But when it takes only a second to accomplish the circulation, the value of making the circulation can be quite low and yet still be worth undertaking. Indeed, many Internet users circulate entire news articles of the most marginal relevance to a discussion list simply because it is easy for them to do so.

In short, transaction costs will certainly drop for some transactions relative to what they would have been for the same transaction previously. But at the same time, all sorts of new and differently valued transactions will be undertaken. The picture of transactions in cyberspace is thus one of extraordinary dynamism and unpredictability. Insofar as future transactions are unpredictable, the task is to design an entitlement system in the face of uncertainty: should we adopt liability rules or property rules for future transactions whose cost-to-value ratio is currently unpredictable? It works out that property rules have the advantage.

The typical liability rule in the Copyright Act is a compulsory license.⁶¹ Two types of compulsory licenses appear in the Copyright Act: 1) very specific licenses with terms set by Congress in consultation with affected industries; and 2) the general “fair-use” provision,⁶² which functions like a compulsory license provision with a royalty of zero. An example of the first type is the Copyright Act’s allowance for the making of cover records, as discussed earlier.⁶³ Anyone who wants to make such a record must pay the statutorily prescribed fee of “either two and three-

⁶¹ See notes 34-41 and accompanying text.

⁶² 17 USC § 107 (1994).

⁶³ See note 35 and accompanying text.

fourths cents, or one-half of one cent per minute of playing time or fraction thereof, whichever amount is larger.”⁶⁴

However, predefined damages that are appropriate for highly specified transactions are inappropriate when we are faced with unpredictable transaction types and values. If we do not know the types of transactions that will likely arise in cyberspace, then clearly we have no basis for enacting a liability rule with specified damages to apply in specified situations. At best, such a liability rule would have to function like liability rules for accident cases in tort, with damages determined after the fact in litigation or settlement. But to a large extent we already have this after-the-fact mechanism with the fair-use provision of the Copyright Act. Fair use is the quintessential “after the fact” determination because everything turns on the facts and circumstances of the particular case.⁶⁵

This leaves the question whether a liability rule or a property rule should apply in cyberspace for situations that 1) cannot be specified in advance, and 2) are not otherwise amenable to a fair-use analysis. Transactions amenable to a fair-use analysis, though not precisely definable, tend to be those that are either trivial or undertaken for unusually worthy purposes, such as criticism, scholarship, research, and the like.⁶⁶ Excluding such transactions, then, leaves the question whether a liability or a property rule would be best for transactions that we cannot now specify or define, that involve nontrivial uses of informational works, and that are not for especially worthy purposes.

A liability rule such as a compulsory license for such transactions makes no sense. Liability rules are appropriate when transaction costs are high, not when those costs are unknown or changing. In addition, liability rules carry a high price tag: the cost of litigation to determine, after the fact, the amount of damages. A property rule does not avoid all litigation, but it does put parties on notice that bargaining is called for and expected. Unlike automobile accidents, which we hope are infrequent, transactions over informational work in cyberspace are likely to be frequent and desirable. An after-the-fact rule that requires litigation to determine damages would therefore be costly and unwise, particularly when we have a property-rule alternative. A fixed

⁶⁴ 17 USC § 115(c)(2) (1994).

⁶⁵ See William F. Patry and Shira Perlmutter, *Fair Use Misconstrued: Profit, Presumptions, and Parody*, 11 Cardozo Arts & Enter L J 667, 668-71 (1993).

⁶⁶ *Id.* at 669 n 15.

compulsory license is similarly unwise because we are dealing by hypothesis with unpredictable transaction types and values.

Finally, property rules for future, unpredictable transactions in cyberspace are more consistent with our copyright history. Compulsory licenses are exceptional in the broad scheme of copyright rights; most people understand that they are supposed to "get permission" to use copyrighted works. No precedent supports having a broad liability rule for unspecified transactions with unspecified damages payments.

Starting cyberspace with property rules has another advantage: politically, it should be easier to "relax" a property rule and turn it into a liability rule in the future than to reverse that process. A change from a property rule to a liability rule takes away the need to bargain. Such a change would therefore be easier to impose than the reverse, which would require the creation of a duty to bargain where one previously did not exist.

For many reasons, then, a property rule works better as the general presumption for cyberspace. This holds true whether the transaction costs for cyberspace transactions are low, as many appear to be; or are presently unpredictable because the ratio of transaction costs to the value of transactions cannot be predicted.

B. Costs of Drawing and Monitoring Boundaries in Cyberspace

The same general conclusion that property rules are desirable for informational works in cyberspace arises from analyzing the issues from the Demsetz and Ellickson perspective. The notion of border drawing and its cost for informational works is more complex than for real property like land. At least four concepts are at play when we think about identifying information "borders."

First, the question arises whether we can track a unit of information as a separate entity and trace it to its author. This is comparable to the need for a title-recording system for land to identify parcel borders and owners.

Second is the question whether we can track alterations or elaborations to a unit of information—editing, rewriting, borrowing concepts, and so on—and whether we can identify and trace the underlying work to its author. No close analog to real property exists here, but tracking alterations to a work is a common problem in copyright litigation.

Third is the problem of monitoring "border crossings"—a far more troublesome problem for information than it is for land. With a parcel of real property, one can determine a trespass by

looking at the border to see if anyone crosses it. To be sure, it may not be feasible to watch large parcels of land twenty-four hours a day, every day, along every border. But with information, the problem is far worse: potential "trespassers" can be located anywhere. Posting guards at every one of the millions of computers connected to the Internet or at an online service is obviously out of the question for owners of information property.

Fourth, Demsetz and Ellickson's reference to the cost of drawing borders is central to the question of when "property" should be privately owned by individuals and households, rather than held in common by a "tribe" or "group" or "horde." It is a bit harder to see how this principle might apply to information in cyberspace, but it does apply nevertheless, and yields some interesting insights.

1. *Tracking and tracing units of information.*

We will look first at the issue of drawing and monitoring borders in the sense of tracking and tracing a given unit of information. Though I do not have empirical data to confirm the point, most of the information circulating in cyberspace appears to be readily identifiable as a "unit" of information. One thinks of e-mail, Usenet newsgroup postings, photographic images, write-ups on "home pages," movie sound clips, computer programs, digitized "radio" programs, and so on. One can identify nearly all of these as demarcated units of information: they have beginnings, endings, and so on.⁶⁷ And far more often than is true with real property like land, units of information in cyberspace either have or can have information included that identifies the author.

To be sure, physical embodiments of informational works, such as books or video cassettes, may seem more concretely demarcated than electronic information. But the difference for these purposes is more apparent than real. Digitized information is almost invariably stored and communicated as a "file." A computer "file" consists of a bounded piece of information with a beginning and an end. Software for operating systems—such as DOS, Windows, or MAC-OS—as well as for communications, depends on the computer's ability to locate beginning and end points for

⁶⁷ It is easy to fool oneself into thinking that because one can demarcate a lot of Internet information today as easily as non-Internet information, then necessarily the same will hold true tomorrow. Perhaps it will not. But I do not argue that there are no new problems to be addressed with property in cyberspace—I merely argue that most of those problems are likely to lie elsewhere than in defining the borders of a given "unit" of information.

such files. Hence an informational work in cyberspace can easily be bounded.

Hypertext-linked information may seem to be an exception to this rule. A given document on the World Wide Web ("WWW"), for example, may consist of linked pieces of files, images, and sounds blended together into what appears to the viewer as a single document. One of the astonishing features of the World Wide Web is this ability to use hypertext links to generate the appearance of a single document from widely geographically dispersed component parts. This "document" might contain ambiguous borders because of multiple constituent parts, each of which might reside on different computers in different places.

But this apparent ambiguity is imaginary. To say that information borders for hypertext are ill-defined would be to confuse the viewpoint of the viewer with that of the underlying software. The human viewer might not know which piece of information came from where, but the software pulling all the pieces together would (or could) know. The software could track the source of each component, record it, and even compute a bill cumulating the costs for each separate component if appropriate. Again, pending some major changes in the way computers store and access information, even small component parts of larger compound documents can be separately identifiable by WWW software.

Some information circulating in cyberspace is anonymous; such information might be trackable as a unit, but not traceable to its real author. But this is not a problem for drawing information borders for purposes of establishing property rights.⁶⁸ Anonymity is voluntary; those who want to claim ownership can choose not to be anonymous. Most of the issues regarding the protection of property in cyberspace likely will concern authors who want, either directly or through an enduring pseudonym or agent, to assert their authorship precisely so that they can retain some property rights.

In addition, the fact that information in cyberspace is digitized offers some new possibilities for technical means of identifying works. One of the offshoots of research into public-key encryption⁶⁹ has been the development of "digital signatures," a

⁶⁸ It may be a problem for *infringement* of an author's rights, in the sense that an anonymous infringer cannot be sued. But anonymity is not a problem for anonymous authors themselves.

⁶⁹ The *White Paper* describes public-key encrypting in the following way:

special form of encoding at the end of a document.⁷⁰ This encoding allows a recipient of information, that purports to be from author "X", to verify both that it is indeed from "X" and no one else, and also that the information remains exactly in the form—same text, same images, same formatting—in which it was sent. Digital signatures will help demarcate the boundaries of informational works in cyberspace.

Other new technologies can do even more. For example, the Working Group on Intellectual Property Rights discusses the possible use of "copyright management information" as a special part of any digitized information. This special bit of text would:

inform the user about the authorship and ownership of a work (e.g., attribution information) as well as to indicate authorized uses of the work (e.g., permitted use information). For instance, information may be included

A widely publicized technique for sending secure transmissions of data is "public key" encryption. This technique can be used to encrypt data using an algorithm requiring two particular keys—a "public" key and a "private" key. The two keys are affiliated with the recipient to which the information is to be sent. The "public" key is distributed publicly, while the private key is kept secret by recipient. Data encrypted using a person's public key can only be decrypted using that person's secret, private key. For instance, a copyright owner could encrypt a work using the public key of the intended recipient. Once the recipient receives the encrypted transmission, he could then use his private key to decrypt that transmission. No secret (private) keys need to be exchanged in this transaction. Without the private key of the intended recipient, the work cannot be read, manipulated or otherwise deciphered by other parties. Of course, if a decrypted copy is made and shared, then others could manipulate the work unless other means are used to protect it.

United States Department of Commerce, Information Infrastructure Task Force, *Intellectual Property and the National Information Infrastructure: Report of the Working Group on Intellectual Property Rights* 176 (Sept 1995) ("White Paper") (cited in note 14) (emphasis omitted). See also A. Michael Froomkin, *The Metaphor is the Key: Cryptography, the Clipper Chip, and the Constitution*, 143 U Pa L Rev 709, 890-94 (1995) (cited in note 22).

⁷⁰ The *White Paper* describes digital signatures as follows:

Mathematical algorithms can also be used to create digital "signatures" that, in effect, place a "seal" on a digitally represented work. Generating a digital signature is referred to as "signing" the work. The algorithms can be implemented through software or hardware, or both. The digital signature serves as means for authenticating the work, both as to the identity of the entity that authenticated or "signed" it and as to the contents of the file that encodes the information that constitutes the work. Thus, by using digital signatures one will be able to identify from whom a particular file originated as well as verify that the contents of that file have not been altered from the contents as originally distributed.

White Paper at 177 (cited in note 14).

in an "electronic envelope" containing a work that provides information regarding authorship, copyright ownership, date of creation or last modification, and terms and conditions of authorized uses.⁷¹

In sum, it seems no harder to identify an informational work in cyberspace as a unit with "boundary lines" than it is to identify a similar informational work elsewhere. Indeed, technical advances may make it even easier.

2. *Alterations to units of information.*

Another problem with informational works is that others besides the author may take an identifiable unit of such a work and change it. When is such a change "wrongful" in relation to property rights, and when is it not? Here again, nothing about cyberspace or property in informational works seems unique in this regard. Authors borrow from other authors' works all the time. An extremely close, almost literal, borrowing will be a copyright infringement; a loose borrowing of a basic plot idea will not be. Real property does not provide an especially good analogy here—though nuisance law is vaguely similar.⁷² But this whole area is a common problem in copyright law, a problem with which courts are quite familiar.⁷³ In copyright cases, the issue is whether an alleged infringer has copied "too much" from another's work.⁷⁴

Much of the problem of alterations stems from the fact that "ideas" are not protected by copyright—only the particular "expression" of those ideas is protected. Naturally, this dichotomy between idea and expression frequently raises questions in litiga-

⁷¹ Id at 180-81.

⁷² If an adjacent landowner A emits smoke or odors that flow onto owner B's property, in a sense A is using a part of B's property.

⁷³ See, for example, the classic formulation by Learned Hand in *Nichols v Universal Pictures Corp.*, 45 F2d 119, 121 (2d Cir 1930) ("Upon any work, and especially upon a play, a great number of patterns of increasing generality will fit equally well, as more and more of the incident is left out. The last may perhaps be no more than the most general statement of what the play is about, and at times might consist only of its title; but there is a point in this series of abstractions where they are no longer protected, since otherwise the playwright could prevent the use of his 'ideas', to which, apart from their expression, his property is never extended."). See also Paul Goldstein, 1 *Copyright* § 2.3 (Little, Brown, 2d ed 1996) (cited in note 36) (discussing the idea-expression distinction in defining a unit of information).

⁷⁴ See generally *Arnstein v Porter*, 154 F2d 464, 473 (2d Cir 1946) ("The question, therefore, is whether defendant took from plaintiff's work so much of what is pleasing to the ears of lay listeners . . . that defendant wrongly appropriated something which belongs to the plaintiff."); Goldstein, 2 *Copyright* at § 7.3 (cited in note 36).

tion about which is which. Did the defendants take only ideas? Or did they take expression? Is a "plot" an expression or just an idea? Is the Macintosh computer interface just an idea?⁷⁵ These issues are always troublesome in real cases; but for our purposes, they are neither more nor less troublesome in cyberspace. Hence, they do not push the analysis of property rights in cyberspace in any particular direction. Essentially, a property-rights scheme—copyright—works reasonably well outside of cyberspace to set limits on what can and cannot be borrowed from an informational work. At the very least, we can say that nothing about cyberspace suggests that a similar regime there will be any worse.

3. *Detecting trespasses.*

The problem in cyberspace may not be so much in identifying information borders for those who want in good faith to know about them or in assessing whether "too much" of a work has been used. The problem is likely to be detection in the first place of "trespasses" in cyberspace—that is, the unauthorized use of an informational work. As noted earlier, practical problems exist with policing very long borders of real property, but they seem to pale beside the problem of detecting "trespass" activities like unauthorized copying or uses of informational works. If these costs are excessive in cyberspace, they might argue against a private-property regime because such a regime would not be "worth it."

Yet the argument for such a regime is still quite strong. First, we cannot be sure that the costs of detecting information-property "trespasses" will be excessive. Detection can take a number of forms, including rewards and "hot lines" for concerned individuals to report suspected infringements. Software producers often learn about corporate infringements of commercial software this way.⁷⁶ This idea does not have much to do with technology or cyberspace, but it does remind us that human beings—not technology—are still a major source of information about the activities of others.

Second, in addition to these "low technology" means of detection, high technology sometimes lowers the cost of monitoring property borders. It certainly does with real property. Barking dogs, fences, and motion detectors often substitute for more ex-

⁷⁵ See *Nichols*, 45 F2d at 121.

⁷⁶ Benjamin Wittes, *BSA Duels with Pirates*, *Legal Times* 539 (Apr 10, 1995).

pensive continuous human monitoring. Analogous technologies might serve the purpose of a "border patrol" for informational works in cyberspace. One might think that digital-signature technology⁷⁷ would serve this purpose, but it does not, because a digital signature does not stop a bad-faith recipient who wants to disguise the actual author. With present techniques, such a "signature" can readily be removed from the document with a simple text editor. At that point the possessor can edit the document and add a different digital signature to make it appear that he is the author.

Other technologies may fare better, however. The *White Paper*, for example, discusses an intriguing technology known as "steganography"⁷⁸—not to be confused with "stenography." This term describes the general use of techniques to "embed" identifying information into a nontextual work—image, sound, video, and so on. The techniques do not embed the identifying information in a single place, the way a digital signature is located at the end of a document. Rather, the techniques enter the embedding information more diffusely throughout a file in such a way that it is difficult to detect or modify.⁷⁹ With the proper software to analyze such a work, one can readily detect whether the work originated with a particular author or has been copied, even with alterations.

With the rise of Internet programs based on the "Java" programming language,⁸⁰ other means of detecting copying may be possible. Such programs are downloaded over the WWW to a user's computer, where they run locally. Earlier methods of accessing the WWW rely on the downloading of relatively static

⁷⁷ See note 68 and accompanying text.

⁷⁸ *White Paper* at 178-79 (cited in note 14).

⁷⁹ The *White Paper* describes steganography as follows:

In essence, using steganographic techniques, a party can embed hidden messages in digitized visual or audio data. . . . For example, one system modulates a known noise signal with the information to be embedded and adds the 'scaled' signal to the original data. Once encoded in this fashion, the steganographically encoded identification data is distributed throughout the work as subliminal noise and, like noise, cannot be fully eliminated from the work. Thus, one can ensure detection of an embedded message even after substantial corruption of the data, such as might occur through compression/decompression, encoding, alteration or excerpting of the original data.

Id.

⁸⁰ See http://java.sun.com/White_Paper/java.whitepaper.1.html, § 6 (Sun Microsystems' home page for their white paper on the Java programming language).

documents. Such documents would, of course, have no way of "knowing" when or whether they were being permanently copied or used in some other unauthorized way. With Java programs, however, a measure of "intelligence" is downloaded along with a document to the user's computer. Thus in theory, such a document could keep track of its own unauthorized uses! This would certainly help to detect information-border "trespasses."

Finally, instituting a legal regime of a particular form of property protection—called "contributory infringement" in copyright law—coupled with technologies for preventing unauthorized uses, can together lower the cost of detection and further justify reliance on a property-rights scheme.

Some years ago, when Universal City Studios and Walt Disney Productions were worried about the possibility that every home owner would archive video copies of televised movies, the studios did not pursue those home owners directly. Rather, they proceeded, in *Sony Corp. of America v Universal City Studios*,⁸¹ against a more centralized target: the producers of the video-recording machines ("VCRs"), the bulk of which at that time were produced by the Sony Corporation. The studios argued—given that Sony did not directly infringe any rights in motion pictures by copying them itself—that the sale of VCRs "contributed" to the infringement by the individuals who bought the VCRs and taped movies with them.

The contributory-infringement doctrine arose from a more developed line of cases in patent law.⁸² The *Sony* Court held that the general outlines of the patent doctrine applied to copyright as well.⁸³

The doctrine is far from a purely judicial construct. The Copyright Act allows contributory-infringement lawsuits, though not explicitly by that name. Section 106 provides that copyright owners have not only the exclusive right to do certain things themselves—reproduce, perform publicly, and so on—they also have the exclusive right to "authorize others" to do those same things.⁸⁴ When one party facilitates another party's infringe-

⁸¹ 464 US 417 (1984).

⁸² See *Dawson Chemical Co. v Rohm and Haas Co.*, 448 US 176, 179-80 (1980) ("The idea that a patentee should be able to obtain relief against those whose acts facilitate infringement by others has been part of our law" for many years). See also *Mercoird Corp. v Mid-Continent Investment Co.*, 320 US 661 (1944); *Snyder v Bunnell* 29 F 47 (SD NY 1886).

⁸³ *Sony*, 464 US at 439.

⁸⁴ 17 USC § 106 (1994).

ment, for example by selling a machine the only purpose of which is to make unlawful copies,⁸⁵ the seller has infringed the copyright owner's exclusive right to "authorize others" to make copies. That is just the doctrine of contributory infringement by another name.

In the *Sony* case, the lawsuit was ultimately unsuccessful because the Court found that the sale of VCRs in the main only contributed to home taping for "time-shifting" purposes, which the Court concluded was a lawful fair use.⁸⁶ But the case illuminates one of the primary purposes of the contributory-infringement doctrine: to provide relief where direct infringers are too numerous or dispersed for the copyright owner to detect.

This point is crucial to an understanding of the contributory-infringement doctrine. A common response to the difficulty of monitoring "trespasses" to informational works is to assert that since copying is widespread and decentralized, we should give up efforts to stop it and accept it as a fact of life.⁸⁷ But such a view misapprehends the relationship between copyright's contributory-infringement doctrine and special-purpose technical restrictions on unauthorized uses.

Copyright owners faced with the problem of detecting trespassers often respond with increased special-purpose technical restrictions. As noted above, these may take the form of signal scrambling, software copy-protection schemes, and the like. In reaction to these special restrictions, others typically create spe-

⁸⁵ I have given an easy case: contributory infringement lies when the "only purpose" of a device is to help others to infringe a copyright. The actual test for contributory infringement is the subject of current debate. The Supreme Court in the *Sony* case held that contributory infringement lies when a device has no "substantial noninfringing uses." *Sony*, 464 US at 456. The *White Paper* proposes a rule to ban the production of devices, the "primary purpose or effect" of which is to circumvent copyright-protection technologies. See *White Paper* at 219 (cited in note 14). Though not cast in the form of a "contributory-infringement" doctrine by name, the *White Paper's* proposal is essentially the same as a contributory-infringement provision. The proposed statutory language reads:

No person shall import, manufacture or distribute any device, product, or component incorporated into a device or product, or offer to perform any service, the primary purpose or effect of which is to avoid, bypass, remove, deactivate, or otherwise circumvent, without the authority of the copyright owner or the law, any process, treatment, mechanism or system which prevents or inhibits the violation of any of the exclusive rights of the copyright owner under section 106.

Id app 1 at 6.

⁸⁶ *Sony*, 464 US at 442-55.

⁸⁷ See John Perry Barlow, *The Economy of Ideas: A Framework for Rethinking Patents and Copyrights in the Digital Age*, *Wired Magazine* 86 (Mar 1994).

cial devices or techniques to overcome the protective scheme. For example, when copy protection was more common on computer software, an industry developed for the production of tools to allow copying of protected software.⁸⁸

In the absence of a contributory-infringement doctrine, the owner would have to develop newer or more sophisticated techniques to counteract the new industry and prevent unauthorized copying. Presumably, in time, these newer techniques would themselves be met by yet more sophisticated devices to perform unauthorized copying. The cycle would repeat as long as the value of the information were high enough to justify the owner's investment in newer special-purpose technical restrictions.

The problem with this scenario is that it constitutes a kind of wasteful "arms race" of technological-protection schemes, with each side increasing its spending to outperform the other's technology. This race is wasteful because informational works require limits on copying to provide incentives for their creation. If technological protection looks costly *ex ante*, valuable works will never be created in the first place.

The purpose of the contributory-infringement doctrine is to put a limit on the arms race of technological protection. The doctrine gives the owner of the informational work an alternative to ever-increasing spending on technology. Whenever litigation, with its resulting deterrent effect, appears to be preferable to greater technological restrictions, owners can switch to litigation and enforce their property rights. Thus when coupled with special-purpose technical restrictions, the contributory-infringement doctrine forces a centralization of infringing activities and makes enforcement more cost effective.

A special-purpose technical restriction raises the costs of copying. These increased costs will be partly financial and partly "cost of knowledge." For example, producing a device that can descramble satellite signals requires a fairly sophisticated knowledge of signal technology, and it requires the production and distribution of the "black box" necessary to effect the descrambling. This box must be stocked in inventory and advertised. All these activities greatly increase the visibility of this means of "trespassing" on the signal-owner's property. Thus the special-purpose technical restriction converts what would other-

⁸⁸ See *Vault Corp. v Quaid Software Ltd.*, 655 F Supp 750, 752 (E D La 1987) (involving litigation between a manufacturer of security software and a company that sells software to "unlock" PROLOK.)

wise be a decentralized series of hard-to-detect infringements into a more centralized activity. The contributory-infringement doctrine enables owners to enforce their exclusive ownership rights against the now easier-to-detect trespasser.

Cyberspace does not change that process as long as the contributory-infringement doctrine is preserved. Indeed, since electronic communications are used so extensively, the possibilities for decentralized infringement are even greater than before. The contributory-infringement doctrine should therefore be strengthened to help convert all these decentralized infringements to more centralized, detectable ones. It is therefore no surprise that the *White Paper* proposes to do just that.⁸⁹

For the purposes of this Article and its focus on property rights, we are looking at the cost of detecting "trespasses"—that is, unauthorized copying of informational works in cyberspace. This section has shown that the cost of detecting informational-border trespasses is likely to be low, despite popular expectations to the contrary. Detection can be accomplished through rewards for disclosure; through a variety of technological means like digital signatures and steganography; and finally through reliance on the contributory-infringement doctrine coupled with technological measures. Once again, therefore, the costs of detection do not seem unusually high in cyberspace; once again, the absence of a high-cost structure argues in favor of a property-rights scheme.

4. Externalities and group ownership.

Demsetz argues that, with any property, the actions of some members of society can have external effects: positive benefits or negative costs.⁹⁰ With communally held property, overcoming these externalities requires that the entire community agree on the rules. This agreement usually entails significant transaction costs and engenders the problems of holdouts.

Ellickson elaborates on the problems of group-held property and stresses a serious risk of shirking.⁹¹ If the group wants to ensure that commonly held property is put to wise and productive uses, it must have careful rules about appropriate conduct by all members, and it must also keep watch over all the members

⁸⁹ See *White Paper* at 219 (cited in note 14).

⁹⁰ Harold Demsetz, *Toward a Theory of Property Rights*, 57 Am Econ Rev 347, 347-48 (1967) (cited in note 1).

⁹¹ Ellickson, 102 Yale L J at 1348-49 (cited in note 5).

to ensure that they follow these rules. This is a familiar application of the idea of "free riding" or the prisoners' dilemma.

Private property, in contrast, entails no free riding. All the costs and benefits are centered on the property owner, without externalities to diminish that owner's incentives to work. As Ellickson puts it, private-property owners can monitor trespassers who cross a border more cheaply than they can stand guard to see whether someone else is working enough or is shirking.⁹²

Our current copyright system features a parallel notion. The analog to "private property," in the sense of individually held property, is the placing of exclusive rights in the hands of a single author. The analog to "public" or group-held property is the placing of copyright rights in the hands of large groups other than the author. The "exclusive" rights of the author under the Copyright Act include the rights of reproduction, preparation of derivative works, public distribution, public performance, public display, and limited rights to attribution and integrity.⁹³ But the public holds "group rights" as well. Fourteen other provisions of the Copyright Act extensively compromise the author's rights, either with compulsory-license provisions⁹⁴ or with outright exceptions to those rights—such as "fair use";⁹⁵ performances at agricultural fairs, horticultural fairs, or exhibitions;⁹⁶ educational copying;⁹⁷ first sale;⁹⁸ and public performances for educational, religious, or charitable purposes.⁹⁹

These exceptions to the author's exclusive rights are often cast in the form of activities—performances at agricultural fairs, for instance—rather than groups. But in practice, behind this surface description one can see the results of interest-group representation in the legislative-drafting process.¹⁰⁰ An exception for agricultural fairs certainly seems designed to benefit those who are engaged in agriculture. An exception for educational photocopying is designed to benefit educators. One can view these

⁹² Id at 1327-28.

⁹³ 17 USC §§ 106, 106A (1994).

⁹⁴ See notes 36-39 and accompanying text.

⁹⁵ 17 USC § 107 (1994).

⁹⁶ 17 USC § 110(6) (1994). One also might characterize these exceptions as a kind of "compulsory license," albeit one that prescribes a damages liability of zero dollars.

⁹⁷ Note that the guidelines concerning "educational photocopying" are not part of the statute, but spring from the general fair-use provision of section 107.

⁹⁸ 17 USC § 109 (1994).

⁹⁹ 17 USC § 110(4) (1994).

¹⁰⁰ See Jessica D. Litman, *Copyright, Compromise, and Legislative History*, 72 Cornell L Rev 857, 870-79 (1987).

exceptions as a kind of group ownership by members of the agricultural and educational businesses. Similarly, the right to rent computer software was "acquired" as private property by computer-software companies during the legislative process¹⁰¹—a right that book publishers did not acquire, and hence that remains a "group" property interest of the public.

We can easily discover the significance of viewing the Copyright Act's exceptions as a form of "group" ownership of rights. Both Demsetz and Ellickson, when they discuss the reasons for private property, focus on the transaction costs of getting large groups to agree. The costs of reaching agreement are often high with real property; a regime of private property helps to overcome these costs.

Property rights in informational works, however, differ from those in real property on precisely this point. Land, like most real and tangible property, evidences the attribute of "rivalrous consumption." That is, one individual's use of a given plot of land for a given purpose prevents the simultaneous use by another for other purposes. Group ownership of land entails high transaction costs because the whole group must agree on those uses ahead of time.

With informational works, the same problem does not seem to follow. Informational works are a type of "public good," that is, a good that evidences "nonrivalrous consumption." One person in a group may use an informational work without impeding another's simultaneous use. On the face of it, then, once group ownership of an informational work has been determined, the group should not have to experience any transaction costs at all. Each member of the group can fully exercise all rights to the informational work without fear that other group members are in any way excluded from doing the same.

Yet, surprisingly, group ownership of public goods like informational works does exhibit the problem of group transaction costs—just not at the stage when the informational work is being used. Rather, the transaction costs occur at the stage when the group rights to the informational work are first defined. This is,

¹⁰¹ See Computer Software Rental Amendments Act, Hearing before the Subcommittee on Courts, Intellectual Property, and the Administration of Justice of the House Committee on the Judiciary, 101st Cong, 2d Sess (1990); Computer Software Rental Amendments Act of 1989, Hearing before the Subcommittee on Patents, Copyrights, and Trademarks of the Senate Committee on the Judiciary, 101st Cong, 1st Sess (1989).

in short, the stage when Congress amends or redrafts the copyright statute.

A moment's reflection will show this to be true. The legislative process surrounding every major revision to the Copyright Act well illustrates the high transaction costs entailed in group ownership. For example, Congress undertook both the 1909 and the 1976 Copyright Act revisions partly because of changing technologies.¹⁰² In each of these efforts, both the Copyright Office and Congress held frequent and prolonged hearings, involving dozens of groups, interests, and experts.

The revision effort for the 1909 Act began in 1906 and lasted until 1909.¹⁰³ The 1976 Act involved even larger transaction costs. The process of revision began in 1955;¹⁰⁴ quite literally more than twenty years were spent on the effort. Countless numbers of individuals, representing scores of interests and industries, were involved. In addition, government representatives exerted similar or greater efforts at the Copyright Office and in Congress. To be sure, not all the time and cost of the revision effort can be attributed to the cost of group negotiations over ownership of rights.¹⁰⁵ But those costs were very much a part of the overall effort. Indeed, the resulting 1976 Act can be described as taking its shape largely from the compromise of different group interests.¹⁰⁶

I am not aware that anyone has tried to add up all the costs spent hammering out the rules of copyright property ownership. Surely, however, the figure must be enormous. It represents the massive transaction costs of group ownership of copyright property.

Recently, we have similar examples. The current effort to update our copyright laws to accommodate cyberspace has not approached the scale of the major revisions accomplished in 1909

¹⁰² Jessica D. Litman, *Copyright Legislation and Technological Change*, 68 Or L Rev 275, 282 (1989).

¹⁰³ Id at 284.

¹⁰⁴ Id at 279.

¹⁰⁵ Preparation of the scholarly and influential *Studies on Copyright*, for example, took "[s]ix years of dedicated and untiring effort on the part of many persons, . . . supported by Congressional appropriations of \$100,000, the services of Copyright Office personnel, and the contributed advice of many members of the copyright bar." 1 *Studies on Copyright* ix (Rothman, Arthur Fisher mem ed, 1963). It would be unfair to account for all of the scholarly time by individual authors as part of the cost of group negotiations over copyright. Yet, in a sense, these authors must have undertaken the studies at least in part because they anticipated the elaborate negotiation process among all affected parties that was certain to ensue.

¹⁰⁶ Litman, 72 Cornell L Rev at 870-71 (cited in note 100).

and 1976. Yet, a single document, the National Information Infrastructure ("NII") Task Force's *Green Paper*, received 1,500 pages of written comments from 150 individuals and organizations over a four-month period.¹⁰⁷ With such attention over a

¹⁰⁷ The *White Paper* reported the details of reaching group consensus as follows:

The Working Group held a public hearing in November 1993, at which 30 witnesses testified. The Working Group also solicited written comments and received some 70 statements during a public comment period which closed on December 10, 1993. Following its review of the public comments and analysis of the issues, the Working Group released a preliminary draft of its report ("Green Paper") on July 7, 1994. . . . Thousands of copies of the Green Paper were distributed in paper form as well as electronically via the IITF Bulletin Board. Following the release of the Green Paper, the Working Group heard testimony from the public in four days of hearings in Chicago, Los Angeles and Washington, D.C., in September 1994. In addition, more than 1,500 pages of written comments on the Green Paper and reply comments were filed, in paper form and through the Internet, by more than 150 individuals and organizations—representing more than 425,000 members of the public—during the comment period, which extended over four months.

The Working Group convened a Conference on Fair Use (CONFU) to bring together copyright owner and user interests to discuss fair use issues and, if possible, to develop guidelines for uses of copyrighted works by librarians and educators. Some 60 interest groups are participants in the Conference and have been meeting regularly since September 1994 in sessions that are open to the public. The Working Group also kicked off a Copyright Awareness Campaign (CAC) in March 1995. Approximately 40 participating individuals and organizations are coordinating their educational efforts and joining with the Working Group and the Department of Education to raise public awareness of copyright. Meetings of the Campaign are also open to the public. Interested parties had numerous opportunities to submit their views on the intellectual property implications of the development and use of the NII and on the Working Group's Green Paper, including its preliminary findings and recommendations. The open process instituted by the Working Group resulted in a well-developed, voluminous record indicating the views of a wide variety of interested parties, including various electronic industries, service providers, the academic, research, library and legal communities, and individual creators, copyright owners and users, as well as the computer software, motion picture, music, broadcasting, publishing and other information and entertainment industries.

White Paper at 3-5 (cited in note 14).

Recently, another time-consuming effort has gone into specifying fair-use guidelines for the electronic age:

Efforts by educators to produce nationally recognized guidelines on the "fair use" of copyrighted materials in digital form hit a snag last week when the Association of American Publishers balked at . . . language that would have allowed a college to make limited use of copyrighted works over its computer network without the copyright owner's permission. . . . [One AAP Vice President] cited concerns that even for a controlled network, "Current technology is not able to prevent a recipient from further distributing copies or altering the content."

Robert L. Jacobson, *Publishers' Group Balks at Key Provision in Proposed Guidelines on*

fairly modest effort, it is no surprise that we went sixty-seven years between major revisions to our property rules for copyright!¹⁰⁸

These high costs of group agreement are not just costly in themselves; they also have the unanticipated and unhappy by-product of ensuring that our property rules for informational works quickly become out of date. Once various groups have invested enormous sums in negotiations with each other and with Congress, they will make business decisions and business investments on the basis of the results. Industries will arise and be shaped by these results. The industries will have a vested interest in keeping the rules of the game the same.¹⁰⁹ In a way, this is simply an example of the need to "amortize" the cost of negotiations over a sufficiently long period so that the expenses of reaching agreement can be recouped.¹¹⁰

Congress does not itself need to "recoup" its costs in the same way, but there is also a limit to the time and attention that members of Congress can pay to any one issue. And the longer and more exhaustive a legislative issue like copyright becomes, the less often Congress will consider major changes to it.

In an era of rapid technological change, it may be that Congress should revise the Copyright Act more thoroughly more often. But none of the participants—industries, lobbying groups, or the Congress itself—has much incentive to undertake such revisions, because doing so would render their previous efforts and current industry structure wasted. Consequently, the high costs of group decision making ensure that the Copyright Act will be long out of date before it can be revised appropriately.

Congress could remedy this problem by creating private, not group-held, property rights for informational works. If Congress assigned more of the rights to the author, and fewer rights to other groups like educators, libraries, cable television, and agricultural-fair exhibitors, then these group decision-making costs of

"Fair Use", Chronicle Higher Educ A23 (Dec 15, 1995).

¹⁰⁸ We do not wait so long for minor revisions, however. This is particularly true for those revisions that tend to affect only newcomers to the copyright world without altering rights for existing parties. In fact, the Copyright Act has seen hundreds of minor amendments since 1976. See Office of Technology Assessment, *Copyright and Home Copying: Technology Challenges the Law* 3 (U.S. Government Printing Office, 1989).

¹⁰⁹ See Dennis C. Mueller, *Public Choice II* 245 (Cambridge, 1989).

¹¹⁰ It is not literally a case of "amortizing," because lobbying expenses are sunk costs that per se would not influence future decisions. But industry undertakes such costs on the expectation that they will yield a future stream of benefits and that industry practices will develop around them.

lobbying during the legislative process could be greatly reduced, and the Act could be amended more frequently.¹¹¹

Some may object that Congress cannot realistically reduce the number of group-held copyrights because the copyright laws affect too many industries and people. This is true to some extent. But the usual explanation gets it precisely backwards. Commentators often argue that because such a large number of stakeholders are involved in copyright—authors, publishers, libraries, educators, online services, and so on—Congress must be willing to balance copyright rights among them all.¹¹² But the reverse is more accurate: because Congress has shown a willingness to balance rights among them all, it has *created* a large number of stakeholders. And Congress has created these stakeholders precisely because it assumes we have assumed that copyright rights must be group owned, and hence group defined, instead of “privately” owned.

Of course, many copyright rights are “privately” owned—they belong exclusively to the author. I am not suggesting that “group” or “private” ownership is a binary concept. It is not all or nothing. Rather, I am suggesting that *to the extent* that copyright rights are group owned, Congress has created higher-than-necessary transaction costs whenever the process of defining or amending those rights is once again undertaken.

CONCLUSION

Would-be authors need an incentive to create informational works. These incentives come in a variety of flavors. One important class of such incentives consists of the assurance that others

¹¹¹ Of course, many commentators will argue that Congress should not give more rights to authors because this is contrary to the interest of the largest affected group: the public. I do not share that view, but my point in the text is not to suggest who should or should not have rights. Rather, my point is that group ownership of copyright rights carries high and under-appreciated costs—negotiating costs and the additional cost of an outdated Copyright Act.

¹¹² See Office of Technology Assessment, *Intellectual Property Rights in an Age of Electronics and Information* 285 (U.S. Government Printing Office, 1986). Compare Goldstein, 1 *Copyright* § 1.14 (cited in note 36) (expressing the balancing of interests as authors against other authors who want to make use of the first authors' works for further creative efforts). Goldstein follows the economic formulation first put forward by William Landes and Richard Posner, rather than expressing the balance as between creators and users. See William M. Landes and Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 *J Legal Stud* 325 (1989). For an example of an article expressing the contrary view, that the balance is between creators and users, see Pamela Samuelson, *Modifying Copyrighted Software: Adjusting Copyright Doctrine to Accommodate a Technology*, 28 *Jurimet J* 179 (1988).

have a limited ability to make unauthorized uses of the informational work. Limitations on the ability of others to copy a work include the legal protection of the work as an entitlement, contractual agreements, the current state-of-the-copying art, and special-purpose technical restrictions.

The current state-of-the-copying art for digital materials in cyberspace appears to pose very little limitation on unauthorized copying. Digital works can be exactly and perfectly copied; this accounts for much of the present-day concern with strengthening or clarifying copyright rights. Increased entitlement protection may be necessary to offset this decline of practical restrictions on copying and hence preserve the existing balance of copyright rights. Special-purpose technical restrictions like encryption can also help, but they often trigger a technological "arms race" as others attempt to defeat the technical restrictions with yet more sophisticated technologies. Copyright's contributory-infringement doctrine provides a cost-effective legal alternative to increasing expenditures on such technologies.

Since cyberspace puts renewed emphasis on the protection of informational works through legal entitlements, it is useful to look more closely at the nature of such a legal entitlement. Two different perspectives on property rights are useful in this regard. The first perspective is that of Calabresi and Melamed, who focus on the protection of legal entitlements through property, liability, and inalienability rules. In this view, transaction costs are a crucial determinant of the appropriateness of property versus liability rules. Transaction costs appear to be falling quite rapidly in cyberspace. This fall implies that property rules will be most suitable for informational works in cyberspace.

The second perspective is that of the economics of property rights. This view, associated with Harold Demsetz and more recently with Robert Ellickson, concentrates on the costs of drawing and monitoring boundaries, and on the costs of group ownership of property versus individual ownership.

Both the cost of drawing borders—identifying digital information as one's own—and the cost of monitoring border trespasses—detecting unauthorized copying or alterations—seem to be no higher in cyberspace than they are for real property. They may even be lower in cyberspace thanks to recent technological developments. A creator can easily demarcate a unit of information, and techniques such as digital signatures can provide powerful methods of identifying any alterations. Other techniques, such as digital "envelopes" and steganography, can help reveal

copying of certain informational works and can help make drawing borders and identifying "trespasses" at least as easy as they are for noncyberspace informational works.

Cyberspace covers a large geographic region, which raises the worrisome possibility that detecting remote "trespasses" to informational property will be difficult. This is the problem of "decentralized infringement" brought about by low-cost reproduction and use technologies like the Internet. Here again, however, special-purpose technical restrictions such as encryption, coupled with copyright's contributory-infringement doctrine, provide a manageable solution to the problem by forcing greater centralization of infringing activities.

Finally, the high costs of group decision making over real property are a principal justification for the institution of private property. Group ownership of informational works is also possible; our current Copyright Act provides for group ownership by limiting an author's rights to control certain uses, such as transmission over cable television or performances at agricultural fairs. The assignment of such rights to groups does not at first appear to entail bargaining and negotiating costs because unlike land, informational property exhibits nonrivalrous consumption: any owner of a right can exercise it without preventing other owners from similarly exercising their rights.

But extensive negotiating costs are nonetheless entailed in the assignment of group ownership to informational works. A closer analysis shows that these negotiating costs do not appear at the time that rights are exercised, but earlier, at the time such rights are acquired from Congress. In particular, the enormous costs of group ownership become manifest during legislative revisions of the Copyright Act, when interest groups, industries, and Congress argue for years over the assignment of rights. If Congress "privatized" property rights in informational works by concentrating them in the hands of authors, the number of copyright stakeholders would be greatly reduced, and group-ownership costs would be greatly lessened.

All the reasons put forth by Calabresi, Melamed, Demsetz, and Ellickson for the institution of private-property regimes point to the appropriateness and usefulness of a private-property regime for informational works in cyberspace. The institution of such a regime—through a mechanism such as individually owned copyright rights—minimizes the inefficiencies of liability rules and group bargaining costs and consequently best promotes the development and usefulness of cyberspace.