

RESTRICTING EXPERIMENTAL USE

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Denying patent holders extensive control over experimental use of their technologies has been widely lauded as an essential facilitative component of the innovative process, one that is to be enthusiastically embraced and expanded. If one posits the cumulative nature of innovation, the possibility of irrational holdout, and the view that patents are awarded in return for the disclosure of valuable information, widespread support for an expansive construction of the doctrine is unsurprising. The position flows naturally from a liability-based conception of intellectual property.

Yet the Federal Circuit has taken a position diametrically opposed to the majority view, limiting the experimental use doctrine to a degree that essentially renders it inoperable. This Article considers the normative foundation of the Federal Circuit's restriction and, in contrast with the prevailing academic view, concludes that it is entirely desirable. Bestowing patent holders with exclusive rights over experimental use facilitates Coasian bargaining in what is likely to be a low transaction costs environment and, more important still, is likely to enhance dynamic efficiency. Scholarship expressing a contrary view tends to place unwarranted focus on an "incentive to disclose" theory of patent rights, a theory which this Article demonstrates is neither plausible nor justified.

To the extent that considerations such as information asymmetry, transaction costs, irrationality, and bargain failure provide conceivable grounds for imposing compulsory licenses in other contexts, they have limited applicability with regard to experimental use. To import unthinkingly such considerations from other contexts is to overlook the crucial facilitative mechanisms likely to

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be associated with a strong property rights regime. Even horizontal competitors, who may understandably be very hesitant to license technology to each other, may nevertheless reach an agreement through reciprocal licensing deals, patent pools, grant-back provisions, or simply a sufficiently high fee. The oft-cited prospect of “irrational” holdout is overstated and, to the extent it exists, is most likely simply a reflection of a proffered licensing fee that undercompensates the patentee. Recognizing the right to exclude that lies at the heart of the patent grant fuels the sole incentive that truly matters, namely, the incentive to innovate.

The folly of the expansive view of experimental use is magnified when one considers the substance of the right it advocates. Its proponents counsel a regime of zero compensation, a price recognized by economists as necessarily inefficient. Some scholars’ assertion that a zero-compensation regime will have negligible impact on patentees’ “incentive to invent” is unsupportable.

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INTRODUCTION

The degree to which information should be subject to private ownership poses one of the most hotly contested questions in contemporary academic discourse.¹ This Article covers a subset of the larger debate, considering the question of whether a patentee's right to exclude includes the authority to prevent others from experimenting on, or with, his invention. In doing so, it considers Judge Newman's argument that "[t]he right to conduct research to achieve . . . knowledge need not, and should not, await expiration of the patent."² In contrast to prevailing academic opinion, the Article concludes, no such general right should exist.

The propertization of information flows from an economic conception of innovation. Valuable invention and expression display public good characteristics of non-excludability and non-rivalry in consumption, which cause private markets to undercompensate inventors, authors, and artists, and thus underproduce desirable goods.³ Informed by economics, the intellectual property laws artificially bestow information goods with the defining trait of physical property—excludability—thereby creating a market.⁴ But this facilitative mechanism also carries the negative effects of increasing the price of information beyond some consumers' reservation levels and, worse,

1. Compare, e.g., Peter S. Menell, *Intellectual Property and the Property Rights Movement*, REGULATION, Fall 2007, at 36, 36–37, with Richard A. Epstein, *The Property Rights Movement and Intellectual Property*, REGULATION, Winter 2008, at 58, 58. See generally LAWRENCE LESSIG, *FREE CULTURE: HOW BIG MEDIA USES TECHNOLOGY AND THE LAW TO LOCK DOWN CULTURE AND CONTROL CREATIVITY* (2004); LAWRENCE LESSIG, *THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD* (2001) [hereinafter LESSIG, *THE FUTURE OF IDEAS*].

2. *Integra Lifesciences I, Ltd. v. Merck KGaA*, 331 F.3d 860, 873 (Fed. Cir. 2003) (Newman, J., concurring in part and dissenting in part).

3. See SUZANNE SCOTCHMER, *INNOVATION AND INCENTIVES* 35–36 (2004). See generally MANCUR OLSON, *THE LOGIC OF COLLECTIVE ACTION: PUBLIC GOODS AND THE THEORY OF GROUPS* (1971).

4. Patents grant an inventor the right to exclude others from making, using, offering to sell, selling, or importing the patented invention. 35 U.S.C. § 271 (2000). Copyrights grant the owner the exclusive right to reproduce a work, prepare derivative works, distribute copies, perform the work publicly, and display the work publicly. 17 U.S.C. § 106 (2006). Trademarks impose liability for the unauthorized use of a registered mark in certain cases. 15 U.S.C. § 1114 (2006).

possibly hindering the innovative process itself.⁵ Progress in the sciences and arts depends critically on prior understanding.⁶ Indeed, the overwhelming impetus for valuable discovery emanates not from individual genius or effort, but from antecedent knowledge.⁷ Granting entities exclusive rights over their inventions and artistic expressions may deny others access to the information they need to engage in unquestionably valuable “cumulative innovation.”⁸

Empirical investigation has yet to determine conclusively whether bestowing information with the full attributes of physical property enhances social welfare by promoting dynamic efficiency, or restricts it by creating a perverse “anticommons” in which valuable information is not shared and technological development is frustrated by holdout.⁹ Ultimately, economic-minded commentators agree that the optimal level of intellectual property protection is one that maximizes the difference between the benefits created by *ex ante* incentives to innovate, on the one hand, and the costs of allocative inefficiency and conceivable holdup of cumulative innovation, on the other.¹⁰ Unfortunately, imperfect information precludes one from applying such a cost-benefit analysis in a determinative fashion. Accordingly, academics have differed sharply on the level of propertization that acts as an optimal heuristic,

5. See LESSIG, *THE FUTURE OF IDEAS*, *supra* note 1; Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 *SCIENCE* 698, 698 (1998) (worrying that the patent system has led to an anticommons, especially in the sphere of biotechnology). *But see* F. Scott Kieff, *Property Rights and Property Rules for Commercializing Inventions*, 85 *MINN. L. REV.* 697, 719–27 (2001) (arguing that the patents do not create a holdout problem, but in fact promote innovation and commercialization).

6. See SCOTCHMER, *supra* note 3, at 127; *see also* Jerry R. Green & Suzanne Scotchmer, *On the division of profit in sequential innovation*, 26 *RAND J. ECON.* 20, 20 (1995).

7. See Maureen A. O'Rourke, *Toward a Doctrine of Fair Use in Patent Law*, 100 *COLUM. L. REV.* 1177, 1183 (2000).

8. See LESSIG, *THE FUTURE OF IDEAS*, *supra* note 1; Mark A. Lemley, *The Economics of Improvement in Intellectual Property Law*, 75 *TEX. L. REV.* 989, 997–99 (1997).

9. See Heller & Eisenberg, *supra* note 5, at 698; Ted O'Donoghue, *A patentability requirement for sequential innovation*, 29 *RAND J. ECON.* 654, 654–55 (1998). *See generally* Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 *HARV. L. REV.* 621, 624 (1998). The more perspicacious view generally considers the optimal level of propertization as falling somewhere between complete and non-existent.

10. See William M. Landes & Richard A. Posner, *An Economic Analysis of Copyright Law*, 18 *J. LEGAL STUD.* 325, 326 (1989).

fiercely debating the extent to which patents and copyrights can be analogized to the law governing tangible property.¹¹

Those advocating the adoption of a system similar to that for tangible property rights support the near-Blackstonian position¹² that a property owner's ability to exclude others should be almost inviolate.¹³ They argue that strong property rights promote the efficient allocation of valuable information through contract, further facilitate post-grant commercialization,¹⁴ and create optimal incentives by allowing patentees and copyright holders to extract the social value of their inventions.¹⁵ Others reject a property-based perspective, instead favoring a liability approach that would grant third parties access to intellectual-property-protected information at a fee. Such commentators typically adopt a parsimonious view. They accept that patent or copyright is necessary to overcome the nature of information as a public good, but advocate a regime that still provides the minimum level of pecuniary compensation necessary to induce innovation.¹⁶ A third camp considers the allocative-inefficiency and blunt-incentive characteristics of intellectual property to be good reasons for replacing the patent system with a reward structure.¹⁷ Finally, there are those who doubt that intellectual property protection is necessary to induce

11. See *supra* note 1; see also Daniel R. Cahoy, *Treating the Legal Side Effects of Cipro®: A Reevaluation of Compensation Rules for Government Takings of Patent Rights*, 40 AM. BUS. L.J. 125, 130–34 (2002); Robert P. Merges, *Of Property Rules, Coase, and Intellectual Property*, 94 COLUM. L. REV. 2655, 2655–56 (1994).

12. 2 WILLIAM BLACKSTONE, COMMENTARIES *2 (describing property as “that sole and despotic dominion which one man claims and exercises over the external things of the world, in total exclusion of the right of any other individual in the universe”).

13. See, e.g., Richard A. Epstein, *Intellectual Property: Old Boundaries and New Frontiers*, 76 IND. L.J. 803, 805, 816–21 (2001) (supporting an analogy between intellectual and tangible property, but rejecting Blackstone's conception of the latter as excessive and inaccurate).

14. See Kieff, *supra* note 5, at 703.

15. See, e.g., Wendy J. Gordon, *On Owning Information: Intellectual Property and the Restitutionary Impulse*, 78 VA. L. REV. 149, 159–60 (1992).

16. See, e.g., Stephen Breyer, *The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies, and Computer Programs*, 84 HARV. L. REV. 281, 322–23 (1970); Stewart E. Sterk, *Rhetoric and Reality in Copyright Law*, 94 MICH. L. REV. 1197, 1205, 1209, 1213–15 (1996).

17. See Kieff, *supra* note 5, at 705–07 (citing Steven Shavell & Tanguy van Ypersele, *Rewards Versus Intellectual Property Rights* (Nat'l Bureau of Econ. Research, Working Paper No. 6956, 1999) and Michael Kremer, *Patent Buy-Outs: A Mechanism for Encouraging Innovation*, (Nat'l Bureau of Econ. Research, Working Paper No. 6304, 1997)).

desirable innovation at all,¹⁸ touting the mantra that “information just wants to be free.”¹⁹ The normative justification for this agnostic position emphasizes above all the altruistic nature of much innovation, particularly in the copyright realm.²⁰

The preceding divergence in academic opinion bears witness to the myriad disagreements in the realm of intellectual property. Within this larger framework, a particularly divisive point of contention has emerged concerning a third party’s right to experiment on another’s patented technology. Given the Byzantine nature of some technological discoveries, it may be difficult to re-create accurately or economically many inventions without some degree of experimentation. Should an intellectual property holder be able to demand a fee for such use or even enjoin it altogether? Should a patentee have any rights over such use at all?

There are, initially, many appealing reasons to think that he should not have any such rights. From a deontological perspective, one might argue that an inventor who gains the luxury of a twenty-year monopoly is contractually obligated to reveal in return precisely what his invention is and how it works.²¹ Indeed, some scholars have drawn this inference solely from the statutory “enablement” requirement,²² which demands that an inventor explain the functioning of the relevant technology in a

18. See, e.g., MICHELE BOLDRIN & DAVID K. LEVINE, AGAINST INTELLECTUAL MONOPOLY 12 (2008) (“Since there is no evidence that intellectual monopoly achieves the desired purpose of increasing innovation and creation, it has no benefits. So there is no need for society to balance the benefits against the costs. This leads us to our final conclusion: intellectual property is an unnecessary evil.”); see also Michele Boldrin & David K. Levine, *Rent-seeking and innovation*, 51 J. MONETARY ECON. 127, 153 (2004).

19. See Thomas O. Barnett, *Interoperability Between Antitrust and Intellectual Property*, 14 GEO. MASON L. REV. 859, 865 (2007).

20. This position is not universally improper; in many circumstances, intellectual property is not needed to spur innovation. See, e.g., Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CAL. L. REV. 1889, 1892 (2002) (“People innovate for many reasons, and in many industries the existence of IP rights doesn’t appear to be chief among them.”). A good example involves a Ph.D student working on his dissertation for the sole purpose of graduating with distinction. Such creative work would clearly take place notwithstanding the absence of intellectual property protection, yet the copyright laws apply.

21. See Orin S. Kerr, *Rethinking Patent Law in the Administrative State*, 42 WM. & MARY L. REV. 127, 129–30 (2000) (analyzing patents as contracts between inventors and government).

22. See *id.* at 135–37.

manner that would allow one skilled in the art to reproduce it “without undue experimentation.”²³ Many have also spoken of an “incentive to disclose” rationale for intellectual property protection.²⁴ This rationale is ostensibly reflected in the Patent Act, which requires that a prospective patentee both fully disclose the “best mode” for practicing his claim²⁵ and satisfy the enablement requirement. Certainly, an experimental use exemption for patents could hardly be called anomalous, for one is codified in the Copyright Act.²⁶

Consistent with these considerations, the overwhelming weight of academic opinion supports an expanded experimental use exemption under patent law.²⁷ Their view is far from

23. 35 U.S.C. § 112 (2000); see *In re Vaeck*, 947 F.2d 488, 495 (Fed. Cir. 1991).

24. See, e.g., Daniel A. Lev, *A Realist Approach to Merck KGaA v. Integra*, 5 NW. J. TECH. INTELL. PROP. 135, 143–44 (2006); see also *infra* note 27.

25. 35 U.S.C. § 112 (2000).

26. 17 U.S.C. § 107 (2006) (fair use exemption).

27. See, e.g., Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017, 1020, 1078 (1989) (“As the use of patented inventions becomes increasingly important to the progress of research science and increasingly threatening to the interests of patent holders, this vaguely defined doctrine [of experimental use] is becoming less satisfactory.”); Ted Hagelin, *The Experimental Use Exemption to Patent Infringement: Information on Ice, Competition on Hold*, 58 FLA. L. REV. 483, 512 (2006) (arguing that the Federal Circuit’s restrictive interpretation of the exemption “serve[s] both to limit scientific and technical advance, and to retard competition”); Janice M. Mueller, *The Evanescent Experimental Use Exemption from United States Patent Infringement Liability: Implications for University and Nonprofit Research and Development*, 56 BAYLOR L. REV. 917, 919 (2004) (arguing that “a narrowly defined but practically meaningful experimental use exemption is long overdue for the U.S. patent system”); Katherine J. Strandburg, *What Does the Public Get? Experimental Use and the Patent Bargain*, 2004 WIS. L. REV. 81, 83 (“[A] well-designed experimental-use exemption from infringement liability can promote faster cumulative technological progress without significantly diminishing incentives to invest in the original invention.”); David C. Hoffman, Note, *A Modest Proposal: Toward Improved Access to Biotechnology Research Tools by Implementing a Broad Experimental Use Exception*, 89 CORNELL L. REV. 993, 1037 (2004) (“Proscribing all research into patented subject matter unless the patent holder gives permission—the route apparently mandated by *Integra v. Merck*—would seriously impede technological progress. Information disclosed in patents is a major source of scientific knowledge and is seldom published elsewhere. An expansive experimental use exception would allow the study of patented subject matter in order to understand it, or to improve upon it, or to find a new use for it, or to modify or design around it. Without such an exception, technological innovation would slow significantly or stop entirely” (footnotes and internal quotation marks omitted)).

radical—indeed, several foreign countries have facilitated free experimental use by statute.²⁸

In light of these strongly voiced opinions, and a judicial environment increasingly hostile to the property rights movement,²⁹ one would expect a broad exemption for experimental use. Yet in a series of recent cases, the Federal Circuit has curtailed the doctrine to a degree that essentially renders it defunct.³⁰ In *Madey v. Duke University*, the court went so far as to refuse to exempt the infringing activity of a research university,³¹ shattering the long-held presumption that academic researchers were immune from liability for patent infringement.³² In her later dissent in *Integra Lifesciences I v. Merck KGaA*, Judge Newman lamented the court's decision in *Madey*, opining that it “essentially eliminate[d]” the well-established common law exemption and ignored patent policy's role in providing an incentive to disclose.³³

Contrary to the weight of academic opinion,³⁴ this Article argues that the Federal Circuit's near elimination of the experimental use doctrine is justified. The court's holding that the

28. See Hagelin, *supra* note 27, at 520–21.

29. Compare *eBay, Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391, 394 (2006) (finding that a patent holder does not enjoy an automatic right to injunctive relief upon a showing of infringement and thus implicitly rejecting the argument put forward by the property rights movement that intellectual property should be treated in an analogous manner to physical property), with Brief of Various Law & Economics Professors as Amici Curiae in Support of Respondent at 23, *eBay*, 547 U.S. 388 (No. 05-130) (authored by F. Scott Kieff, Richard Epstein, and R. Polk Wagner) (describing the virtues of the pre-*eBay* regime that treated intellectual property as analogous to physical property).

30. See, e.g., *Integra Lifesciences I, Ltd. v. Merck KGaA*, 331 F.3d 860, 867 (Fed. Cir. 2003); *Madey v. Duke Univ.*, 307 F.3d 1351, 1362 (Fed. Cir. 2002).

31. *Madey*, 307 F.3d at 1362.

32. See Mueller, *supra* note 27, at 938 n.99 (stating that *Madey* “[c]ame as a surprise to many university researchers and their lawyers, who believed that an almost 200 year old experimental use exemption protected them from suits . . . as long as they were conducting research in the name of science—not profits—professors and doctoral students thought they were free to use patented tools” (quoting Matt Fleischer-Black, *Schools Dazed*, AM. LAW., Oct. 3, 2003) (internal quotation marks omitted)).

33. *Integra Lifesciences*, 331 F.3d at 873 (Newman, J., concurring in part and dissenting in part).

34. See *supra* note 27; see also John H. Barton, *Patents and Antitrust: A Rethinking in Light of Patent Breadth and Sequential Innovation*, 65 ANTITRUST L.J. 449, 457 (1997) (advocating a change in the law “so as clearly to permit use of patented technology for technology improvement purposes without needing to obtain an explicit license”); Arti Kaur Rai, *Regulating Scientific Research: Intellectual Property Rights and the Norms of Science*, 94 NW. U. L. REV. 77, 139 (1999).

exemption persists only to the extent of “philosophic inquiry” ensures that the only unauthorized use that can take place is that which has no economic consequence for the patentee in the marketplace. Providing a patentee with an exclusive right—as the Federal Circuit has done—ensures that ex ante incentives remain optimal. Allowing exclusion is appropriate in all situations except one.

When a patent is improvidently granted by the Patent and Trademark Office (“PTO”)—a phenomenon that unfortunately occurs with some regularity—exclusion is decidedly not proper.³⁵ Given the pervasive poor quality of issued patents, there is strong normative ground for allowing rivals and others to experiment with another’s patented technology to the extent necessary to assess the validity of the patent.³⁶ Improperly acquired patents cause serious social harm and restrict the dissemination of valuable information with no offsetting, concomitant benefit.³⁷ Facilitating the challenge of questionable patents therefore constitutes a strong policy mandate.

Several academics forcefully make the case for an expanded experimental use doctrine,³⁸ but their analysis falls short for a number of reasons. Perhaps most unsupportable is the contention that one can grant competitors freedom to experiment on an invention without harming ex ante incentives. Professor

35. Patents granted by the PTO are invalidated by the courts at a startling rate. See John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 AIPLA Q.J. 185, 205 (1998) (observing that nearly fifty percent of all litigated patents are struck down); Jean O. Lanjouw & Mark Schankerman, *Protecting Intellectual Property Rights: Are Small Firms Handicapped?*, 47 J.L. & ECON. 45, 59 (2004) (finding that win rates are close to fifty percent in patent cases); Glynn S. Lunney, Jr., *Patent Law, the Federal Circuit, and the Supreme Court: A Quiet Revolution*, 11 SUP. CT. ECON. REV. 1, 12, 37–38 (2003) (finding that patent owners succeed about thirty percent of the time at the Federal Circuit and suggesting the availability of injunctive relief explains the departure from a fifty percent success rate).

36. As explained below, however, this should not be an unqualified right, but rather a restricted one. Allowing rivals free rein to research another’s patented technology in ostensible furtherance of assessing the patent’s validity may allow those competitors to research indirectly for purely commercial reasons. Accordingly, an experimenter in these circumstances should be prepared to explain to the relevant patentee, and ultimately the court if sued for infringement, why the patent specification does not provide an adequate basis for testing validity. In most circumstances, experimentation would not be required. See *infra* Part II.D.

37. For an especially broad attack on the social ills of improvidently granted patents, see Christopher R. Leslie, *The Anticompetitive Effects of Unenforced, Invalid Patents*, 91 MINN. L. REV. 101 (2006).

38. See *supra* note 27.

Strandburg, for instance, urges a dichotomy between experimenting “on” versus experimenting “with” patented technology and concludes that the former will not have a material effect on prospective patentees’ incentive to innovate.³⁹ This position fails to withstand logical scrutiny. Further, proponents of an enlarged experimental use doctrine uniformly place an unwarranted focus on patent law’s supposed “incentive to disclose” foundation.⁴⁰ This Article argues that the *sole* purpose of patent policy is to spur desirable innovation.

The strongest conceivable argument in favor of a broad experimental use exemption relates to the problem of technological holdout, identification and transaction costs, and other impediments to cumulative innovation. By ensuring that all innovators have access to the full amount of information concerning a patented invention—a level of understanding likely to be gained only through actual experimentation—society ensures that the maximum amount of valuable information is passed to the public, as early as possible. The ensuing knowledge will not necessarily directly benefit society in the short-run, for a competitor cannot normally sell a patented improvement without the original inventor’s blessing,⁴¹ but there may well be indirect or eventual benefits. A patentee’s refusal to allow a competitor to experiment with, or on, his invention may delay all these gains.

Yet even concern with maximizing information available to innovators fails to justify a more expansive experimental use doctrine than that established by the Federal Circuit. First, its call is not as compelling as it may initially appear. The vast majority of patented inventions are “self-disclosing” and require little in the way of testing to understand.⁴² Moreover, patents are not issued

39. See Strandburg, *supra* note 27, at 83, 121.

40. Judge Newman’s dissent in *Integra Lifesciences* is illustrative. See *Integra Lifesciences I, Ltd. v. Merck KGaA*, 331 F.3d 860, 873 (Fed. Cir. 2003) (Newman, J., concurring in part and dissenting in part).

41. In cases of extreme improvement, the courts may view an invention as beyond the reach of an otherwise blocking patent on the basis of the reverse doctrine of equivalents. See *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608–09 (1950) (“[W]here a device is so far changed in principle from a patented article that it performs the same or a similar function in a substantially different way, but nevertheless falls within the literal words of the claim, the doctrine of equivalents may be used [in reverse] to restrict the claim and defeat the patentee’s action for infringement.”). The doctrine, however, is rarely applied.

42. See Frank H. Easterbrook, *Intellectual Property Is Still Property*, 13 HARV. J.L. & PUB. POL’Y 108, 109–10 (1990).

in the dark; applicants are required to disclose an invention's best mode of practice and satisfy the enablement condition.⁴³ Thus, even a patentee who "unreasonably" holds out makes much information publicly available for cumulative innovation, "inventing around," and other activities. Just as important, there is an underappreciated "quasi-fair use" aspect to patent law, which allows much experimentation to take place free from challenge. Given the extraordinary expense of patent litigation—an expense that is entirely absorbed by the patentee—there is an environment of considerable under enforcement.⁴⁴ As a result, the only experimental uses that will likely give rise to infringement proceedings are significant research activities by horizontal competitors.

Second, unrestricted experimental use will inevitably take place when an invention enters the public domain upon expiration of its patent. This consideration is entitled to greater weight within the field of patents than it is in copyright, given the former's considerably shorter duration.⁴⁵

Third, and most importantly, the number of "irrational" hold-outs is likely to be less than many fear. Negotiating a license to experiment with a patented technology is, in many ways, like negotiating for a license to sell a product incorporating an improvement patent. Both theory and empirical evidence demonstrate that strong property rights can yield mutually beneficial bargains. These bargains often take the form of simple pecuniary compensation and social convention, but, increasingly, they occur through such sophisticated exchange mechanisms as individual cross-licensing, grant-back provisions, and patent pools.⁴⁶ Ultimately, little evidence supports the view that excessively powerful patent rights can create an anticommons.⁴⁷

Part I of the Article discusses the leading case law that has created and molded the experimental use exemption. Given that these cases are well known and widely understood, the

43. 35 U.S.C. § 112 (2000).

44. I thank Professor F. Scott Kieff for pointing this out to me.

45. Compare 35 U.S.C. § 154(a)(2) (2000) (granting patentees a twenty-year term from the date of application), with 17 U.S.C. § 302(b) (2000) (setting out the general rule that "the copyright endures for a term consisting of the life of the last surviving author and 70 years after such last surviving author's death").

46. See, e.g., Carl Shapiro, *Navigating the Patent Thicket: Cross Licensing, Patent Pools, and Standard Setting*, in 1 *INNOVATION POL'Y & THE ECON.* 119 (Adam B. Jaffe et al. eds., 2001).

47. See Kieff, *supra* note 5, at 719–27.

discussion will be brief. Part I also considers in greater detail the overarching debate concerning the respective primacy of property and liability rules in the intellectual property setting. Defining the proper reach of the experimental use doctrine constitutes only a limited, albeit an important, subset of this larger controversy.

The heart of the Article follows in Part II, in which the views of those who favor a more substantive experimental use doctrine are critically assessed and found wanting. In particular, the incentive-to-disclose theory is both a vacuous concept and a misnomer. As it is usually construed, it provides no normative support for those seeking an expansion of the exemption. Nor are the theory's proponents justified in arguing that an exemption could be applied without negatively affecting *ex ante* incentives to engage in the innovative process. Finally, it is a mistake to think that strong property rights will foreclose socially valuable cumulative innovation in the context of experimental use.

The question of whether propertization will foreclose efficient access to information is difficult, and it should not be resolved in favor of full proprietary control of information generally. There is much to be said for a parsimonious position insofar as it is arrived at *ex ante* through an appropriate revision of patent and copyright duration and breadth, as opposed to indeterminate *ex post* dilution of inventors' and authors' rights. Liability rules may be justified in some limited situations where bargaining costs are apt to be disproportionate to the social gain sought to be achieved. With respect to experimental use, however, where the end sought (disclosure) is largely satisfied by other means, and where the end itself is subsumed within the larger incentive to innovate, the case for such governmental intervention, and the associated dilution in private property rights, is weak.

I. FRAMING THE ISSUE IN CONTEXT

A. *A Brief Overview of the Law*

In his famous 1813 decision in *Whittemore v. Cutter*, Justice Story first articulated the principle that has led the courts to recognize a common law doctrine of experimental use. He proclaimed that "it could never have been the intention of the legislature to punish a man, who constructed . . . a machine merely

for philosophical experiments, or for the purpose of ascertaining the sufficiency of the machine to produce its described effects."⁴⁸

This original conception of the doctrine is considerably broader than the current version. In particular, the second use Justice Story exempted would grant any person the right to experiment on a patented technology to confirm its efficacy. In order to accomplish this goal, an experimenter would obviously be required to investigate how the invention operates.⁴⁹ Accordingly, this reading of the doctrine would grant experimenters considerable freedom to research others' patented inventions.

Justice Story's view on experimental use gradually gave way to a standard that distinguished between commercial and non-commercial use of a patented technology.⁵⁰ The Federal Circuit embraced this dichotomy in *Roche Products, Inc. v. Bolar Pharmaceutical Co.*⁵¹ There, the Federal Circuit held that a generic drug producer's testing of a manufacturer's patented drug formula constituted infringement and was not protected by the experimental use doctrine.⁵² The defendant hoped to satisfy the labyrinthine statutory requirements in advance of the expiration of the plaintiff's patent, so as to be able promptly to begin marketing its generic drugs. The court based its decision on the commercial purpose underlying the defendant's experimental use.⁵³ It explained:

[Defendant's] intended "experimental" use is solely for business reasons and not for amusement, to satisfy idle curiosity, or for strictly philosophical inquiry. [Defendant's] intended use of [the patented information] to derive FDA required test data is thus an infringement of the [patent]. [Defendant] may intend to perform "experiments," but unlicensed experiments conducted with a view to the adaption of the patented invention to the experimenter's business is a violation of the rights of the patentee to exclude others from using his patented invention. It is obvious here that it is a misnomer to

48. 29 F. Cas. 1120, 1121 (C.C.D. Mass. 1813) (No. 17,600); see also *Poppenhusen v. Falke*, 19 F. Cas. 1048, 1049 (C.C.S.D.N.Y. 1861) (No. 11,279) ("[A]n experiment with a patented article for the sole purpose of gratifying a philosophical taste, or curiosity, or for mere amusement, is not an infringement of the rights of the patentee.").

49. See *Strandburg*, *supra* note 27, at 95.

50. See generally *id.* at 93–100.

51. 733 F.2d 858 (Fed. Cir. 1984).

52. *Id.*

53. *Id.* at 863–64.

call the intended use *de minimis*. It is no trifle in its economic effect on the parties even if the quantity used is small. It is no dilettante affair such as Justice Story envisioned. We cannot construe the experimental use rule so broadly as to allow a violation of the patent laws in the guise of "scientific inquiry," when that inquiry has definite, cognizable, and not insubstantial commercial purposes.⁵⁴

The practical repercussions of the *Roche Products* decision for the pharmaceutical industry were quickly rendered moot by congressional enactment of the Hatch-Waxman Act,⁵⁵ which granted generic manufacturers free rein to experiment on brand-name patented drugs.⁵⁶ However, the commercial/noncommercial divide underlying the decision was subsequently re-affirmed in *Embrex Inc. v. Service Engineering Corp.*⁵⁷ In that case, the Federal Circuit cited *Roche Products* with approval and placed determinative weight on the fact that the defendant "performed the tests expressly for commercial purposes."⁵⁸ Notably, the court was unmoved by the fact that the defendant's infringement emanated from its attempts to design around the patent.⁵⁹

Although a broad interpretation of the exemption for non-commercial use would have real bite, the Federal Circuit has recently stripped the doctrine of practical force. It is difficult to envision a practice more paradigmatic of noncommercial use than academic research at the university level. Yet, it was precisely this activity that the court recently found infringing in *Madey*.⁶⁰ In that case, much to the dismay of the academic community,⁶¹ the Federal Circuit held that university research "unmistakably further[s] the institution's legitimate business objectives, including educating and enlightening students and faculty participating in these projects."⁶² It continued:

Regardless of whether a particular institution or entity is engaged in an endeavor for commercial gain, so long as the act

54. *Id.* at 863.

55. Pub. L. No. 98-417, 98 Stat. 1585 (1984) (codified in scattered sections of 21 U.S.C. and 35 U.S.C.).

56. See 35 U.S.C. § 271(e)(1) (2000).

57. 216 F.3d 1343 (Fed. Cir. 2000).

58. *Id.* at 1349.

59. *Id.* at 1346.

60. *Madey v. Duke Univ.*, 307 F.3d 1351 (Fed. Cir. 2002).

61. See Strandburg, *supra* note 27, at 85.

62. *Madey*, 307 F.3d at 1362.

is in furtherance of the alleged infringer's legitimate business and is not solely for amusement, to satisfy idle curiosity, or for strictly philosophical inquiry, the act does not qualify for the very narrow and strictly limited experimental use defense. Moreover, the profit or non-profit status of the user is not determinative.⁶³

Apparently the sole activity protected after *Madey* is research directed at "strictly philosophical inquiry."⁶⁴ Yet, given that even university research falls outside this definition, there seems to be little experimentation that can be legally conducted without the permission of the relevant patentee.⁶⁵

In her later dissent in *Integra Lifesciences*, Judge Newman lamented the court's decision in *Madey*, opining that it eliminated the well-established common law exemption for research and eviscerated the incentive to disclose justification of patent policy:

The purpose of a patent system is not only to provide a financial incentive to create new knowledge and bring it to public benefit through new products; it also serves to add to the body of published scientific/technologic knowledge. The requirement of disclosure of the details of patented inventions facilitates further knowledge and understanding of what was done by the patentee, and may lead to further technologic advance. The right to conduct research to achieve such knowledge need not, and should not, await expiration of the patent. That is not the law, and it would be a practice impossible to administer. Yet today the court disapproves and essentially eliminates the common law research exemption. This change of law is ill-suited to today's research-founded, technology-based economy.⁶⁶

Judge Newman further opined that the effective elimination of the experimental use doctrine "[was] as impractical as it [was] incorrect," stressing the central importance of cumulative innovation:

The information contained in patents is a major source of scientific as well as technologic knowledge. Indeed, in many areas of knowledge, technical information is not published

63. *Id.*

64. *Id.*

65. Though, as previously noted, significant under enforcement means many researchers have a de facto ability to engage in unfettered experimentation.

66. *Integra Lifesciences I, Ltd. v. Merck KGaA*, 331 F.3d 860, 873 (Fed. Cir. 2003) (Newman, J., concurring in part and dissenting in part).

outside of patent documents. A rule that this information cannot be investigated without permission of the patentee is belied by the routine appearance of improvements on patented subject matter, as well as the rapid evolution of improvements on concepts that are patented.

The subject matter of patents may be studied in order to understand it, or to improve upon it, or to find a new use for it, or to modify or “design around” it. Were such research subject to prohibition by the patentee the advancement of technology would stop, for the first patentee in the field could bar not only patent-protected competition, but all research that might lead to such competition, as well as barring improvement or challenge or avoidance of patented technology. Today’s accelerated technological advance is based in large part on knowledge of the details of patented inventions and how they are made and used. Prohibition of research into such knowledge cannot be squared with the framework of the patent law.⁶⁷

Most academics agree,⁶⁸ and Judge Newman’s condemnation is particularly important to the debate on experimental use because it brings to the judiciary many of the arguments found in the academic debate. Her powerfully voiced concerns are of unquestionable importance and warrant serious attention.

Yet Judge Newman’s arguments are ill-founded. In particular, she construes the award of a patent as one might view the creation of a black hole, swallowing all information surrounding it and forever hiding all that is contained within. Her criticism overlooks that a broad experimental use doctrine is unnecessary for the public to gain the benefit of patented information because the vast majority of patented inventions are susceptible to ready understanding once revealed to the market.⁶⁹ Indeed, the ability of third parties to appropriate valuable information easily is the sole fact that legitimately justifies patent protection.⁷⁰ Even in the minority instance of inventions that do not lend themselves to ready comprehension, considerable information accompanies the award of a patent, flowing largely from the enable-

67. *Id.* at 875.

68. *See supra* note 27.

69. *See* Easterbrook, *supra* note 42, at 109–10.

70. As mentioned above, ready appropriation requires intellectual property protection, which enables innovators to exclude others and recoup the social value of their inventions.

ment and best-mode-of-practice requirements of patentability.⁷¹ To be sure, experimentation will sometimes be needed to move from the abstract to reality, but such unfettered testing can and does legitimately take place upon expiration. Moreover, given the highly improbable chance that a patentee brings an infringement claim, noncommercial researchers largely enjoy a *de facto* right to engage in experimentation.

A patentee is, by the very terms of the Patent Act itself, entitled to the exclusive use of his invention.⁷² The Act makes no reference to an experimental use exemption, nor does it otherwise insinuate that the right to exclude should be judicially diluted.⁷³ Indeed, Congress has suggested quite the opposite, by specifying that a refusal to license a patented invention does not constitute misuse.⁷⁴

By granting patentees exclusive rights, Congress has allowed inventors to extract the lion's share of the social value of their inventions from those who would pay to access them. It is precisely this reward that serves to spur innovation in the first place. A legitimate issue for debate is whether an inventor should be able to absorb *all* social value emanating from his discovery. Allowing such appropriation is the only way to ensure that all valuable *ex ante* innovation takes place, though it is not clear that such a policy promotes aggregate welfare given that the social value generated by a given invention will often exceed the return sufficient to have spurred the innovative activity *ex ante*. Moreover, to extract all future social value from an invention, a patentee's right to exclude must be broad, perpetual, and absolute, which would have serious repercussions for cumulative innovation. In either case, however, there is no question that the incentive to invent is of paramount importance.⁷⁵

Judge Newman pays lip service to the need for incentives to invent,⁷⁶ but fails to substantiate it in a meaningful way or to

71. See 35 U.S.C. § 112 (2000).

72. *Id.* § 101.

73. Judge Rader of the Federal Circuit has emphasized this point, stating that he would like to "lay to rest permanently [Service Engineering Corporation]'s infringement excuses which find no support in the Patent Act." *Embrex, Inc. v. Serv. Eng'g Corp.*, 216 F.3d 1343, 1353 (Fed. Cir. 2000) (Rader, J., concurring).

74. 35 U.S.C. § 271(d)(4) (2000).

75. See Easterbrook, *supra* note 42, at 109–10.

76. See *Integra Lifesciences I, Ltd. v. Merck KGaA*, 331 F.3d 860, 873 (Fed. Cir. 2003) (Newman, J., concurring in part and dissenting in part).

explain why a reduction in proprietary entitlement is likely to enhance social welfare by promoting cumulative innovation by more than it debilitates social welfare. In short, she treats an “incentive to disclose” theory of the patent law as both equal in importance, and coterminous, with the incentive to invent, without providing good reason for doing so. Crucially, however, there is no such thing as an “incentive to disclose” in the patent regime, a fact explored in some detail below.⁷⁷

Judge Newman’s fear of excessive exclusion is similarly conclusory.⁷⁸ She regards the fact that patentees *may* refuse to license their technology for experimentation as tantamount to the fact that they *will* in fact decline to do so.⁷⁹ Similar concerns have been raised about “blocking patents”⁸⁰ and the lack of an independent invention exemption.⁸¹ Yet the fear of pervasive irrational holdout has been disproved by the widespread emergence of patent pools and standard-setting organizations.⁸² Such mechanisms function precisely because patentees enjoy strong property rights. There is no serious argument suggesting the situation would be different with respect to experimentation. Indeed, as explored below, effective negotiation would be more likely to take place in this context, as transaction costs will usually be limited.

B. *The Property Rights Movement and the Liability Faction*

Academic opinion concerning the propriety of experimental use diverges sharply from the Federal Circuit’s jurisprudence. In order to understand this deviation, it is important to appreciate that the controversy is but a subset of a larger debate concerning the propertization of information. One’s opinion about the need for an experimental use right depends considerably

77. See *infra* Part II.A.

78. See *Integra Lifesciences I*, 331 F.3d at 875 (Newman, J., concurring in part and dissenting in part).

79. See *id.*

80. See *Prima Tek II, L.L.C. v. A-Roo Co.*, 222 F.3d 1372, 1379 n.2 (Fed. Cir. 2000) (“A ‘blocking patent’ is an earlier patent that must be licensed in order to practice a later patent.”).

81. See Samson Vermont, *Independent Invention As a Defense to Patent Infringement*, 105 MICH. L. REV. 475 (2006) (noting that there is no independent invention defense under current law, but making the case for introducing such an exemption).

82. See Lemley, *supra* note 20 (discussing the importance of standard-setting organizations in the formation of intellectual property rights).

on whether one's analysis is guided by a natural rights tradition or by utilitarian (consequentialist) considerations. As this Part explores, U.S. intellectual property policy is informed by the latter. Even within this utilitarian framework, however, serious disagreement exists concerning the relative superiority of property and liability rules. The election of one over another has profound consequences for the formulation of an experimental use exemption.

1. *Utilitarianism as the Exclusive Foundation for Intellectual Property*

It is well settled as a historical matter that utilitarianism provides the exclusive justification for the intellectual property system in the United States.⁸³ The normative issue is more controversial. In Europe, for instance, there is a strong natural rights tradition that is consistent with both Lockean labor-desert⁸⁴ and Hegelian personhood⁸⁵ theories. Indeed, this deontological conception of intellectual property has played a central role in the formation of European copyright doctrine.⁸⁶

83. See *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 330–31 (1945) (“The primary purpose of our patent system is not reward of the individual but the advancement of the arts and sciences.”); *id.* at 331 n.1 (observing that the role of the patent system is “much deeper and the effect much wider than individual gain”); Yochai Benkler, *Siren Songs and Amish Children: Autonomy, Information, and Law*, 76 N.Y.U. L. REV. 23, 59 (2001) (noting that “the basic ideological commitment of American intellectual property is actually heavily utilitarian, not Lockean or Hegelian”); Peter Lee, *The Evolution of Intellectual Infrastructure*, 83 WASH. L. REV. 39, 53–54 (2008) (“The Supreme Court has recognized that the ‘ultimate goal of the patent system is to bring new designs and technologies into the public domain through disclosure.’ While acknowledging the valuable contributions of inventors, the Court has accordingly rejected any moral rights or Lockean labor theory justifications for granting patents.”).

84. See JOHN LOCKE, *THE SECOND TREATISE OF GOVERNMENT* § 27; see also Seana Valentine Shiffrin, *Lockean Arguments for Private Intellectual Property*, in *NEW ESSAYS IN THE LEGAL AND POLITICAL THEORY OF PROPERTY* 138 (Stephen R. Munzer ed., 2001).

85. See Thomas F. Cotter, *Pragmatism, Economics, and the Droit Moral*, 76 N.C. L. REV. 1, 6–10 (1997) (“As viewed by . . . Hegel, private property is acquired not necessarily by labor, but rather by one’s joining of his individual Will to some object external to the self. As a result of this process, the thing possessed comes to embody the owner’s personality”); Justin Hughes, *The Philosophy of Intellectual Property*, 77 GEO. L.J. 287, 330–64 (1988); Margaret Jane Radin, *Property and Personhood*, 34 STAN. L. REV. 957 (1982).

86. See, e.g., Robert C. Bird & Lucille M. Ponte, *Protecting Moral Rights in the United States and the United Kingdom: Challenges and Opportunities Under the U.K.’s New Performance Regulations*, 24 B.U. INT’L L.J. 213, 217–46 (2006).

Whether such theories ought to play a similar role in the United States is a matter of some contention. For instance, America was technically required to recognize the moral rights of authors in adopting the Berne Convention,⁸⁷ and its subsequent refusal to do so has been divisive.⁸⁸

Even within the United States, not all accept an exclusively economic rationale for intellectual property protection.⁸⁹ Professor Yen, for instance, has argued that copyright closely reflects natural law concerns and has urged a reconstitution of U.S. law along those lines.⁹⁰ Most often, such commentators look to the Lockean view of private property for guidance.⁹¹ John Locke famously justified private property rights on the basis of a labor-desert theory, claiming that all the world's resources (except persons themselves) are initially owned in common,⁹² but by combining a common resource with labor, a person gains a natural property right over that resource.⁹³ Only two limitations are placed on this process of appropriation, namely, that no spoilage be associated with the acquisition of the property and that "enough and as good" be left for others to appropriate for themselves.⁹⁴

Unfortunately, the Lockean view and other natural law perspectives are themselves indeterminate—indeed, likely more so than economic theories—and tend to operate as a conduit for a particular author's personal predilection. Those skeptical of proprietary control over ideas and technology (the "liability" group), for instance, sometimes posit that Locke's focus on the common precludes strong intellectual property protection.⁹⁵ Yet, such a position fails to account for the fact that the common may not itself exist without this protection. Others (the "property" group) tie the Lockean inquiry to a consequentialist account justifying strong property rights in ideas and inven-

87. See Lemley, *supra* note 8, at 1031.

88. See *id.*

89. See, e.g., Alfred C. Yen, *Restoring the Natural Law: Copyright as Labor and Possession*, 51 OHIO ST. L.J. 517, 529–39 (1990).

90. See *id.*; see also Wendy J. Gordon, *A Property Right in Self-Expression: Equality and Individualism in the Natural Law of Intellectual Property*, 102 YALE L.J. 1533, 1535 (1993).

91. See LOCKE, *supra* note 84, § 27.

92. *Id.* § 25.

93. *Id.* § 27.

94. *Id.* §§ 27, 31.

95. See, e.g., Shiffrin, *supra* note 84, at 138, 156.

tions.⁹⁶ This, too, is questionable because cumulative innovation necessarily implies that an individual inventor or artist's labor is but a fraction of that which facilitated the ultimate information good in question. This, in turn, dilutes the Lockean case for granting an exclusive right to one individual or entity.⁹⁷ Moreover, the non-rivalrous nature of information would suggest that propertization violates the "enough and as good" condition by removing a resource from the common pool that would otherwise be enjoyed by all.⁹⁸

Thus, in contrast to the rest of the world, the United States has largely spurned a natural rights foundation of intellectual property law, which suggests that the issue of experimental use under U.S. law should be analyzed through the lens of economic incentives. Despite some controversy concerning the primacy of utilitarianism, the U.S. view is the correct one for at least three reasons.

First, although a consequentialist economic approach can be legitimately criticized for sometimes failing to yield black-letter policy conclusions,⁹⁹ its underlying conceptual framework, at least, is coherent and susceptible to unanimous agreement. Controversy tends to arise only in the application of the theory. In contrast, a natural rights conception of property fails even to provide a coherent theoretical framework for the construction of optimal rules.

Take, for instance, the relevant questions of whether a third party should be able to conduct commercial experimentation upon another's patented invention and be able to patent an improvement. Currently, the patent laws answer these issues in the negative¹⁰⁰ and affirmative,¹⁰¹ respectively. How might the

96. See, e.g., Richard A. Epstein, *Liability versus Property? Cracks in the Foundations of Copyright Law*, 42 SAN DIEGO L. REV. 1, 4 (2005).

97. But see *id.* at 15 (arguing that, notwithstanding the Lockean desert theory, an optimal property rights regime awards property protection at "the earliest possible moment," upon the slightest expense of labor).

98. Ultimately, such inconsistent interpretations arise from the ambiguity that underlies the Lockean foundation itself. See William Fisher, *Theories of Intellectual Property*, in NEW ESSAYS IN THE LEGAL AND POLITICAL THEORY OF PROPERTY, *supra* note 84, at 168, 185. Additionally, Locke was not writing with respect to intellectual property specifically, so there should be little surprise that analogies prove to be imperfect. See Epstein, *supra* note 96, at 2-3.

99. See Yen, *supra* note 89, at 520 (doubting "whether economics is in fact capable of yielding reliable policy recommendations").

100. See *Madey v. Duke Univ.*, 307 F.3d 1351, 1362 (Fed. Cir. 2002).

question be answered from a utilitarian perspective? As a matter of theory, free experimentation and subsequent patenting should both be allowed if the long-run social gains in the form of enhanced follow-on innovation outweigh the harm caused by reduced incentives for an earlier inventor to create and patent the technology in question. This inquiry is surely theoretically determinate. Of course, the empirical matter of deciding which rules best conform to the theoretical ideal is immensely challenging and yields differing conclusions of the kind shortly to be explored.

Crucially, however, there is good reason to believe that not only will moral rights theories fail to yield more reliable policy predictions, but also that they will fail even to provide a guiding framework.¹⁰² This is because utilitarianism, as informed by economics, seeks to promote a single goal, namely, long-run aggregate welfare.¹⁰³ Natural rights theory, by contrast, is plagued by subjectivity.¹⁰⁴ If a patentee has a moral right to prevent others from using his invention and patenting an improvement, how do we credit the improver's inventive efforts and genius? Is the latter's contribution deontologically meaningless, irrespective of the social gain that accompanies it? The answer comes down to one's moral predisposition. More vexingly still, what of the former inventors who contributed to the knowledge that made the patentee's invention possible? Surely they all have as valid a moral claim to follow-on efforts as does the patentee.

Logical adherence to a strict moral ideal, which would give each inventor exclusive control over how his contribution is used or altered, would give all contributors of knowledge, no matter how attenuated in time or technological contribution, a veto over future use. Ironically, this would lead to a position far more extreme than that advocated by those associated with

101. See 35 U.S.C. § 101.

102. Notably, even avid proponents of the natural rights view often acknowledge the indeterminacy underlying that perspective. See, e.g., Yen, *supra* note 89, at 517 n.1 (conceding in the first sentence that "[d]efining the natural law is a difficult task, and any definition will be incomplete").

103. As famously expressed by Francis Hutcheson: "That action is best which procures the greatest happiness of the greatest number." William Robert Scott, FRANCIS HUTCHESON: HIS LIFE, TEACHING, AND POSITION IN THE HISTORY OF PHILOSOPHY 275 (1900) (emphasis omitted).

104. See, e.g., Lemley, *supra* note 8, at 1034 n.217.

the “property rights movement” (PRM).¹⁰⁵ The identification, negotiation, and possible holdout costs of such a position would be severe. Going even further, why would we limit an inventor’s exclusive rights to a mere twenty-year period from the date of filing? One would imagine that a lifetime grant would more appropriately fit the natural rights foundation. Proponents of natural rights are, therefore, in no position to criticize economists’ treatment of intellectual property for want of clarity.¹⁰⁶

Second, the moral rights tradition faces a serious reconciliatory problem with the unquestionable social costs that would follow a legal regime that departs from the utilitarian framework. In the presence of such costs, a natural-rights-inspired regime would face a choice between either embracing dogmatism and creating disproportionate social harm or attempting to achieve a middle ground, which would inevitably be indeterminate and fully satisfy neither goal.

Third, and perhaps most fundamentally, it may not even be accurate to speak of the natural rights tradition as distinguishable from consequentialist goals. For example, some have attempted to reconcile the Lockean conception of property with utilitarianism by presenting the private property right not as a moral claim but as a reward emanating from the socially beneficial activity of mixing value-adding labor with a common resource.¹⁰⁷

In sum, there are overarching considerations that favor a purely utilitarian approach to intellectual property law, espe-

105. See Epstein, *supra* note 1 (noting that the property rights movement does not counsel an unqualified right to exclude and observing further than the property rights in physical property to which analogy is drawn are no more sacrosanct).

106. See, e.g., Lemley, *supra* note 8, at 1034 n.217. Unsurprisingly, moral theories have been employed to a wide variety of ends. See, e.g., Epstein, *supra* note 96, at 3–4 (arguing that the Lockean tradition supports a utilitarian perspective); cf. Yen, *supra* note 89, at 529–39. For an illustration of how ostensible adherence to a common underlying norm can yield different policy conclusions, see Gordon, *supra* note 90, at 1535 (advocating different conclusions from a natural rights analysis than the courts have drawn).

107. See RICHARD A. EPSTEIN, TAKINGS: PRIVATE PROPERTY AND THE POWER OF EMINENT DOMAIN 5 (1985) (asserting that natural rights theory “is consistent, I believe, with both libertarian and utilitarian justifications of individual rights, which, properly understood, tend to converge in most important cases”); see also Shyamkrishna Balganesh, *The Social Costs of Property Rights in Broadcast (and Cable) Signals*, 22 BERKELEY TECH. L.J. 1303, 1323 (2007) (noting that a justification can be both Lockean and consequentialist); Michael Risch, *Why Do We Have Trade Secrets?*, 11 MARQ. INTELL. PROP. L. REV. 1, 31–32 (2007) (noting that there are “utilitarian explanations for the Lockean theory”).

cially for U.S. patent theory, for which “a strong moral rights tradition . . . is almost entirely lacking.”¹⁰⁸

2. *Informing the Consequentialist Inquiry*

Despite some dissent, the debate has thus largely settled on how best to inform the consequentialist analysis associated with economics, with two distinct groups advocating property and liability rules, respectively.¹⁰⁹ As Professor Richard Epstein explained:

A property right gives an individual the right to keep an entitlement unless and until he chooses to part with it voluntarily. Property rights are, in this sense, made absolute because the ownership of some asset confers sole and exclusive power on a given individual to determine whether to retain or part with an asset on whatever terms he sees fit. In contrast, a liability rule denies the holder of the asset the power to exclude others or, indeed, to keep the asset for himself. Rather, under the standard definition he is helpless to resist the efforts by some other individual to take that thing upon payment of its fair value, as objectively determined by some neutral party.

. . . .

Because property rules give one person the sole and absolute power over the use and disposition of a given thing, it follows that its owner may hold out for as much as he pleases before selling the thing in question. In contrast, by limiting the owner’s protection to a liability rule, that hold-out power is lost, and in its stead the owner of the thing receives some right to compensation for the thing that has been taken away from him against his will.¹¹⁰

The property-liability debate is fueled largely by varying beliefs in the power of private markets to facilitate ex ante innova-

108. Lemley, *supra* note 8, at 1031.

109. See Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089 (1972); see also Ian Ayres & J.M. Balkin, *Legal Entitlements as Auctions: Property Rules, Liability Rules, and Beyond*, 106 YALE L.J. 703 (1996); Richard A. Epstein, *A Clear View of The Cathedral: The Dominance of Property Rules*, 106 YALE L.J. 2091 (1997); Louis Kaplow & Steven Shavell, *Property Rules Versus Liability Rules: An Economic Analysis*, 109 HARV. L. REV. 713 (1996).

110. Epstein, *supra* note 109, at 2091 (footnotes omitted).

tion, post-grant commercialization, and follow-on research.¹¹¹ Some fear bargaining failure where the owners of crucial technologies may refuse to license their use, thus holding up cumulative innovation.¹¹²

The importance of the property-liability divide is axiomatic to the intellectual property field, and this conclusion holds equally true for the question of how to treat experimental use of a patented technology. A property rights view would grant a patentee exclusive use of his invention, thereby entitling him to enjoin others from using his discovery for any purpose during the term of the patent. One wishing to experiment on the patented fruit of another's innovation would have to bargain with the patentee for permission. A liability view, in contrast, would grant a third party access to the technology at a price objectively deemed suitable.

This Article contends that there are overriding considerations in favor of implementing the property rights view in this setting. This is so for numerous reasons, two of which deserve particular emphasis.¹¹³ First, although proponents of a broader experimental use doctrine obviously align with a liability-based view of intellectual property, they argue that third parties should have financially unfettered access to patented goods for research falling within their respective definitions of the exemption. Yet, free access is rarely economically desirable. As recently noted, "economists generally know, and antitrust lawyers generally suspect, that zero is rarely a reasonable price."¹¹⁴ As explored below, an open-ended right to experiment on another's patented invention necessarily reduces the value of that innovation to the inventor and may trigger a situation of under-compensation. Second, it is generally accepted that deciding which rule to apply turns largely on the

111. See Ronald Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960).

112. See *Integra Lifesciences I, Ltd. v. Merck KGaA*, 331 F.3d 860, 872–73 (Fed. Cir. 2003) (Newman, J., concurring in part and dissenting in part).

113. The other major concerns in favor of a property rights approach lie in protecting immensely important ex ante incentives to innovate and the relative weakness of the arguments forwarded by those who wish to expand the experimental use doctrine. See *infra* Part II.

114. U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, ANTITRUST ENFORCEMENT AND INTELLECTUAL PROPERTY RIGHTS: PROMOTING INNOVATION AND COMPETITION 48 (2007) [hereinafter DOJ & FTC, PROMOTING INNOVATION AND COMPETITION] (citation omitted).

presence and magnitude of transaction costs.¹¹⁵ The greater those costs, the more pervasive the bargaining failure and the greater the waste involved even in ultimately fruitful negotiations. Thus, in the presence of large negotiation costs, social welfare may conceivably be promoted by adopting a liability regime. Yet, the experimental use setting is apt to be characterized by low transaction costs, which makes the case for a property-based approach compelling.

In sum, utilitarian analysis is the sole mechanism for judging the propriety of the experimental use doctrine. Natural rights theories have had little impact on development of U.S. doctrine, and for good reason. Whether one views the Federal Circuit's perspective as overly narrow turns in large part on whether one adheres to a property- or liability-based conception of intellectual property. Although the Author has a strong predilection for strong property rights (over intellectual property of appropriately crafted duration and scope), there are especially strong grounds for adhering to a property rights view in the context of experimental use.

II. RESTRICTING EXPERIMENTAL USE

Academics have widely criticized the Federal Circuit's narrow reading of the experimental use doctrine, arguing that it "serve[s] both to limit scientific and technical advance, and to retard competition."¹¹⁶ This Part explores the views used to further this opinion and ultimately finds them deficient. Accordingly, the Federal Circuit's approach is largely to be commended. The sole alteration in the law should be to reflect (partially) Professor Rebecca Eisenberg's suggestion that third parties should be free to experiment on a patented invention for the purpose of assessing its validity.¹¹⁷ Given the demonstrably poor screening function performed by the PTO¹¹⁸ and the considerable social cost likely to be associated with the

115. See RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 55–57 (7th ed. 2007).

116. See Hagelin, *supra* note 27, at 512. See generally *supra* note 27.

117. See Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017, 1078 (1989).

118. See *supra* note 35.

threat of enforcement of invalid patents,¹¹⁹ an experimental use exemption limited solely to assessing validity is warranted.

This Part addresses the three major arguments that have been used to favor an expansion of the experimental use doctrine: first, that the contemporary narrow standard violates the “incentive to disclose” rationale that underlies patent policy,¹²⁰ second, that the doctrine can be expanded without significantly harming ex ante incentives,¹²¹ and, third, that a broader standard would facilitate cumulative innovation in a desirable manner.¹²² All are shown to be inadequate. In exposing this inadequacy, the Article demonstrates how contrary considerations strongly support the case for a highly restricted experimental use doctrine.

A. Patent Policy as an “Incentive to Disclose”

Much has been made of patent law’s supposed “incentive to disclose” rationale.¹²³ Some state, for instance, that “American ingenuity is encouraged by a patent system that provides incentives for inventors to disclose their inventions in exchange for a period of exclusivity.”¹²⁴ Intuitively, the disclosure rationale makes some sense. One can imagine a “social contract” between an inventor and society, pursuant to which the latter grants the former a temporary monopoly in exchange for the patentee’s full revelation of his valuable technological advance.¹²⁵ The courts ostensibly support this view, repeatedly emphasizing the importance of the information-sharing function of the patent laws.¹²⁶ However, talk of an *incentive* to dis-

119. See Leslie, *supra* note 37.

120. See *infra* Part II.A.

121. See *infra* Part II.B.

122. See *infra* Part II.C.

123. See, e.g., Note, *The Disclosure Function of the Patent System (Or Lack Thereof)*, 118 HARV. L. REV. 2007 (2005).

124. Michael J. Shuster et al., *Altering Patent Suit Proof Burden Would Chill Innovation*, LEGAL BACKGROUNDER, Apr. 16, 2004, at 7, http://www.fenwick.com/docstore/477/Altering_Patent.pdf.

125. See Kerr, *supra* note 21, at 134–35.

126. See *Aronson v. Quick Point Pencil Co.*, 440 U.S. 257, 262 (1979) (“First, patent law seeks to foster and reward invention; second, it promotes disclosure of inventions to stimulate further innovation and to permit the public to practice the invention once the patent expires; third, the stringent requirements for patent protection seek to assure that ideas in the public domain remain there for the free use of the public.”); *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 481 (1974)

close is in fact both inaccurate and misleading because, in a world where trade secret protection is available, no such incentive is created by the patent regime.

Although the patent laws are undoubtedly crafted to facilitate the public dissemination of knowledge, it is a profound mistake to make the further inference that those laws are either needed or designed to spur the disclosure of such information as has already been developed. Several commentators who have decried the Federal Circuit's restrictive reading of the experimental use doctrine have fallen prey to this trap,¹²⁷ as have some courts historically.¹²⁸ Their myopic view fails to account for the fact that the disclosure role of patent law is entirely subsumed within that law's "incentive to invent" function.

The patent system is designed exclusively to incentivize the costly development of easily appropriated information that would otherwise be under produced.¹²⁹ The dissemination of that information is a necessary corollary, which takes place in a number of ways, most notably from the fact of its being created in the first place. This is because the overwhelming proportion of patented inventions are "self-disclosing," in that they are readily susceptible to understanding, and hence appropriation, by third parties.¹³⁰ For such inventions, the mere fact of their creation and marketing suffices to fulfill the socially valuable goal of disclosure. Interestingly, however, the patent laws play

("When a patent is granted and the information contained in it is circulated to the general public and those especially skilled in the trade, such additions to the general store of knowledge are of such importance to the public weal that the Federal Government is willing to pay the high price of 17 years of exclusive use for its disclosure, which disclosure, it is assumed, will stimulate ideas and the eventual development of further significant advances in the art."); Application of Argoudelis, 434 F.2d 1390, 1394 (C.C.P.A. 1970) (Baldwin, J., concurring). One purpose of the patent system is "to provide the assurance that the public will, in fact, receive something in return for the patent grant. This consideration is, of course, the full and complete disclosure of how to make and use the claimed invention. Thus, the patent adds a measure of worthwhile knowledge to the public storehouse." *Id.*

127. See Mueller, *supra* note 27, at 921-22; Strandburg, *supra* note 27, at 104-07; Hoffman, *supra* note 27, at 1037.

128. See Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 330-31 (1945) (stating that "[t]he primary purpose of our patent system . . . is not a certificate of merit, but an incentive to disclosure"); Flick-Reedy Corp. v. Hydro-Line Mfg. Co., 351 F.2d 546, 550-51 (7th Cir. 1965) (suggesting that the intention of the patent law is to reward "an inventor who 'refrains from keeping his invention a trade secret'").

129. See Easterbrook, *supra* note 42, at 109-10.

130. See *id.*

no role whatsoever in actually incentivizing that disclosure in a manner distinct from spurring the invention of the technology itself. Non-self-disclosing inventions are different, but they are of no concern to the patent laws. This is because no rational inventor of a non-self-disclosing invention would elect patent protection for his valuable information. Trade secret protection, by contrast, allows such a person to protect the fruit of his innovation in perpetuity.¹³¹ As the classic example goes, Coca-Cola would have been foolish indeed to patent its priceless formula.

The Patent Act does require that a patentee disclose certain information about his invention in return for receiving intellectual property protection.¹³² First, and most obviously, in order to obtain a patent, an inventor must meet a demanding series of requirements designed to ensure that the invented technology is revealed to the public in an accessible way.¹³³ In particular, the enablement condition requires that the applicant disclose sufficient information to allow one skilled in the art to practice the claimed invention without undue experimentation.¹³⁴ A conscious violation of this requirement not only invalidates the patent, but also exposes the patentee to treble damages under the antitrust laws.¹³⁵ Moreover, and most fundamentally, upon expiration of the patent, all proprietary rights to the information disappear in perpetuity.¹³⁶ At this moment, all those wishing to research, market, sell, or otherwise use the information are free to do so.¹³⁷ Given that the information may never have been produced without patent protection, the ultimate, unfettered release of that information to the public domain can be seen as a positive, inevitable, and inherent consequence of the incentive to invent.

This condition is not, however, an incentive to disclose—it is a disincentive that requires prospective patentees to suffer a

131. See UNIF. TRADE SECRETS ACT § 2, 14 U.L.A. 449 (amended 1985).

132. 35 U.S.C. § 112 (2000).

133. See *id.*

134. See, e.g., *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991).

135. See *Nobelpharma AB v. Implant Innovations, Inc.*, 141 F.3d 1059, 1072–73 (Fed. Cir. 1998); *Atlas Powder Co. v. E.I. du Pont De Nemours & Co.*, 750 F.2d 1569, 1576–77 (Fed. Cir. 1984).

136. See, e.g., Jonathan Grossman, *Human Embryos, Patents, and the Thirteenth Amendment*, 55 U. KAN. L. REV. 731, 765 (2007) (explaining that “patented subject matter enters the public domain” after the expiration of the patent).

137. *Id.*

cost in exchange for protection. Ultimately, this disincentive serves to direct non-self-disclosing inventions away from patent and toward trade secret protection.

In a world where inventions were either perfectly susceptible to appropriation, or not at all, an inventor's election of patent or trade secret protection would be straightforward. *No one* whose invention could be readily appropriated would elect the trade secret path. No one would contest that the sole function of the patent system in such an environment would be to create an incentive structure to spur the research and development of information displaying public good characteristics.

In the real world, of course, inventors act in a probabilistic environment. Some creations will straddle the line between disclosing and not disclosing, for which inventors will have to conduct a cost-benefit analysis of electing either the patent or trade secret regime. However, this fact has little, if any, effect on the preceding discussion. Companies are well accustomed to operating in an uncertain environment, routinely making probabilistic decisions over nondeterministic characteristics of the future business world. Inventors choosing between the two systems will weigh the expected return from patent protection, which will itself have to be discounted by the odds of patent invalidity and ineffective enforcement, against the return from trade secret protection, discounted by the probability of appropriation.

Thus, the discoveries that will be patented are those that are sufficiently self-disclosing that the expected return from the patent system will be higher than for trade secrets, given the anticipated probability of appropriation. For such inventions, speaking of an "incentive to disclose" is still misleading, as it was the likelihood of self-disclosure that led their creators to seek patent protection in the first place. In other words, as determined by the inventor's own analysis, disclosure would have taken place under trade secret protection and would likely have taken place within a patent's life. Note further that if the expected return from trade secret protection in this context exceeds the minimum pecuniary level sufficient to have spurred development of the invention, then the patent system actually imposes a net social cost. Speaking of an incentive to disclose is not only technically inaccurate, it obfuscates a host of the preceding issues.

Unfortunately, the majority of academic discussion glosses over these points and simply concludes that an experimental use doctrine is needed to fulfill what is erroneously perceived

to be a primary function of the patent laws. For instance, Judge Newman draws a dichotomy between an “incentive to create new knowledge” and the goal of “add[ing] to the body of published scientific/technologic knowledge.”¹³⁸ This, of course, is a false distinction because the mere attainment of the former goal automatically satisfies the latter. In other words, increasing the scope and depth of the public domain of knowledge is a necessary byproduct of the incentive to invent itself. Focusing on this beneficial side effect thus yields few valuable policy conclusions. Some other commentators draw a similar dichotomy, but their perspectives are equally consistent with the point that disclosure of information is a mere corollary of the innovative process itself, albeit an important one.¹³⁹

Others, however, promote a position that is inconsistent with disclosure as an ancillary benefit of an incentive to innovate. Professor Strandburg, for example, disapproves of “most scholarly and judicial expositions [where] the incentive to invent is featured, [and where] the incentive to disclose is mentioned in passing and then set aside as though it merely supplements the free-rider analysis of the incentive to invent.”¹⁴⁰ She continues:

What seems to go unnoticed in these discussions is that these two theories are not mutually reinforcing justifications but alternatives that apply quite differently to different types of inventions. . . . [Unlike the incentive to invent theory, t]he ‘incentive to disclose’ theory . . . is based on the notion that a patent is a quid pro quo in which an inventor teaches her invention to the public in exchange for a limited period of exclusive rights to the invention.”¹⁴¹

This account is mistaken on numerous grounds. First, under the patent system, the incentive to innovate is directly relevant in every case, as non-self-disclosing inventions are protected as trade secrets. The concept of “incentives” is more than slightly incongruous in this account. Of course, disclosure is a quid pro

138. *Integra Lifesciences I, Ltd. v. Merck KGaA*, 331 F.3d 860, 873 (Fed. Cir. 2003) (Newman, J., concurring in part and dissenting in part).

139. See, e.g., Hoffman, *supra* note 27, at 1037 (arguing that the goals of the patent system are to incentivize innovation and “to increase the body of published scientific and technical knowledge”); O’Rourke, *supra* note 7, at 1186 (noting that “[t]he quid pro quo for the grant of a patent is the statutorily-mandated disclosure that adds to the store of public knowledge”).

140. Strandburg, *supra* note 27, at 104–05.

141. *Id.* (footnotes omitted).

quo of the patent bargain. However, precisely by the terms of that exchange, such disclosure constitutes a cost to an inventor, who would obviously prefer to have twenty years' exclusivity without having to explain the functioning of her invention to her rivals, thereby reducing their costs of re-creating the technology. That such disclosure is a cost, however, by definition means that it is *not* an incentive to disclose, but rather a disincentive. Prospective patentees are nevertheless willing to pay the price because otherwise free riding will take place, for which reason trade secret protection is not an attractive option.

If most patented inventions are self-disclosing, though, one might reasonably question why the enablement requirement under § 112 exists in the first place. After all, if patented technology readily reveals itself to the scrutinizing eye, why should a patentee have to describe the invention in such detailed terms? This possible incongruity is resolved by noting the requirement's cost-reducing function, which minimizes the duplicative efforts required to re-create the inventive moment. For instance, in a situation where an inventor reckons his technological breakthrough would likely be reverse-engineered within a year of commercialization, he will, if smart, elect patent protection. The enablement requirement would largely eliminate the considerable expense and social waste associated with the reproductive efforts expended by his rivals over the year following expiration of the patent.

Some commentators have misconstrued the implications that one should draw from § 112's enablement requirement. Illustratively, Professor Hagelin looks upon this statutory provision as providing strong support for a broad experimental use doctrine.¹⁴² He finds the Federal Circuit's treatment of experimental use difficult to reconcile with the statutory requirement of enablement, noting that

[t]o do so would require a bizarre chain of reasoning: the information disclosed in the patent specification is sufficient to teach the invention if it does not have to be supplemented by undue additional experimentation, but no experimenta-

142. See Hagelin, *supra* note 27, at 515; see also Eisenberg, *supra* note 27, at 1022 (opining that the enablement condition suggests that limitations exist on a patentee's right to exclude).

tion (undue or otherwise) can be performed because it would violate the rights of the patent holder.¹⁴³

Similarly, Professor Eisenberg argues that “the disclosure requirement suggests that there are limits to the patent holder’s exclusive rights even during the patent term.”¹⁴⁴

This, however, may be a serious misconstruction of the enablement prerequisite—the provision is not designed to allow people to practice the claimed invention *during* the term of the patent; its role is to facilitate use of the information after the patent expires. The point of the requirement is to reduce the recreation costs of the invented technology, thus permitting a rival or other entity to reproduce the claimed invention more economically when legally allowed to do so. This requirement could conceivably be satisfied upon expiration of the patent, by requiring the patentee to release information at that time. Indeed, Professor Eisenberg sees the absence of this possibility as evidence of a right to engage in experimental use.¹⁴⁵ Approaching the matter this way, however, might impair rivals’ abilities to begin marketing generic products promptly following expiration. Moreover, patents are routinely invalidated short of their natural expiration.¹⁴⁶ Thus, requiring that the enablement condition be satisfied before the grant of a patent facilitates prompt competition upon termination, whenever that may be.

In conclusion, Professor Strandburg’s observation that the incentive to invent and incentive to disclose “justifications for the patent system are actually in tension”¹⁴⁷ is itself sufficient ground to reject the latter rationalization. In an environment where the former enjoys hegemonic importance, the latter will nevertheless ultimately be satisfied—either in the short run for self-disclosing inventions, which are the majority, or upon expiration of the patent for the remainder. The reverse does not hold true. A system where a patentee is stripped of his right to exclude rivals from experimenting with his invention necessar-

143. Hagelin, *supra* note 27, at 515.

144. Eisenberg, *supra* note 27, at 1022. She proceeds: “If the public had absolutely no right to use the disclosure without the patent holder’s consent until after the patent expired, it would make little sense to require that the disclosure be made freely available to the public at the outset of the patent term.” *Id.*

145. *See id.*

146. *See supra* note 35.

147. Strandburg, *supra* note 27, at 105.

ily suffers a loss in ex post return. In such a situation, some inventions that would otherwise have emerged may be either delayed or never produced at all.

B. *Employing the Exemption to Avoid
Harm to Ex Ante Incentives*

Those advocating a broader experimental use doctrine fail properly to address the harm to ex ante incentives that would necessarily follow. In particular, some have suggested that the exemption can be applied in a manner that is unlikely materially to affect incentives to engage in innovation.¹⁴⁸ If this were possible, there would be strong normative ground for implementing such an expanded doctrine. Unfortunately, this position is unsupportable.

Illustratively, Professor Strandburg urges a distinction between experimenting “on” and experimenting “with” a patented technology, with the former being defined as experimentation aimed at verifying, designing around, or improving upon a patented invention, and the latter being defined as experimentation in which a patented invention is used as a research tool.¹⁴⁹ She posits that an exemption should apply with respect to the former activity, given that its effect is to promote cumulative innovation and the furtherance of knowledge, but not to the latter, which involves using a patented technology in the very market for which it was designed.¹⁵⁰ The fundamental argument underlying this dichotomy is that an asymmetric effect exists on the commercial profitability flowing to a patentee and thus on the relevant ex ante incentives to invent. Indeed, she goes so far as to argue that “‘experimenting on’ a patented invention has relatively little impact on the incentive to invent and should be broadly permitted.”¹⁵¹

This argument is erroneous for numerous reasons. Most obviously, a rival who successfully experiments on a patented technology to invent around it will invariably reduce the value of the earlier inventor’s patent by reducing demand for the original patentee’s product. Even if the experimentation is sim-

148. *See id.* at 88.

149. *See id.* at 88–89.

150. *See id.*

151. *Id.* at 89–90.

ply for the purpose of generating a generic equivalent of the patented good—in order to allow the experimenter to begin marketing rival goods the moment the patent expires—that competitors' products will enter the market more quickly following expiration necessarily reduces the value flowing from the patent. Moreover, application of the exemption deprives patentees of the licensing fees they could otherwise have charged for the experimental use of their inventions.

It follows that a broad right to experiment “on” a protected technology will significantly reduce the financial return to an inventor from patenting his discovery. Of course, this fact is quite distinct from the normative issue of whether applying the exemption despite such harm will still promote social welfare in a favorable way. It must not be forgotten that aggregate welfare is not best promoted by maximizing *ex ante* incentives—if it were, intellectual property protection would probably be both perpetual and considerably broader.¹⁵² Instead, the benefit of enhancing those incentives must be weighed against both the ensuing allocative efficiency loss and the possible frustration of, and heightened cost in achieving, follow-on innovation.

It may well be desirable to allow competitors to experiment on a patented technology to allow prompt post-expiration marketing of rival goods. Professor Strandburg's statement that “experimenting on has relatively little impact on *ex ante* incentives and should be broadly allowed” perhaps reflects her belief that the boon to follow-on innovation from such a right outweighs any harm caused by reducing the patentee's financial return. Such a position would be entirely defensible—over-incentivizing innovation through excessive *ex post* compensation causes an inefficiently large volume of scarce inputs to be devoted to the innovative process. This, however, is not what she says. Depriving a patentee of his exclusivity clearly reduces the return he enjoys from his patent. Whether he should have a

152. Of course, to accomplish this, Congress would have to seek a constitutional amendment of Article I, Section 8, Clause 8, which grants Congress the power “to promote the Progress of Science and useful Arts, by securing for limited times to Authors and Inventors the exclusive Right to their Respective Writings and Discoveries.” U.S. CONST. art. I, § 8, cl. 8. The Supreme Court has interpreted this provision as preventing the States, or other entities, from extending the life of a patent beyond its expiration date. *See* *Sears, Roebuck & Co. v. Stiffel Co.*, 376 U.S. 225, 231 (1964).

right to enjoy the incremental profit from his refusal to license is a different issue.

If a reason exists to treat the scenarios of experimenting “on” and “with” differently, therefore, it cannot be on the basis of either an unspoken inference or a supposed absence of harm to *ex ante* incentives. Neither ground supports Professor Strandburg’s conclusion that a distinction can be legitimately drawn between “a patentee’s need to recoup investment [and] a socially detrimental attempt to maintain a stranglehold on research results.”¹⁵³ To the extent the latter outcome is a byproduct of a patentee’s statutorily granted right to exclude, that “stranglehold” may be entirely legitimate and may, in fact, reflect the social benefit that flows from his invention. Where the value to a patentee of refusing to license exceeds the value placed on the right to experiment by third parties, exclusion is socially optimal. It is precisely such exclusivity that spurs *ex ante* innovation.

Crucially, however, Professor Strandburg’s suggestion that a patentee need only recoup his investment (and her further inference that a greater level of profitability achieved through exclusivity may amount to a “stranglehold”) is gravely mistaken. A prospective patentee needs a prospect of financial return far larger than the cost of investment to induce him to innovate—the level of expected future return must be enhanced to compensate for the magnitude of the *ex ante* risk of failure. Omitting this consideration may result in a patentee’s massive under-compensation. In the pharmaceutical industry, for instance, it has been estimated that merely one in five commercial research efforts proves fruitful.¹⁵⁴ Awarding drug manufacturers an amount equal to the cost of developing the patented drugs at issue would be equivalent to under compensating them by a factor of five for their costs alone.

In any event, Professor Strandburg’s fear of a stranglehold is likely misplaced. If one considers patent protection to be exces-

153. Strandburg, *supra* note 27, at 90.

154. The pharmaceutical industry trade group PhRMA estimated that the cost of discovering, researching, and developing a new drug in 2001 was approximately \$800 million. PHARM. RES. & MFRS. OF AM., PROFILE 2008: PHARMACEUTICAL INDUSTRY 2 (2008), available at <http://www.phrma.org/files/2008%20Profile.pdf>. Yet, the same organization “estimates that fewer than one in five drug development efforts results in a successful drug.” See SCOTCHMER, *supra* note 3, at 40.

sively generous in over-incentivizing ex ante innovation and imposing costly impediments to follow-on innovation, then the superior solution is to reduce the scope and duration of that protection ex ante through legislative fiat. Indeterminate ex post interference in proprietary rights by the courts tends to inject further uncertainty into an already flawed system, to undermine efficient contractual exchange, and to endanger ex ante technological research.¹⁵⁵ Despite Professor Strandburg's fear that cumulative innovation suffers the Damoclean threat of patentees' "stranglehold" over follow-on innovation, there seems little need for such congressional action in the realm of experimental use.

First, property rights are themselves capable of facilitating desirable outcomes. Much has been made of the anticommons dilemma, whether those wishing to market products entailing hundreds of patents may face holdout problems, or whether owners of research tool patents will refuse to license.¹⁵⁶ Yet, in neither case has empiricism borne out these doomsday predictions. In fact, property rights demonstrably have the opposite effect, both facilitating post-grant commercialization and ex ante innovation.¹⁵⁷ Second, the self-revealing nature of patented technology—in conjunction with the enablement and best use requirements of patentability—largely deprives a patentee of the ability to maintain any form of "stranglehold" on his discovered information. What information is not made publicly available in this fashion may nevertheless be made available through contract. Although excessive propertization in high transaction cost settings might lead to inordinate levels of bar-

155. The obvious exception to this point involves the fair use doctrine in copyright law. This tenet of intellectual property law is, however, eminently distinguishable. In particular, information constraints prevented Congress from envisioning the myriad factual scenarios that would arise at the frontiers of copyright. Thus, Congress instructed the courts as to the general nature of the fair use doctrine and left it to them to develop desirable limits on the borders of exclusion. Note, however, that fair use is further distinguishable from experimental use in a fundamental way—the former is congressionally sanctioned, whereas the latter is not. In addition, much of the information sought through experimental use is revealed in other ways, such as the enablement requirement of patentability, the self-disclosing nature of information, and the under enforcement that characterizes patent rights. In contrast, if fair use is not applied in certain situations of parody or criticism, for instance, society may be denied desirable information goods. Copyright's far greater duration also magnifies this problem.

156. See Heller & Eisenberg, *supra* note 5.

157. See Kieff, *supra* note 5.

gaining failure, such a concern has little place here. As explored in the following section, transaction costs are likely to be low, thus facilitating socially desirable bargaining.

A final point that warrants consideration involves Professor Strandburg's contention that the "free-rider 'incentive to invent' theory does not apply to non-self-disclosing inventions."¹⁵⁸ This is true, but patent law has no role with respect to such discoveries. She posits that

[b]ecause these inventions could have been maintained as trade secrets for a sufficient time after commercialization to recoup the costs of their development, an exclusive patent grant is not necessary to stimulate invention. These inventions can and will be invented and then commercialized if an appropriate market for them exists whether or not they are patentable.¹⁵⁹

This observation is largely correct—except for the suggestion that the mere recoupment of development costs is sufficient to spur invention—but eliminates her ensuing argument with regard to patent law's purpose in spurring the disclosure of non-self-disclosing inventions. For the inventors of such technologies, patent protection will not be an attractive option and trade secret safeguards will be employed instead.¹⁶⁰ As noted above, there is no "incentive" to disclose; disclosure is a by-product of the patent deal that necessarily imposes a cost on an inventor in the form of making it easier for his rivals to appropriate the value of his invention. The inventor nevertheless suffers the cost because those electing patent protection benefit from exclusion that the trade secret option could not provide.

Professor Strandburg concludes that the

role of the patent system for non-self-disclosing inventions is therefore not to encourage primary invention (for which trade secret protection is sufficient) but to enable more rapid follow-on invention by disclosing new technical discoveries that can be used as building blocks and by providing notice of work that has already been completed.¹⁶¹

158. Strandburg, *supra* note 27, at 106 (emphasis omitted).

159. *Id.*

160. See Easterbrook, *supra* note 42, at 109–10.

161. Strandburg, *supra* note 27, at 106.

This is simply a non sequitur. What Professor Strandburg fails to mention is that the patent system acts in diametric opposition to this supposed goal, by creating a powerful disincentive to choosing its protection in place of trade secrets for non-self-disclosing technologies. If no one patents a non-self-disclosing invention for which trade secret protection is sufficient, how can patent law play a role in facilitating the disclosure of that invention?

The answer, of course, is that it cannot,¹⁶² which serves simply to remind that the goal of the patent system is purely and exclusively to incentivize innovation for self-disclosing technologies, defined as those which would likely be reverse-engineered or otherwise appropriated within the life of a patent.

C. *The Critical Importance of Cumulative Innovation*

Professor Lemley is correct to note that the “more absolute the property right given to original authors and inventors, the more critical efficient licensing is to subsequent innovation, and the more sensitive the industry is to market failures in licensing.”¹⁶³ These are lofty concerns and their impact transcends the issue of experimental use to weigh on the formation of intellectual property rules generally. In the context of experimentation, though, the issue is whether strong property rights will facilitate inefficient holdout and thus frustrate the process of follow-on innovation. One must, however, begin by emphasizing that the social need for patentees voluntarily to license the experimental use of their inventions is limited in most cases. The patented technology underlying marketed goods typically lends itself to ready understanding when scrutinized by one skilled in the art. Combined with the written description and other requirements of patentability, much information is made available for cumulative innovation from a patent grant.

162. The sole exception would be where an inventor believes that a rival will likely invent the same technology independently within the following twenty years, in which case the former has a strong incentive to patent his creation. If he does not, the latter will be able to patent her invention and then enjoin the former from continuing use of the technology. This is an exception to the otherwise rigid U.S. rule that the first-to-invent is entitled to a patent. Nevertheless, the situation in which such an outcome will arise will be rare.

163. Lemley, *supra* note 8, at 998–99.

Moreover, commentators often omit reference to the quasi-fair-use right in patent law. Although there is no such legal right, the extraordinary financial cost to a patentee of actually litigating a claim means that it will not be in his rational self-interest to bring actions for limited instances of infringement. The average patent case now costs millions of dollars, and that cost is borne entirely by the patentee.¹⁶⁴ Attorneys' fees are often denied and, because there are no statutory damages for patent infringement, unlike copyright, a patentee must also establish the extent and cause of his harm. As a result, there is an environment of massive under enforcement. In this setting, noncommercial or academic experimental use constitute prime examples of activities that a patentee is unlikely to challenge in court. Even without an open legal right to engage in experimentation, many wishing to conduct such inquisitive activity have a de facto ability to do so.¹⁶⁵

Nevertheless, there are circumstances in which an ability to experiment on another's technology will promote social welfare. Even for some self-revealing technologies, free experimentation may reduce the cost of the trial-and-error process in recreating the relevant technology. Other inventions, which are not themselves subject to ready appropriation but are nevertheless vulnerable to reverse engineering within the life of a patent grant, will not provide bountiful levels of readily observed information in marketed form. Although the best use and enablement requirements provide much knowledge about the patented technology, a right to experiment may be needed to acquire a full understanding of the invention. In such circumstances, optimal levels of follow-on innovation require voluntary licensing by patentees.

The major impediment to efficient licensing is the presence of serious transaction costs that may foreclose agreement and en-

164. The American Intellectual Property Law Association ("AIPLA") reported that the average cost of patent litigation in which the amount in dispute exceeded \$25 million was \$3 million in 2001, \$4 million in 2003, \$4.5 million in 2005, and more than \$5 million in 2007. Alan Ratliff, *By the Numbers: IP Litigation & Damages Update*, in THE AIPLA 2007 ANNUAL MEETING: CONCURRENT TRACK 2: THE IN-HOUSE COUNSEL INSTITUTE: DAMAGES (2007).

165. One might look to *Madey v. Duke University*, 307 F.3d 1351 (Fed. Cir. 2002), as evidence against this point. As an empirical matter, university research is almost never challenged by a patentee. The facts in *Madey*, however, were unique.

hance the expense of bargaining.¹⁶⁶ In the realm of experimental use, however, the likelihood of market failures in licensing is limited. Moreover, significant social gains are apt to accompany strong property rights in this context.

Ronald Coase famously wrote that, in a world of zero transaction costs, strong property rights will lead to an optimal allocation of resources irrespective of the initial allocation of those rights.¹⁶⁷ As conceptually useful as the Coase theorem may be, in the real world, transaction costs always exist.¹⁶⁸ As these costs grow larger, the normative case for relying on private property rights to ensure efficient outcomes diminishes,¹⁶⁹ and the wealth distribution effects of initial allocation become more pronounced.

As applied to the domain of intellectual property, negotiation between a small number of easily identifiable parties over a discrete topic is likely to be free of considerable transaction costs where at least one of the parties has a good alternative to dealing with the other. In such circumstances, one can reasonably expect Coasian bargaining to ensue. A good example would involve a situation where an entity reads the specification of a patent and subsequently invents and patents an improved technology. There, it may be in the mutual interests of both parties to reach an agreement concerning the licensing fee to be paid to the original patentee from the marketing of the superior product, which may elicit heightened consumer demand and hence higher revenue. Bilateral monopoly need not exist because the original patentee may have a good alternative: simply marketing his patented technology and preventing the improver from selling his product.¹⁷⁰ An opposing example would be where an entity seeks to construct a product entailing hundreds, even thousands, of patented technologies.¹⁷¹ In such a situation, the process of even identifying every relevant pat-

166. See POSNER, *supra* note 115, at 67–71.

167. See Coase, *supra* note 111.

168. See, e.g., John J. Donohue III, *Two Notes on the Coase Theorem: Reply*, 99 YALE L.J. 635, 635 (1989).

169. See POSNER, *supra* note 115, at 67–71.

170. Note, however, that the improver has no choice but to negotiate with the original patentee.

171. See Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 1991 (2007) (noting that in the information technology sector, hundreds or even thousands of patents may apply to a single product or standard).

entee may be prohibitively costly.¹⁷² When one factors in the cost of actually negotiating a price with each patentee, in addition to the preclusive effect of “hold-out,”¹⁷³ direct negotiating may be impossible.

There are two solutions to the quagmire created by a high-transaction-cost environment. The first is to discard property rights in favor of liability rules, and possibly award a compulsory license. In the field of copyright, this is a relatively common solution.¹⁷⁴ The alternative is to respect strong property rights and allow those possessing them to reach a mutual, long-term solution. In the patent field, this solution has largely taken the form of standard-setting organizations and patent pools.¹⁷⁵

Neither route, however, is free from cost. If society elects liability rules, a third party must attempt to set an appropriate price for the license, which is unlikely to reflect the actual market value that would have been placed on the information by the parties and is apt to be further afflicted by regulatory lag.¹⁷⁶ Moreover, liability rules likely will hinder post-grant commercialization. The latter solution will also be imperfect. For one, there is no guarantee that every holder of a blocking patent will participate in a pool or adhere to community protocol.¹⁷⁷ Moreover, patent pools and other licensing agreements are closely scrutinized for antitrust violations, given that they are comprised of horizontal competitors, which creates a disincentive to joining for fear of an inadvertent antitrust violation.¹⁷⁸

Ultimately, there is no question that the pervasive proprietization of information can have adverse effects on follow-on innovation by creating identification and negotiation costs for those wishing to avail themselves of the patented technology or

172. *See id.*

173. *See* Douglas Lichtman, *Patent Holdouts and the Standard-Setting Process* (Univ. of Chi. Olin Law & Econ. Program, Working Paper No. 292, 2006), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=902646.

174. *See* SCOTCHMER, *supra* note 3, at 78–79.

175. *See* Lemley, *supra* note 8.

176. Robert W. Crandall & J. Gregory Sidak, *Competition and Regulatory Policies for Interactive Broadband Networks*, 68 S. CAL. L. REV. 1203, 1221 (1995) (defining regulatory lag as “the general delay in the responses of regulators to changes in cost or market conditions”).

177. *See* Lemley & Shapiro, *supra* note 171, at 2015 n.51.

178. *See* DOJ & FTC, PROMOTING INNOVATION AND COMPETITION, *supra* note 114, at 57–85.

copyrighted expression.¹⁷⁹ It does *not* follow, however, that such propertization is necessarily undesirable. This negative effect must be weighed against the many benefits flowing from exclusivity. The key is to recognize that the transaction costs associated with a strong property rights regime will vary depending on the context.

It is precisely because of this phenomenon that a powerful right to exclude is appropriate within the realm of experimental use. This is because, where a party consciously seeks to experiment on another's invention, by definition the experimenter knows who the patentee is and suffers no identification cost from having to negotiate with him. Given that the negotiation is limited to those discrete parties, bargaining costs are unlikely to be prohibitive. Of course, this does not mean that licensing will necessarily result—the patentee may well derive greater utility from refusing to license than he would gain from the licensing fee the prospective experimenter would be willing to pay—but this does not mean there has been a bargaining failure. In those circumstances, long-run social welfare is promoted through *ex ante* incentives by recognizing the legitimacy of a refusal to license. This tenet of the patent grant alone is what feeds the all-important “incentive to invent.”

It follows that Coasian bargaining is likely to ensue in most instances where an entity wishes to experiment on a patented technology. Obviously, there are some cases where *objectively* rational behavior, and hence agreement, will be less likely—perhaps with respect to longstanding rivals negotiating over a license to develop a generic product to be marketed upon expiration of a patent. Even here, though, agreement may well be possible, whether through a sufficiently high licensing fee or, perhaps more likely, reciprocal licensing or grant-back arrangements.¹⁸⁰ Moreover, by refusing to deal with his rival, a patentee is obviously enhancing his utility—if not short-term pecuniary wealth—thus granting him a valuable form of *subjective ex post* return. On the other hand, the situations that have most riled

179. See Lemley, *supra* note 8, at 998–99.

180. See DOJ & FTC, PROMOTING INNOVATION AND COMPETITION, *supra* note 114, at 87–102 (exploring the economics of grant-backs, reach-through licenses and other patent licensing practices); Richard L. Schmalbeck, Comment, *The Validity of Grant-Back Clauses in Patent Licensing Agreements*, 42 U. CHI. L. REV. 733 (1975) (analyzing the economics of grant-back arrangements).

commentators—namely, the Federal Circuit’s refusal to allow an experimental use exemption for academic research universities¹⁸¹—are most likely to bear witness to fruitful negotiations.

Finally, it must not be forgotten that even when a patentee refuses to license his technology for experimental use—and even when that refusal is deemed irrational by some external, and hence unreliable, metric—it does not follow that society is denied information concerning the technology. The enablement, written description, and best-use requirements, in conjunction with under enforcement, ensure that at least some meaningful knowledge about the patented invention is immediately released to the public,¹⁸² and full, unfettered access follows upon expiration of the patent. This tenet of patent jurisprudence is sufficient in itself to differentiate the disclosure function (not incentive) of the patent system from the access to information sought in other areas of intellectual property.

Notwithstanding the foregoing, the majority of commentators have strongly criticized the Federal Circuit’s near elimination of the experimental use doctrine.¹⁸³ Reviewing the academic literature, Professor Strandburg notes that “there has been considerable concern that prior patentees may be unwilling to license the experimental use of their inventions on reasonable terms to potential competitors.”¹⁸⁴ With respect to the argument that property rights can play a central role in facilitating Coasian bargaining and efficient outcomes, however, she argues:

[A]s pointed out by Professors Michael Heller and Eisenberg and others, efficient licensing arrangements may not always be concluded for a variety of reasons including the transaction costs of coordinating multiple licenses, the inability of inventors to agree upon the appropriate division of rewards for original and follow-on inventions, and the possibility of anticompetitive behavior resulting in licensing failure or in collusive licensing practices.¹⁸⁵

Professor Strandburg forwards three major arguments to refute the contention that private property rights are desirable in the setting of experimental use. First, she cites excessive trans-

181. See *Madey v. Duke Univ.*, 307 F.3d 1351, 1362 (Fed. Cir. 2002).

182. See 35 U.S.C. § 112 (2000).

183. See *supra* note 27.

184. Strandburg, *supra* note 27, at 82.

185. *Id.* at 92.

action costs, which are central to the argument that strong property rights will foreclose cumulative innovation.¹⁸⁶ Yet, in the context of experimental use, transaction costs can generally be expected to be low. As a general matter, there are two major impediments to a successful contract: identification costs and bilateral monopoly.¹⁸⁷ The first concern is a nonissue in the context of experimental use because, if a third party wishes to investigate a patented technology, the owner of the relevant patent will be apparent. Nor does the second barrier exist in this context, though it should be noted that bilateral monopoly will rarely foreclose agreement in itself even where it does exist.¹⁸⁸ Bilateral monopoly exists in a negotiation between two parties when neither party has “good alternatives” to dealing with the other.¹⁸⁹ Whether a party wishing to experiment on another’s patented invention has a good alternative depends in large part on whether there is a substitute technology available. Often such substitutes will exist,¹⁹⁰ but sometimes they will not. The patentee, however, will almost always have good alternatives. If his technological contribution is valuable, which one might reasonably assume to be the case when at least one party wishes to experiment on or with it, he will likely have myriad licensing opportunities with third parties. Alternatively, he can simply refuse to license at all and internalize the value of his invention.

Second, Professor Strandburg argues that inventors may not be able “to agree upon the appropriate division of rewards for original and follow-on inventions.”¹⁹¹ Interestingly, this is not a general concern with respect to experimental use, but rather reflects the common scenario of an inventor of a superior technology having to negotiate with the holder of a blocking patent.¹⁹² A third party may wish to conduct tests on a patented invention for numerous reasons, perhaps to attempt to invent

186. *See id.*

187. *See* POSNER, *supra* note 115, at 60.

188. *See id.* at 61 (“Although the frustration of a potentially value-maximizing exchange is the most dramatic consequence of bilateral monopoly, it is not the usual consequence. Usually the parties will bargain to a mutually satisfactory price.”).

189. *See id.* at 60.

190. *See* Easterbrook, *supra* note 42, at 109 (“Frequently, indeed almost always, different patented goods and processes compete with each other and with unpatented goods and processes.”).

191. Strandburg, *supra* note 27, at 92.

192. *See* Prima Tek II L.L.C. v. A-Roo Co., 222 F.3d 1372, 1379 & n.2 (Fed. Cir. 2000).

around the patent or to understand fully the product or process to begin marketing generic products promptly upon expiration. In either of these cases, there will be no negotiation over the division of rewards for original and improvement patents.

In other situations, a third party may intend to improve upon the patented technology, in which case the parties may have to agree *ex ante* to a future division of proceeds. Nor is this situation necessarily subject to bilateral monopoly. The patentee may elect to improve his invention himself or license it to a third party to accomplish the same goal. He is not bound to deal exclusively with the third party before him. He may simply elect to continue marketing his original patented invention and prevent the improvement patentee from marketing his. Only if the specific entity wishing to obtain a license has a unique and valuable idea will bilateral monopoly exist. Even in this case, the likely result will not be failure in negotiation, but higher costs of negotiation.¹⁹³ Where an improvement patent promises significantly to increase consumer demand, both the original and improvement patentee will have strong incentive to find common ground and agreement. Although this bargaining may be imperfect, given the existence of some cost, it will not frustrate the process of cumulative innovation. Importantly, empiricism reflects the foregoing theory.¹⁹⁴ There has been an increasing proliferation of institutions based on private property rights that are specifically designed to facilitate low transaction cost reciprocal licensing of complementary technologies and improvement patents.¹⁹⁵

Third, Professor Strandburg looks to a breakdown in competition as an impediment to a property rights approach.¹⁹⁶ The invocation of anticompetitive concerns, however, is of little moment; cartel-like behavior in the sphere of intellectual property is prohibited and actively monitored under the antitrust

193. See POSNER, *supra* note 115, at 61.

194. See Kieff, *supra* note 5, at 719–27.

195. See, e.g., Josh Lerner, *Monetizing IP: The Executive's Challenge*, HARV. BUS. SCH. WORKING KNOWLEDGE, June 9, 2008, <http://hbswk.hbs.edu/pdf/item/5925.pdf> (interviewing Sean Silverthorne) (discussing the importance and proliferation of patent pools). See generally DOJ & FTC, PROMOTING INNOVATION AND COMPETITION, *supra* note 115, at 57–85.

196. See Strandburg, *supra* note 27, at 92.

laws.¹⁹⁷ Absent a reason to think that the antitrust laws inadequately protect the public from illegal, collusive behavior, it is not apparent what role the possibility of anticompetitive behavior should have on the formulation of an experimental use exemption under patent law.

Ultimately, commentators fail to place satisfactory weight on the most fundamental point, namely, that most inventions are readily self-disclosing and, for those that are not, much information in the form of the enablement, written description, and best use requirements accompanies the patentability of even the most recondite inventions, even in the presence of an “unreasonable” refusal to license. Professor Strandburg severely discounts this observation, reasoning that “the written patent disclosure alone [is not] . . . up to the task of facilitating improvements and design-arounds.”¹⁹⁸

Whether such disclosure will be adequate in any given situation is a highly context-specific inquiry, but the information there revealed provides at least some information to those engaged in the process of follow-on innovation. She correctly notes that “there is an inherent mismatch between science and technology and verbal explanation” and that “the inability of competitors to ‘experiment on’ a patented invention provides an incentive for as much obfuscation as the system will tolerate.”¹⁹⁹ However, the disclosure-oriented requirements for patentability are far from anemic, but rather impose stringent requirements on a patent applicant.²⁰⁰ Moreover, if policymakers believe that the system tolerates too much obfuscation, then the solution lies in raising the bar for patentability or improving the prosecution process. Regardless, the enablement and best-use functions are substantive, and are further supported by the antitrust laws. *Nobelpharma AB v. Implant Innovations* is an illustrative case, where an inventor deliberately omitted reference to the best mode of practicing his invention.²⁰¹ There, the court noted that “there were some minor details that were not in-

197. See, e.g., U.S. DEP’T OF JUSTICE & FED. TRADE COMM’N, ANTITRUST GUIDELINES FOR THE LICENSING OF INTELLECTUAL PROPERTY (1995).

198. Strandburg, *supra* note 27, at 102.

199. *Id.*

200. See 35 U.S.C. § 112 (2000).

201. See *Nobelpharma AB v. Implant Innovations, Inc.*, 141 F.3d 1059, 1059 (Fed. Cir. 1998).

cluded [in the patent] and which proved to be quite important.”²⁰² As “his disclosures were inadequate to enable one skilled in the art to practice that best mode,”²⁰³ the court not only invalidated the patent, but held that the patentee was subject to antitrust liability for his actions.²⁰⁴

If patents were issued without a requirement of detailed disclosure, the normative case for an experimental use exemption would be stronger.²⁰⁵ In a setting where patents were issued without any disclosure, no information separate from that emanating from the embodying product would be available for cumulative innovation until the expiration of the patent. The reality is far removed from this caliginous position because most patented inventions are readily self-revealing and, for those technologies whose obscurity falls just short of that required for effective trade secret protection, considerable information nevertheless accompanies the patent grant. Although greater information would still undoubtedly flow from free experimentation, there is no denying that an unqualified right to engage in such experimentation would markedly reduce ex ante incentives to innovate. Nevertheless, as this Part has illustrated, the level of mutually satisfactory licensing is apt to be higher than many fear.

D. *The Optimal Exemption*

The Federal Circuit’s restrictive reading of the experimental use doctrine resonates with few academics. Yet, this Article has shown that the “incentive to disclose” function and fear of bargaining failure arguments routinely employed to criticize the court’s jurisprudence have little force. In fact, post-*Madey*, the exemption is crafted in such a way as to reflect accurately the exclusive purpose of the patent laws, namely, spurring ex ante innovation through the prospect of financial reward.

A third party’s right to engage in unlicensed experimentation on a patented invention is now so narrow that only “strictly philosophical inquiry” is protected.²⁰⁶ As a result, those who would place pecuniary value on investigating the workings of a pat-

202. *Id.* at 1065.

203. *Id.* at 1063.

204. *Id.* at 1072.

205. This is true at least insofar as access would be subject to the payment of a mandatory fee, thus guaranteeing some ex post return to the patent holder.

206. *Madey v. Duke Univ.*, 307 F.3d 1351, 1362 (Fed. Cir. 2002).

ented technology will have to pay the relevant patentee for an absolute right. Of course, the quasi-fair-use nature of patent law created by the cost of enforcement will allow many who place some, but not large, commercial value on experimentation to engage in the activity without reprise. Those who place significant pecuniary value on experimental use, however, will likely have to reach a contractual licensing arrangement with the patentee.

This fact is not a weakness in the law. The entire purpose of the patent grant is to bestow a worthy inventor with the right to exclude others from practicing the invention. It is this ability that creates value for the inventor, thus spurring his *ex ante* innovative efforts. A party's desire to engage in experimental use is no different in kind from an economic perspective than other infringing activity. In all settings where third parties derive utility from practicing the claimed invention, but do not compensate the patentee, the inventor is denied the ability to extract the social value of his contribution. This creates a danger of under compensation and thus of future under production of desirable information goods. One might question whether university research falls within this description; a scrutinizing look reveals that it does. University activity in the innovation and patent realm is now heavily commercial—and profitable, with about \$1.5 billion in 2006 flowing from licensing revenues.²⁰⁷ Given this reality, the normative case for granting universities free reign to practice others' patented inventions for the purpose of experimentation, and likely future licensing of improvements, is weaker than would first appear.

Nevertheless, there is good cause for recognizing a substantive experimental use exemption in one setting. The proliferation of invalid patents mistakenly issued by the PTO has created a rather serious problem. The "bad patent" dilemma creates many significant issues for an innovative process that depends critically on some semblance of certainty. The social harm caused by erroneously awarded patents is considerable,

207. Maureen Farrell, *Universities That Turn Research Into Revenue*, FORBES, Sept. 12, 2008, http://www.forbes.com/2008/09/12/google-general-electric-ent-tech-cx_mf_0912universitypatent.html.

thus society has an overriding interest in invalidating them.²⁰⁸ The primary mechanism for accomplishing this has been private litigation in federal court, though reexamination at the PTO looks to be an increasingly important vehicle for this purpose.²⁰⁹ To facilitate the efficacy of these important processes, those potentially affected by blocking patents must be able to ascertain those patents' validity. For this reason, this Article counsels a limited experimental use right for those wishing to test the validity of an issued patent, limited to circumstances where such testing could not reliably take place from the specification and claims of the patent itself.

Such an exemption could pose a considerable danger, namely, that allowing rivals free rein to research another's patented technology in ostensible furtherance of assessing the patent's validity may allow those competitors indirectly to research purely for commercial reasons. Accordingly, an experimenter in these circumstances should be prepared to explain to the relevant patentee, and ultimately the court if sued for infringement, why the patent specification does not provide an adequate basis for testing validity. In most circumstances, the claims and specification would be more than sufficient, providing rivals with ample information, for instance, to comb the prior art for an anticipatory reference. Thus, the right to engage in experimental use to determine validity would not be unqualified, but rather highly restricted.

CONCLUSION

It is all too easy to look upon the intellectual property regime as a primary incentive mechanism for spurring the disclosure of information. It is equally tempting to assume that, but for the existence of the patent bargain, inventors would elect to keep their inventions secret, thereby denying the public the benefit of their innovative efforts. Too many academics, and some dissenting judges, have fallen prey to this alluring view. In contrast, a more perspicacious inquiry reveals that the *sole*

208. See Jay P. Kesan & Andres A. Gallo, *Why 'Bad' Patents Survive in the Market and How Should We Change?—The Private and Social Costs of Patents*, 55 EMORY L.J. 61, 76–86 (2006).

209. 35 U.S.C. §§ 301–307 (2000) (*ex parte* reexamination); 35 U.S.C. §§ 311–318 (2000) (*inter partes* reexamination).

purpose of the patent system is to spur the creation and development of technological innovation alone. The ultimate dissemination of valuable information flows naturally from this innovation, as an inherent byproduct of the fact of creation itself. This conclusion need not entail a detached and abstruse philosophic inquiry, but is, in fact, an axiom. The common refrain that “information wants to be free” has a significant semblance of truth to it—the vast majority of innovative creations are readily obvious to the world when made publicly visible. In the realm of patent law, such disclosure typically accompanies the commercial marketing of a product incorporating the protected information. In the world of copyright, communicating an expression to another typically has the same effect. In both cases, no independent incentive toward disclosing information is needed in excess of that designed to spur innovation itself.

Rare exceptions do exist. So-called “non-self-disclosing” inventions may in fact be marketed without revealing the underlying technology. One might plausibly argue that an incentive to disclose this information under the patent law is needed to promote social welfare. But the patent system provides no such incentive. The inventors of these technologies will seek perpetual trade secret protection in lieu of the temporary exclusivity awarded under the patent laws. Requiring an inventor to disclose the workings of his non-self-revealing technological contribution to the world at large unequivocally imposes a cost on the future patentee, a cost that may be significantly exacerbated by a broad experimental use exemption. So construed, the patent laws actually create a “disincentive to disclose,” driving some inventions toward trade secret protection instead.

Stripped of an “incentive to disclose” theory of patent law, those advocating a broad experimental use exemption face the laborious task of explaining why an exemption founded exclusively on facilitating the dissemination of patented information should exist at all, let alone be expanded beyond its current level. This task is rendered all the more onerous when one appreciates that any expansion in the exemption comes at a direct, pecuniary cost to the patentee at issue, thus reducing both the expected return from patenting one’s invention and the *ex ante* incentives to engage in future innovation. In other words, promoting an ill-conceived notion of disclosure comes at a direct cost to the sole incentive that truly matters, the incentive to create.

The only remaining argument in favor of an expanded experimental use doctrine lies in the possibility of bargaining failure. As the innovative process depends critically on the existence and accessibility of prior art, an intellectual property holder's conscious refusal to make his work available for improvement and inspiration may significantly fetter this creative process. Some form of compulsory license may be felt to remedy this market failure, by foreclosing the possibility of irrational holdout and making all information—patent-protected or not—available to those wishing to access and understand it.²¹⁰

This perspective, too, is vulnerable to the criticism that it comes at a direct cost to the relevant patentee, preventing him from appropriating the social benefit of his innovation during the life of the patent. This rationale crumbles for the same reason as the "incentive to disclose" theory of patent law. That patented technologies are largely self-revealing essentially eviscerates the foundation of the argument that an experimental use exemption is needed to facilitate the dissemination of information, which would otherwise be foreclosed by a patentee's refusal to license. Because such information flows naturally from the vast majority of patented inventions, no compulsory license is needed. For those few truly non-self-disclosing inventions, an experimental use exemption will have no effect because the technologies will be rationally protected by trade secret.

For the minority of inventions that, although not readily self-revealing, are likely to be vulnerable to appropriation within the life of a patent grant—thus spurring the relevant inventor to elect patent in lieu of trade secret protection—some social gain may flow from making the information available for experimentation. In such circumstances, a refusal to license may be thought to carry appreciable social harm. Even here, however, it must not be forgotten that considerable information accompanies the patent grant, most notably with respect to the enablement requirement. This knowledge certainly facilitates some follow-on innovation, albeit less than would be associated with an unquali-

210. A more reasonable suggestion comes from Jordan Karp, who has suggested that Congress mandate a compulsory license that would allow experimenters to pay a statutory fee, which would prevent unreasonable holdout, yet provide a patentee with a pecuniary return for his contribution. See Jordan P. Karp, Note, *Experimental Use as Patent Infringement: The Impropriety of a Broad Exception*, 100 YALE L.J. 2169, 2188 (1991).

fied right to experiment. Closer inquiry, however, suggests that the preclusive effect is unlikely to be as significant as some fear. The situation of a third party wishing to experiment on a particular patentee's specific invention is not akin to the high identification and negotiation cost scenarios that might be expected to foreclose Coasian bargaining. Where a refusal to license nevertheless ensues, such refusal lies within the patentee's right to exclude—the sole right that fuels the entire purpose of patent protection, the incentive to innovate.

It follows that the Federal Circuit's approach is largely to be commended. The only alteration in the law should be to permit a narrow experimental use exemption to test for invalidity.