Inventing Invention: A Case Study of Legal Innovation

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> "[T]he so-called patentability requirement was invented by the Americans, in particular the Justices of the U.S. Supreme Court in the famous case *Hotchkiss v. Greenwood* in 1850."[1]

This is a story about innovation — legal innovation. At the beginning of the nineteenth century, all countries having patent systems generally required patentable inventions to be both *new* and *useful*. Those two requirements have now been joined by a third: Patentable inventions must be *new*, *useful* and *nonobvious*. This development is not unique to the law of the United States. Every nation in the World Trade Organization applies these three standards in awarding patents.[2]

Though nonobviousness is the most recently developed of the three requirements for obtaining a patent, it now generally considered to be the defining feature of invention. Indeed, in United States, what is today called "nonobviousness" was for about a century known as the "invention doctrine," and n many countries, the doctrine is still known as "inventive step" or simply *the* patentability requirement (as in the above quote). The doctrine is widely understood to be so fundamental to the proper functioning of the patent system that it can be accurately described as the "final gatekeeper of the patent system,"[3] the "ultimate condition of patentability,"[4] and "the heart of

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[1] See, e.g., Freidrich-Karl Beier, *The Inventive Step in its Historical Development*, 17 Intern'l Rev. Indus. Prop. & Copyright L. (IIC) 301, 304 (1986).

[2] See TRIPs Article 27.1, which requires member countries to award patents for all inventions that "are new, involve an inventive step and are capable of industrial application." A footnote defines "'inventive step' and 'capable of industrial application' ... to be synonymous with the terms 'non-obvious' and 'useful' respectively." Id. n.5. In many countries that use the "inventive step" test for patentability, the term "inventive step" is specifically defined to refer to something that is "not obvious to a person of ordinary skill in the art." See EPC art. 56; UK Patent Act; German Patent Act art. 4, English translation available at http://www.jpo.go.jp/shiryou_e/s_sonota_e/aippi_e/germany/pl/mokuji.htm (similar); Brazilian Patent Act, art. 13, English translation available at http://www.jpo.go.jp/shiryou_e/s_sonota_e/aippi_e/brazil/ipl/mokuji.htm ("An invention shall be considered as involving inventive step if, having regard to the state of the art, it is not evident or obvious to a person skilled in the art."). The parallel provisions in the Japanese and Korean Patent Acts use language that is typically translated as barring inventions that "could easily have been made." See Patent Act of 1959, art. 29(2), translation reprinted in Examination Guidelines for Patent and Utility Model chap. 2, at 16 (JPO 2000), available at http://www.jpo.go.jp/tetuzuki_e/t_tokkyo_e/Guidelines/PartII-2.pdf; see also Korean Patent Act, art. 29(2), translation available at http://www.kipo.go.kr/kpo/eng/info_doc/data/PatentAct.pdf.

[3] ROBERT P. MERGES AND JOHN F. DUFFY, PATENT LAW AND POLICY 644 (3rd ed. 2002).

[4] NONOBVIOUSNESS — THE ULTIMATE CONDITION OF PATENTABILITY (John F. Witherspoon ed. 1980).

the patent law."[5] This Article traces how this defining doctrine of invention was itself invented by the world legal culture.

For scholars of intellectual property law, this history provides significant insights into the proper functioning and continued development of patent law. For example, one great puzzle posed by this history is how early patent systems could possibly have functioned without any doctrine similar to what is now seen as a central and fundamental pillar of innovation law. To a great extent, the emerging modern theory of nonobviousness helps to solve this puzzle: Modern theory predicts that the nonobviousness doctrine plays its most important role where society and technology is experiencing rapid change. In a more static society, theory predicts that the nonobviousness doctrine would be less important. Here history and theory are mutually reinforcing, for the nonobviousness doctrine did not develop until it was demanded by the rapid technological and social changes of the nineteenth century.

The case study presented in this article is also of much more general interest. Change is endemic in law. Law review articles are filled with tales of the "development" or "evolution" of law.[6] Each new judicial decision, each new piece of legislation, even each new legal argument crafted by ordinary lawyers brings some small increment of novelty and change to the law. All lawyers, judges and legislators know this to be true, and it has become a shibboleth that the law must change, grow and develop as social conditions do. Yet despite the omnipresent recognition of legal change, only few scholars have devoted substantial attention to the processes by which legal precedents develop and change over a substantial period time. The existing scholarly treatments of legal change are invariably primitive. Legal change is treated as if it is something that just happens — that follows inexorably from the emergence of social needs and changed social conditions. Legal precedent is analogized to fungible capital stock,[7] or to sequential chapters in a chain novel,[8] or to Darwinian evolution.[9]

The historical rise of the nonobviousness standard reveals more depth and texture into the

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[5] Federal Trade Commission, *To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy*, Chap. 4, at 2 (Oct. 2003).

[6] E. Donald Elliott, The Evolutionary Tradition in Jurisprudence, 85 Colum. L. Rev. 38 (1985) (observing that "the idea that law 'evolves' is so deeply ingrained in Anglo-American legal thought that most lawyers are no longer even conscious of it as a metaphor" but also asserting the law "grows by feeding on ideas from outside, not by inventing new ones of its own").

[7] Richard Posner, Economic Analysis of Law § 20.1, at 509-10 (3rd ed. 1986).

[8] See RONALD M. DWORKIN, LAW'S EMPIRE (Harvard University Press, 1986).

[9] Elliott, supra note 6, at 38-39. Mark Roe challenges the evolutionary metaphor in Mark J. Roe, Chaos and Evolution in Law and Economics, 109 Harv. L. Rev. 641 (1996). Similarly, Michael Abramowicz has argued that the development of a sound legal principles should not be simply assumed and that instead society should investigate ways to speed up the process of legal evolution and development. See Michael Abramowicz, *peeding Up the Crawl to the Top*, 20 Yale J. on Reg. 139 (2003).

process of legal change, and it introduces a new element — the possibility of true innovation in law. True innovation here means not merely any change but one that is an intellectual advance. Although the process of legal innovation appears to based largely on trial-and-error, intellectual justifications appear essential for the continued development and ultimate success of the innovation. Innovation can occur at any level in the legal hierarchy, though it usually begins humbly. At the lowest level, litigants in practical disputes are constantly casting about for new angles and new arguments that might help to clarify, develop or change the law, and lower courts accept or reject these suggested changes. The accepted innovations can either grow, as other courts adopt them and provide further articulation and rationales for them, or wither, as other courts narrow or reject them. Successful doctrines eventually receive greater permanence as courts higher in the hierarchy endorse them. Higher still in the hierarchy, the legislature can choose whether to codify doctrines developed in the courts. Uncodified doctrines may wither as they remain subject to the common-law process of continual reinterpretation and modification. But codified doctrines can become pillars of the law. They can — as the nonobviousness requirement has — become part of the law of other jurisdictions and enshrined in world-wide treaties.

Legal innovations do not, however, always begin at the bottom of the legal hierarchy. Novel developments can also come directly from a legislature. Unprecedented legislative developments may start small — perhaps as mere exceptions to more general rules. In the process of litigation, courts will attempt to articulate justifications for the exception, and those justifications will lead to either more generous or grudging application of the rule. Scholarly commentators too play a role, though traditionally that role has been largely limited to creating justifications for existing innovations. The process of justification is essential for the survival of the innovation, for unjustified rules do not seem to thrive. In the end, a legal innovation can truly be said to be successful when it is widely excepted and sufficiently justified.

The history provided here shows one successful doctrine that has grown up and conquered the world, and also many failed doctrines that had promising beginnings but then withered. The most striking feature of this history is its time scale: Legal innovations take decades, even centuries, to develop. Moreover, legal doctrines later seen to reflect deeply flawed policy can remain stable law for large portions of a century before their downfall. This result has obvious relevance to the great debate over the so-called "positive theory" of economic analysis of law, which posits that various areas of law are "best explained as if the judges who created the law through decisions operating as precedents in later cases were trying to promote efficient resource allocation."[10] Even

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[10] William M. Landes and Richard A. Posner, The Economic Structure of Tort Law 1 (Harvard 1987). Though this famous articulation of the "positive" economic analysis of law was written specifically about tort law, it has been applied more generally too. See generally, Richard A. Posner, Economic Analysis of Law 6 (Little, Brown 1972) (defining a "positive role" for economic analysis of law in "explaining the rules and outcomes of the legal system as they are" and positing that "[s]ince judges are frequently called upon to decide cases in which economic factors are inescapable, it is not surprising that they should frequently decide in accordance with an intuitive perception of cost and efficiency"). Cf. Priest, The Common Law Process and the Selection of Efficient Rules, 6 J. Leg. Stud. 65 (1977); Kornhauser, A Guide to the Perplexed Claims of Efficiency in Law, 8 Hofstra L. Rev. 591 (1980); Posner, A Reply to Some Recent Criticisms of the Efficiency Theory of the Common Law, 9 Hofstra L. Rev. 775 (1981).

among scholars who economically sophisticated, this theory has been highly controversial.[11] The area of patent law is a particularly attractive area to test the positive theory of economic analysis because, unlike many other areas such as tort and criminal law, the patent system has long been based on the utilitarian considerations, rather than consideration of fairness or justice.

The history of the nonobviousness doctrine shows that, in the very long run, considerations of economic efficiency do put pressure on legal actors (not only judges but legislators, commentators, attorneys and other actors in the legal culture) to create, to adopt and to justify economically efficient doctrines. However, the relevant time span within which those considerations can operate is very long — on the order of several decades at least.

Law develops like a technology. Engineers have incentives to make their products as efficient as possible, but those incentives do not mean that our past, present or future technologies are free from imperfections and inefficiencies. So too, the law at any point in time may be riddled with problems and imperfections. As time passes, the law progresses, though not always linearly (law too has its failed experiments). If there is a major difference between law and other technologies, it lies in the extraordinarily weak and sluggish mechanism for progress in law. The success or failure of an experiment in law cannot be immediately measured, and it may never be subject to rigorous empirical proof. Moreover, the incentives of those improving law are terribly weak and subject to corruption.

This case study is not, it should be emphasized, a denial of the positive theory of economic analysis of law. But it does highlight the caveats on the theory. The positive theory of economic analysis of law should "not [be] conceived as asserting a perfect congruence between law and efficiency."[12] "The incentives of judges [and, we might add, legislators, commentators and other legal actors] to fashion efficient doctrine are weak."[13] The limitations of any positive theory of economic analysis does not militate against applying economic analysis to law. Rather those limitation suggest that economic analysis of law should have a more unabashedly normative component, which might facilitate innovation and progress in law.

I. Current Wisdom Concerning the Invention Standard.

The best way to appreciate to development of the invention doctrine is to begin at the end of

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[11] See, e.g., Richard A. Epstein, *The Economics of Tort Law: A Hurried and Partial Overview*, 10 KAN. J.L. & PUB. POL'Y 60, 64 (2000) ("it turns out that the positive economic analysis of law says that you people have been doing it right all along, even though you do not know a word about the subject, for which I think the caveat is: if that is the case, then let's say that ignorance is bliss and the less you learn about economics the better we will all be").

[12] Landes and Posner, Economic Structure of Tort Law at 24

[13] Landes and Posner, Economic Structure at 28. As Judge Posner has noted elsewhere, the compensation of judges and lawyers does not directly depend on their production of good precedent for they receive no royalties even if they help to produce a precedent that guides thousand of future cases. Posner, Economic Analysis § 20.2 at 554 (6th ed.).

the story, with the law and theory as it exists today. Current law in almost all major developed countries generally requires that, to be patentable, an invention must reflect a certain quantum of technical achievement. In the United States patent statute, patents are prohibited from issuing to inventions that "would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." Similarly, the European Patent Convention as well as the English, German, Dutch statutes require patentable inventions to be "not obvious to a person skilled in the art."[14] The Korean and Japanese laws forbid patents if the invention "could easily have been made" by a person skilled in the art. In sum, world patent law has now reached a consensus that the type of invention required for patentability must include some step that is not technically trivial, where triviality is measured by the capabilities of a person skilled in the relevant technical field. This general requirement, which will be referred to here as the "nonobviousness" doctrine, is now recognized throughout the world as the essence of invention.

On first impression, denying patents for trivial advances may seem like a straightforward application of the legal maxim "*de minimis non curat lex*," which generally allows courts to ignore "purely trivial effects."[15] But this intuition is not correct. Developments that are technologically trivial could have great economic significance, and the *de minimis* doctrine usually does not authorize ignoring matters with a significant economic effect. Furthermore, the nonobviousness requirement is significantly more stringent than would be expected if it were merely a particular manifestation of the general de minimis rule: An engineering group can work on a problem for weeks; they can arrive at a solution that is new; the solution can have significant economic value; and still, that solution may be deemed "obvious" and therefore unpatentable.[16]

Similarly, the nonobviousness doctrine cannot be explained by reference to more general principles of intellectual property law. Indeed in copyright, the branch of intellectual property law that most closely resembles patent law, the standard for obtaining rights has been set "extremely low."[17] Copyrights are generally available for "original works of authorship."[18] While this standard requires some "spark" of creativity, "[t]he vast majority of works make the grade quite easily, as they possess some creative spark, 'no matter how crude, humble or obvious' it might be."[19] A ten-year-old who completes her creative writing homework is entitled to a copyright even if she spent only an hour writing a trite story and even if her teacher thought the effort worth no more than a "C."

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[14] Patent Act of 1977, art. 3 available at http://www.patent.gov.uk/patent/legal/consolidation.pdf.

[15] *Republic of Argentina v. Weltover, Inc.*, 504 U.S. 607, 618 (1992).

[16] The point is demonstrated by the facts of *Calmar v. Cook Chemical*, which is reported as a companion case in Graham v. John Deere Co., 383 U.S. 1, 26-37 (1966).

[17] Feist Publication, Inc. v. Rural Telephone Service Co., 499 U.S. 340, 345 (1991).

[18] 17 U.S.C. § 102(a).

[19] *Feist*, 499 U.S. at 345 (quoting 1 M. Nimmer & D. Nimmer, *Copyright* § 1.08[C][1] (1990)).

The high standard of creativity required to obtain patent rights is thus not explicable in terms of a general legal policy or even as a policy general throughout intellectual property law. The standard can be explained by reference to the broad scope of rights conferred by patents, discussed in part A below, and by an economic analysis of implications of granting such rights, discussed in part B. Finally part C of this section gives a brief overview of the historical tests, the development of which will be explained in greater detail in the remainder of the paper.

A. More Rights, More Responsibilites.

Two fundamental differences in the scope of rights protected by copyrights and patents explain the difference between the standards of creativity needed to support the rights. First, unlike a patent, a copyright prevents only copying of the protected work. It grants no rights over independent creations of similar or even identical works, nor does it preclude use of any previously available work. Granting copyrights for the trivial efforts of a ten-year-old does not necessarily stifle the creative work of others because, if other ten-year-olds can also produce the triviality, the copyright system allows them to do so. A copyright on a triviality will thus have a limited economic impact. Even if people are willing to pay for the triviality, each creator will be in competition with others, and none is likely to be able to charge much for the work.

Second, copyrights protect only the particular expressions of ideas, but patent rights can protect at a much broader and more conceptual level. Thus, the first writer to describe a telephone in an engineering treatise, or the first fiction writer to use a telephone as a crucial element in a story, cannot prevent other writers from describing the function of a telephone or from using the telephone as an important element in advancing a plot. A patent on the telephone, however, can — and in fact did — grant rights covering all practical uses of telephone technology during the term of the patent.[20]

There are good justifications for the different scope of rights in patent and copyright. It is a well-worn axiom that copyright is said to protect expression, rather than the underlying ideas conveyed in a work. The meaning of this axiom is best revealed by considering typical subject matter that is covered by a copyright such as book, song, picture or movie. Each of these works consists of numerous well-known parts, be they words, notes, sounds, geometric shapes and images. The number of potential parts is vast, and the number of possible combinations infinite or practically so. It is well known that all of the relevant parts are capable of being combined (perhaps in accordance to set rules as in the rules of grammar). The intellectual feat — the difficult work that

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[20] *See* The Telephone Cases, 126 U.S. 1 (1888) (sustaining Alexander Graham Bell's very broad patent on basic telephone technology). Bell's broadest patent claim covered "[t]he method of, and apparatus for, transmitting vocal or other sounds ... by causing electrical undulations, similar in form to the vibrations of the air accompanying the said vocal or other sounds." Bell's key concept was encompassed in the phrase "electrical undulations." Prior attempts to create a telephone had attempted to replicate sound using *pulses* of electricity, with the electrical circuit being established and broken many times per second. Bell's insight was that sound could be carried by varying the intensity of a continuous current of electricity. His insight — using intensity waves or undulations of continuous current rather than pulses of electricity — both distinguished his telephone from all prior (unsuccessful) attempts and defined his broad property right.

society wants to protect — involves combining a large number of those elements into a desirable work, and the desirability of the work is tied to all the particulars of the combination, not the general concept. A sufficient right to encourage that sort of work is a right narrow in legal terms — e.g., one that does not preclude independent creation and that does not protect the work at a conceptual level. The apparently narrow scope of the right will not be very important as a practical matter because, while it is theoretically possible for an entire book or song to be independently created by two individuals, as a practical matter the chances of that happening are virtually zero. Thus, the legal limitations on the right do not prevent the rightholder from enjoying significant protection as a practical matter.

By contrast, the hard work society is attempting to encourage in the patent system is conceptual in nature, and it is much more likely to be independently created by multiple parties. A narrow right that allows for independent creation and protects only the precise details of a particular embodiment of the invention is unlikely to give sufficient protection as a practical matter to encourage the type of investments and work that society wants to encourage. Moreover, unlike in copyright, allowing a defense of independent invention will also significantly limit the practical value of the right. An independent invention defense would also present difficult administrative problems because courts would have a difficult time distinguishing between true and false claims of duplication. By contrast, in the copyright area, claims of true duplication are much more rare.

Finally, permitting independent creation as a defense in patent law would encourage unproductive duplication. Once an invention has been created — once a technical insight such as Bell's has been discovered — it is a waste of resources for others to continue working in an attempt to achieve that insight a second time. If independent invention were a defense, firms would have an incentive to wall off their researchers from the knowledge of new discoveries and to continue funding their researchers' attempts to discover independently what has already been discovered. By contrast, the independently created copyrighted works are so unlikely to be identical that the problem of wasteful duplication is negligible.

The differences in the scope of patents and copyrights have long been thought to justify a very different level of creativity to obtain the rights. Because patents preclude more than just copying, patent law has always required novelty as one substantial element of the creative standard that must be met. Thus, no valid patent can be obtained by an inventor who independently creates something previously available in the prior art. This rule is easily justified, because it prevents already existing matter from falling under a new set of the exclusive rights and thereby prevents researchers from being over-rewarded by receiving rights beyond their contribution.[21]

The broader scope of patent rights may also seem to provide an easy justification for the nonobviousness doctrine. The intuition is that, compared to copyrights, patent rights place much greater restrictions on the freedom of others and thus more is demanded from the inventor than from the author. With greater rights comes greater responsibilities for obtaining the rights. This

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[21] Such over-rewards would be inefficient because researchers would expend too many resources trying to obtain the rewards. The analogy would be offering a $50 reward to find a $25 lost watch.

justification suggests that, if patent law granted more narrow rights and allowed independent creation as a defense, the standard of creativity could sensibly be set lower. In fact, this approach is sometimes taken in this and other countries by permitting a special class of patent-like rights that operate more like copyright. Independent creation is a defense to infringement, and rights are more limited to the specific configuration disclosed by the inventor. Correspondingly, the level of creativity needed to obtain the patent-like right is lower: Nonobviousness is not required; sometimes not even novelty need be shown.[22]

Such mini-patent rights are not, however, necessarily wise policy.[23] While such limited rights avoid the difficulties of having to define a stringent standard of creativity, they require courts to determine whether an accused infringer has copied or independently arrived at the relevant advance. That task may be very difficult where the protected subject matter is not an idiosyncratic creation (like a story) but a conceptual advance that, even if independently created, is likely to be highly similar or identical to the first creation. Thus, society may have good reasons to permit intellectual property rights that do not allow a defense of independent creation, and where such rights do exist, we can expect a relatively high standard of creativity to obtain them.

The intuition that more should be demanded in exchange for greater rights seems to provide a fair guide to the levels of creativity demanded across copyright and patent law, but the nonobviousness standard for patentable inventions can also be supported by a more rigorous economic rationale.

B. Economic View: The Economic Effects of Trivial Patents.

The economic importance of the nonobviousness requirement can best be understood by considering the consequences of eliminating the doctrine and permitting patents to issue on trivial inventions. It is important to emphasize that "trivial" inventions here refers to *technologically* trivial inventions — in other words, inventions that could be had for little cost in technological research and development. For these inventions, the rewards of the patent system are assumed to be largely unnecessary. The basic intuition is that, for such trivial "inventions" ("developments" might be the better word), enough incentive to create them is provided even by being the first to market the

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[22] The example in the United States is the Semiconductor Chip Protection Act, 17 U.S.C. §901 et seq, which protects semiconductor chip designs only against copying and requires neither novelty nor nonobviousness to obtain rights. Similarly, German utility design right (known as Geschmacksmuster) has a lower standard of creativity required to obtain the right, but provides protection only against copying. *See* 1 Donald S. Chisum, *Chisum on Patents* § 3.06[2] (2004) (noting that the Geschmacksmuster protects "against copying or imitation of the design and does not protect against innocent duplication"); J.H. Reichman, *Toward a Third Intellectual Property Paradigm: Article: Legal Hybrids Between the Patent and Copyright Paradigms*, 94 Colum. L. Rev. 2432, 2458 (1994) (noting the "weaker standard than nonobviousness" needed to support the German Geschmacksmuster).

[23] *See generally*, Mark D. Janis, *Second Tier Patent Protection*, 40 Harv. Int'l L.J. 151 (1999) (detailing the difficulties encountered by minor or "second tier" patent systems).

innovation or by other means of intellectual property protection.[24] While that is the correct basic intuition, the nonobviousness doctrine in actual practice can be seen as preforming four similar, but slightly different functions.

1. *Preventing "Thickets" of Economically Trivial Patents*. Although technical triviality does not necessarily imply economic triviality, at least some technically trivial developments are also economically trivial. A good example might be the patent at issue in *Graham v. John Deere Co.*, which involved a very slight modification of a prior art clamp for holding a plough shank (the positions of certain pieces were changed slightly and the plough shank was fastened to the clamp more securely).[25] This patented clamp almost certainly did not have great economic significance; indeed, the patentee never bothered to practice the patent.[26] For such patents, the basic intuition for denying patentability to obvious developments holds: To the extent these developments are worth producing, sufficient incentives exist for ordinary mechanics and engineers to create them.

For two reasons, however, preventing economically and technically trivial patents does not provide the best justification for the nonobviousness doctrine. First, if the patent is truly economically trivial, then the burden on the economy will be slight. The adverse effects of such patents are felt mainly in aggregate: A low standard of patentability creates the possibility of a thicket of economically and technically trivial patents. The social costs imposed each one are small, but they make it expensive for firms to search through issued patents to determine whether their technology has been patented. Second, a thicket of economically trivial patents can be discouraged by other techniques, most notably, by charging high fees for obtaining or maintaining each patent. Ideally, the issuance and maintenance fees should be sufficient so as to account not only for the administrative costs of prosecuting a patent application, but also the costs that the patent will impose on third parties who have to search for the patent and to comprehend the extent of the exclusive rights granted.

The remaining three functions of the nonobviousness doctrine concern economically significant patents. These functions provide the principal justifications for the doctrine. Often more than one function can be observed in a single case.

2. *Preventing the Exploitation of Exogenous Developments.* The most important function of the nonobviousness doctrine is to prevent individuals from patenting obvious, yet economically significant responses to new conditions or "exogenous" developments — i.e., developments

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[24] This assumption has been made in prior scholarly treatments of the nonobviousness doctrine. See, e.g., Glynn S. Lunney, Jr., *Patent Law, the Federal Circuit, and the Supreme Court: A Quiet Revolution*, 11 S. Ct. Econ. Rev. 1, 3-4 (2004) (describing the consequence of eliminating the nonobviousness requirement as "extending patent protection to innovations that would have been devised and disclosed without the inducement of a patent").

[25] 383 U.S. 1, 20-26 (1966) (describing differences between the patented clamp and the prior art pieces).

[26] The patentee admitted in trial testimony that the '798 clamp was never commercially manufactured and had never been produced at all prior to the construction of a test piece as an exhibit for the litigation with John Deere. S.Ct. Appendix at 252.

achieved through some cause not attributable to the patent applicant's efforts. There is no good substitute for the obviousness doctrine in these circumstances. Higher filing or maintenance fees will not deter inventors from seeking such patents because the patent rights, if valid, will be quite valuable. Two good illustrations of this function are the Selden patent on the automobile (U.S. Pat. No. 549,160), issued in 1895, and the 1-Click® patent (U.S. Pat. No. 5,960,411), issued to Amazon.com in 1999. Both of these patents were (and are) controversial, and both have had difficulty with the non-obviousness requirement.[27]

If they are valid, these patents are fairly valuable rights. Individuals will not be dissuaded from obtaining such patent if the law will allow them to do so. As in all cases of economically significant patents, a good question to ask in deciding nonobviousness is: If the invention is obvious *and* valuable, why did not other person see fit to make the invention and to seek the patent prior to the patentees? In each case there is a very good answer: Just prior to the patented development, other important events occurred that made the development possible or more valuable. Consider Selden's patent on the combination of an internal gasoline combustion engine with all the other elements of a car (running wheels, carriage, steering mechanism, etc.). In 1877 (Selden's alleged date of invention), internal combustion gasoline engines were just beginning to become a viable technology, so it is not surprising that no one previously had mounted a test engine onto a car. Once such engine become available (and through any efforts by Selden), it required little intelligence to think that a lightweight new engine with output measured in horsepower might serve as a substitute for carriage horses. Similarly, the 1-Click® process was created by Jeff Bezos sometime prior to May of 1997,[28] during the very advent of widespread commerce. It is not surprising that no one patented methods for speeding internet commerce prior to the rise of such commerce. When the social need arise, many obvious ways to satisfy it become obvious.

The 1-Click® also demonstrates a problem of proving obviousness where social need or

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[27] The Selden patent was used to collect hundreds of thousands of dollars in royalties between 1895 and 1911. Just prior to its natural expiration, a court of appeals narrowly construed the patent's broad claims because, the court held, otherwise the broad claim in the patent would be "invalid for want of invention." *See Columbia Motor Car Co. v. C. A. Duerr & Co.*, 184 F. 893, 901 (2d Cir. 1911). The 1-Click® patent issued in 1999 and was immediately used to obtain an injunction against Amazon.com's competitor Barnesandnoble.com. The patent immediately drew widespread criticism. See, e.g., James Gleick, *Patently Absurd*, N.Y. TIMES MAG., Mar. 12, 2000, at 44 (arguing that "[w]hen 21st-century historians look back at the breakdown of the United States patent system, they will see a turning point in the case of Jeff Bezos and Amazon.com and their special invention: 'The patented One Click® feature,' as Bezos calls it"). The injunction against Barnesandnoble.com was later vacated because the Federal Circuit found "substantial questions" as to whether the 1-Click® patent was anticipated or rendered obvious by the prior art. *See Amazon.com v. Barnesandnoble.com*, 239 F.3d 1343 (Fed. Cir. 2001). The 1-Click® patent, however, survived the litigation with Barnesandnoble.com because the two parties settled the litigation before a court could finally determine the validity of the issue. *See Online Booksellers End Dispute*, N.Y. TIMES, March 8, 2002, at C4. Recently, a New Zealand citizen has petitioned the PTO for administrative reexamination of the 1-Click® patent. See *Irked customer spurs patent study,* THE SEATTLE TIMES, May 19, 2006, at D1 (noting that a New Zealand actor filed the petition for reexamination as "revenge for an 'annoyingly slow' book delivery from Amazon," and that he raised the $2,520reexamination fee from donations to his weblog).

[28] See Amazon.com, Inc. v. Barnesandnoble.com, Inc., 73 F. Supp. 2d 1228, 1232 (W.D. Wash. 1999).

capabilities have quickly changed so as to open up a new range of valuable, obvious developments. The "prior art" will be very close in time to the alleged invention and, precisely because the development is obvious, it may not be well documented. In the 1-Click® case, the prior art examined by the District Court originated from the mid-1990's, within a year or two of the alleged 1-Click® invention.[29] Also four of the five pieces of prior art were not patented, suggesting that similar developments were not considered patentable by other firms or even worth the trouble of publishing as a interesting or important advances.[30] Other pieces of prior art may also have existed, but it notoriously difficult to document prior art that is merely practiced in nascent industry. When this pattern of facts appears, a court should be wary of claims that seemingly obvious advances are nonobvious.

This analysis also suggests that the timing and circumstances surrounding the arrival of a new development can provide good proxies of technical difficulty: Where the problem and the tools for solving it have long existed, then the advent of a new solution strongly indicates that the problem was difficult. Conversely, where the novel idea occurs to multiple people soon after a problem arises, or soon after tools for solving the problem become available, then the novel development should not be eligible for any patent right having broad rights and a bar against independent creation.

3. *Allocating Rewards Among Inventors*. Another distinct function of the obviousness doctrine is to allocate the rewards of the patent royalties among inventors or alleged inventors. The classic situation here is where an inventor works to achieve an advance over all the prior art known to the inventor, but unbeknownst to that inventor, another inventor has already achieved a highly similar invention. The obviousness doctrine protects the scope of the first inventor's achievement by preventing others from obtaining rights to obvious variants of the first inventor's work.

This function can be seen in both of the cases decided in the consolidated *Graham* cases. In *Graham* itself, the advances that Graham thought he had achieved — securing the plough shank better and eliminating wear between the shank and another piece in the plough clamp — had already been accomplished by another inventor, Elmer Rolf. Graham was almost certainly not aware of Rolf's work, and in fact, Graham could have achieved priority of invention over Rolf if Graham had filed his patent application just a few months earlier. But Graham delayed, and under complex rules for determining patent priority, Rolf's work was considered prior to Graham's. The two inventions were not identical, but nonobviousness doctrine provides Rolf with a bit more protection: It prevents Graham from patenting trivial, workmanlike variations of Rolf's basic idea, and it thereby protects Rolf's ability to practice his invention.

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[29] Id. at 1233-35 (citing five pieces of prior art and providing development dates for four of them; the four dated from 1995, 1996, 1996 and "the mid-1990s").

[30] The fifth piece of prior art was also another broad patent to seemingly basic and trivial developments necessary for internet commerce. Fittingly perhaps, the owners of that patent have targeted Amazon.com, among others, for infringement of that patent. See Soverain Software L.L.C. v. Amazon.com, Inc., 79 U.S.P.Q.2D (BNA) 1208 (E.D. Tex. 2005) (denying motion for summary judgment).

A similar situation occurred in the *Calmar v. Cook Chemical* case. There, all the objective evidence seemed to suggest that Cook Chemical's patent was valid. There had been a long-felt need for a better type of cap to cover leaky insecticide sprayers; other companies had not found a solution; the inventor at Cook Chemical, Baxter Scoggin, worked long and hard to find a solution; and others copied Scoggin's solution once it was found. But all of these objective factors were consistent with what actually happened in the case: Another inventor, Jay Livingstone, had created the same type of solution and filed for a patent slightly earlier. Scoggin was not aware of Livingstone's solution because the Livingstone's patent application was held in secrecy for most of the time when Scoggin was working on a solution. The Livingstone's cap designed, which was disclosed but not claimed in his patent application, was prior art under 35 U.S.C. § 102(e). That sort of material is considered prior art in obviousness analysis precisely because the first inventor's ability to practice his invention is better protected.[31]

This justification also accounts for the modern exception to the general rule: Secret patent applications available102(e) are *not* used as prior art for obviousness purposes if the application and the later invention are owned by a single entity at the time of invention. In such cases, the same party will receive the rewards from both patents, so allocating rewards among parties is not a concern. The law thus eliminates the nonobviousness doctrine in those circumstances and allows the granting of patents provided mere novelty exists over the prior commonly-owned invention.[32]

4. *Limiting Claim Scope*. The nonobviousness doctrine also has an important role in limiting the scope of subject matter that an inventor can claim. Again the Selden case provides a very good historical example. In that case, the court of appeals held that Selden had exercised "something more than mere mechanical skill" to the point such that "invention was involved."[33] But Selden's invention was more narrow than the broad claim to any combination of a lightweight internal combustion engine with the other elements of a car. At most, Selden had made certain improvements in the structure of a particular class of gasoline engine — the so-called "constant pressure" engine, which had since become obsolete.[34] For these improvements, the court held, Selden was entitled to a patent for his improved engine and, if he wished, for his improved engine

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[31] See Hazeltine Research, Inc. v. Brenner, 382 U.S. 252 (1965) (establishing that 102(e) prior art can be used in obviousness analysis).

[32] 35 U.S.C. § 103(c).

[33] Columbia Motor Car Co. v. C. A. Duerr & Co., 184 F. at 907.

[34] In the early automotive era, gasoline engines fell within two classes. The "constant pressure" engine burned the gasoline vapor very smoothly while the volume in the piston expanded. The "constant volume" engine ignited the vapor all at once in a small explosion; thus, in fraction of a second when the vapor was ignited, the piston maintained roughly constant volume. The constant pressure engine was soon recognized to be inferior to the explosive-type constant volume engine, and ever since cars have been constructed with that latter style of engine. The court's narrowing of Selden's patent to cover only the obsolete constant pressure engine rendered his patent worthless.

mounted on a car chassis.[35] Yet the court restricted Selden's patent rights to match the extent of his inventive contribution. It emphatically rejected "the theory that Selden invented a light engine, an engine of small bulk, or an engine of high speed, using those terms absolutely."[36]

The use of obviousness doctrine to confine claim scope can also be seen in the recent *KSR v. Teleflex* litigation.[37] In that case, the issue is whether one particular patent claim on an adjustable accelerator pedal — claim 4 of U.S. Pat. No. 6,237,565 — is obvious and therefore invalid. The patent itself has three other claims that are more narrow and that more closely track the specific type of adjustable pedal created by the named inventor.[38] It is entirely possible that those more specific claims could be valid, even if the fourth claim is invalid.

This fourth function of nonobviousness brings us back to the intuition of "more rights, more responsibilities." Even within patent law, as claims become broader, a more general and fundamental contribution will be necessary to sustain the rights.

C. Historical Tests of Invention.

The four economic functions of obviousness doctrine provide good predictors of when the doctrine will be important, and when not. Obviousness doctrine will be least important in societies where (1) patent rights are expensive to obtain and to enforce, (2) the pace of social change is relatively slow, (3) few inventors are likely to working on similar projects, and (4) patent rights are kept relatively narrow. These conditions prevailed prior to the 19th century, and during that period, a clear conception of obviousness did not exist. As patents became easier to obtain and broader, inventors more numerous, and society less static, the need for obviousness or some similar doctrine grew more dire. Still, the progress toward a worldwide obviousness standard was not linear.

The chart below summarizes some of different standards for patentable invention that have been employed in the last half millennium. Subjective tests look to the inventor's own efforts. Such tests have been employed only occasionally throughout history. In the United States, a subjective approach to judging patentability is now precluded by the last sentence of § 103(a).[39] The tests in the right column are objective; they are not contingent on any efforts or qualities of the inventor. Roughly, the tests listed lower in the columns are more difficult to satisfy.

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[35] Id. at 907-08.

[36] Id. at 908.

[37] *KSR International Co., Petitioner v. Teleflex, Inc.*, 126 S. Ct. 2965 (June 26, 2006) (order granting certiorari).

[38] The other three patents all include in the claim language a "guide member" on which the pedal adjusts back and forth. See U.S. Pat. No. 6,237,565, col. 5-6 (2001).

[39] 35 U.S.C. § 103(a) ("Patentability shall not be negatived by the manner in which the invention was made.").

Subjective Tests	Objective Tests
	Novelty Only (English Practice 19th Century) (French Practice until 20th Century)
Sweat of the Brow (Venetian Practice)	Substantial Novelty / NonTriviality (English practice 17-18th Centuries) (American practice 19th Century)
	Nonobviousness (American Practice 1850 -) (English Practice 1890 -) (Worldwide standard 1994 -)
Flash of Creative Genius (*Cuno*, 1941)	Objective Genius (Another interpretation of *Cuno*)

As we will see, the history does not show steady progress toward the nonobviousness standard, even though this standard (or some closely related verbal equivalent) eventually becomes a worldwide standard. Rather, some concept of ingenuity was initially in the first patent law (Venice's), but the concept was lost when the idea of a patent system is transported to Great Britain. English practice required novelty or substantial novelty only for a long period of time. American law, most likely inspired by a French law, began to move away from a novelty-only standard in the early 1800's. American law invented the concept of "non-obviousness" as tested by the capabilities of a person having ordinary skill in a field, but American law also experimented with arguably more stringent standards. English law lagged behind American law in recognizing nonobviousness, but after latching onto nonobviousness in the late 19th century, English law never experimented with more rigorous tests. French law originated the statutory language that American common law judges would transform into the nonobviousness requirement, and yet France came late to adopting nonobviousness into its law.

The development is spasmodic and irregular, with a general convergence requiring decades of time. Nor should this history suggest that the development process is complete. Rather, while a consensus on obviousness has been reached, nations continue to experiment in developing more accurate and more precise conceptions of obviousness. To a more detailed look at this history, we now turn.

II. Embryonic Patent Law: The Rise and Fall of Ingenuity.

The relatively recent development of the nonobviousness doctrine is explained in part by the overall youth of the entire field of patent law. Unlike areas such as tort, contract or more general

property law, which can easily trace their origins back thousands of years,[40] patent law patent law can be traced back only a little more than a half millennium. Patent law began in much the same way as the nonobviousness doctrine itself — tentative, narrow and experimental. At first, a few discretionary exclusive rights were granted to individual businesses as a reward for some innovation or the introduction of new technology from another country. At first, these grants were exceptional, for anti-monopoly policies were deeply rooted in ancient law. But the exceptions were generalized into a regular system for rewarding innovation, and that system spread as countries copied the legal innovation from each other. There were policy missteps in the process, and one of those missteps was the loss of any sense that the patent must cover something truly inventive rather than merely something new.

A. The Venetian Experiment and the Original Test of Invention.

Patent law began as an exception to the classical hostility to the legal monopolies in general and to innovation rewards in particular. In the Hellenistic era, Aristotle had considered, but rejected, the idea of providing some incentive for innovation.[41] His hostility toward the idea was based in part on a fear of social change and in part on the practical concern that people would generate novelties merely to obtain a reward rather than to achieve any practical benefit.[42] While Aristotle provided a scholarly impediment to the development of patent law, late Roman law provided a legal impediment. In the late 5th century, Emperor Zeno issued a decree that strictly prohibited monopolies on "anything ... [in] the common use of mankind," with the punishment for disobedience set as loss of all property and perpetual exile.[43] For hundreds of years after Zeno's decree, nothing resembling a patent appeared in Europe or, so far as anyone can determine, anywhere else in the world. In Europe at least, the absence of patents can be explained partly because Europe lacked a state with sufficient sophistication to develop a patent policy but also partly because the late Roman hostility toward monopolies endured in the legal culture.

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[40] [cites]

[41] ARISTOTLE, POLITICS, pt. II.8, at 65 (Ernest Barker trans., 1995) (considering the suggestion that "some honour ought to be conferred on those who suggest an improvement which is of benefit to the city," but concluding that it "cannot be safely enacted, and has only a specious sound").

[42] Id. at 65-66. See also Trevor J. Saunders, Aristotle's Politics Translated with a Commentary, 145 (1995) (noting that "Greek literature on rewards and honours, on social and technical progress, and on the merits and demerits of making changes to laws and customs, is full of echoes of the points made" by Aristotle). Curiously, Aristotle's opposed innovation rewards because he thought the idea would generate new *legal* innovations. See Duffy, at ___; Prager, 34 JPOS at 113 (concluding that Aristotle was concerned about "possible abuse [of innovation rewards] in the legal and constitutional fields, where he definitely preferred stability to any development"). Of course, patents have generally not been granted for legal innovations — at least not yet! See Ayers, Duffy, Merges & Duffy.

[43] S. P. Scott, 13 The Civil Law 120 (1932) (translating the Book IV, Title 59 of the Code of Justinian). Zeno's decree purported to make illegal not only private monopolies but even those purported authorized by Imperial "Rescript already promulgated, or which may hereafter be promulgated." Id. The decree is traditional dated to approximately 480 A.D., *see* Prager, 34 JPOS at 115.

Precursors to patents began to appear in European jurisdictions during 14th and early 15th centuries.[44] These early "proto-patents"[45] or "quasi-patents"[46] were merely ad hoc grants of exclusive business rights from a sovereign entity. While some of these grants were based explicitly on industrial innovations or other introductions of novel technologies, others seem to have been motivated in part by other policy objections, including outright favoritism.[47] Thus, for example, a 1398 decree from the Duke of Saxony conferred an exclusive right on a new paper mill, even though at the time the art of paper making was, at best, only new to that particular region of Europe.[48] Similarly, monopoly privileges in glassmaking were also granted in France during the fourteenth century, but those grants seem to have been designed "to restrict—not stimulate—French glassmaking in order to conserve the forests which provided wood and charcoal for this industry."[49]

This period is best described as an era of experimentation with state-sponsored monopolies. The influence of the anti-monopoly policy of Roman law waned, and numerous states began to grant monopolies to serve a variety of commercial or political ends.

The policy of granting monopolies specifically and solely to encourage technological development first crystallized into legislation in Venetian Republic.[50] In the later half of the fifteenth

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[44] See Simon Thorley, et al., Terrell on the Law of Patents § 1.06, at 2 (Sweet & Maxwell 2000) (tracing the origins of English patent law back to the "prerogative of the Crown" to grant charters and patents to trade guilds and corporations). Between 1331 and 1452, the Crown granted exclusive rights to various "foreign weavers and other craftsman," though at least some of these grants do not seem to have been predicated on innovation. *Id*. (noting that grants were conferred for importing Cornish tin and for selling sweet wines in the City of London).

[45] Pohlmann, 43 JPOS at 122

[46] Prager, 34 JPOS at 123.

[47] See Bugbee at 14 (noting that in England "'letters patent' ... were issued for all sorts of privileges and grants" and that "true patents of invention—which were very late in appearing—comprised only a very small fraction of the total").

[48] Prager, 34 JPOS at 123-24 (discussing the grant and setting forth a partial translation from the original German). The recitation in the grant mentions only that the mill is "newly started"and has obtained the Duke's "grace and favor," the grant protects the mill from any competition that might be damaging in any manner. *Id*. at 123-24.

[49] Bugbee at 169 n.30. See Prager, 34 JPOS at 124 (also viewing as a type of quasi-patent the early French grants of monopolies "for the establishment of glass furnaces in forests owned by the Crown").

[50] See, e.g., Bugbee, at 23 (crediting Venetian Republic with "the world's first patent system"); M. Frumkin, *The Origin of Patents*, 27 JPOS 143, 144 (1945); F. D. Prager, The Early Growth and Influence of Intellectual Property, 34 JPOS 106, 107-08 (noting that the system of patent monopolies was perfected in Italy, mainly in Venice during the fifteenth century); Edward C. Walterscheid, The Early Evolution of the United States Patent Law (Part 1), 76 JPTOS 697, 706 (1994) (same); Donald S. Chisum, et al., Principles of Patent Law 10-11 (1998). Venice's claim to priority in the development of the first true patent law is based on the work of Guido Mandich. See Mandich, Venetian Patents (1450-1550), 30 JPOS 166, 169 (1948) ("We can now claim the priority of Venice in recognizing the *right* of inventors").

century, Venice granted monopoly privileges with increasing frequency for allegedly improved industrial devices and processes brought about by the applicant's "skill and experience," "pertinent thoughts and labors," or "efforts, study and ingenuity."[51] The grants thus looked to the efforts of the individual being rewarded. If such "sweat of the brow" were seen as a prerequisite to exclusive rights, then the Venetian patent system was employing a

This practice was confirmed in the act of March 19, 1474, which is the first known legislative statement of generally applicable patent principles:

> WE HAVE among us men of great genius, apt to invent and discover ingenious devices; and in view of the grandeur and virtue of our City, more such men come to us every day from divers parts. Now, if provision were made for the works and devices discovered by such persons, so that others who may see them could not build them and take the inventor's honor away, more men would then apply their genius, would discover, and would build devices of great utility and benefit to our commonwealth. Therefore:
>
> BE IT ENACTED that, by the authority of this Council, every person who shall build any new and ingenious device in this City, not previously made in our Commonwealth, shall give notice of it to the office of our General Welfare Board when it has been reduced to perfection so that it can be used and operated. It being forbidden to every other person in any of our territories and towns to make any further device conforming with and similar to said one, without the consent and license of the author, for the term of 10 years. And if anybody builds it in violation thereof, the aforesaid author and inventor shall be entitled to have him summoned before any magistrate of this City, by which magistrate the said infringer shall be constrained to pay him hundred ducats; and the devices shall be destroyed at once. It being, however, with the power and discretion of the Government, in its activities, to take and use any such device and instrument, with this condition however that no one but the author shall operate it.[52]

Of more enduring significance than any innovation rewarded under it, this Venetian statute is a true legal innovation. The statute includes many recognizable features of modern patent law, including an exclusive right, a limited term, at least a crude administrative examination and requirements of novelty (albeit mere territorial novelty), operability and utility.

An embryonic requirement of nonobviousness or inventiveness also seems to appear, for the statute requires the device to be a "new *and ingenious* device"—in the original Italian, "nuovo et ingegnoso artifico."[53] Writing in the middle part of the twentieth century, Giulio Mandich interpreted this passage as setting forth "in outline, a requirement of inventive merit . . . according

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[51]Mandich, 30 JPOS at 173-74 (quoting, respectively, Venetian monopoly grants made in 1460 for an improved stove and for a device for raising water, and in 1469 for the newly imported art of printing).

[52] Mandich, at 176-77 (translation by F.D. Prager).

[53] Mandich at 177.

to which the invention must not be a trifling, all too obvious application of known technology."[54] That may, however, be too much of a twentieth century spin. As with grants prior to 1474, subsequent Venetian patents (which, despite the general legislative declaration, were often still granted in separate acts) tended to emphasize "the heavy expense, assiduous labors, and burning of the midnight oil" that applicant undertook to create the invention.[55] In other words, the test was subjective — looking to the efforts of the inventor — not objective.

The policy set forth in the Venetian statute was quite plainly copied throughout Europe. The historical evidence is strong that other jurisdictions did not independently invent the concept patent law, but rather followed the Venetian example. Nevertheless, if the Venetian statute or practice did include some concept of an invention standard in addition to mere novelty and utility, that concept was lost as the Venetian concept of patent law was transmitted. One jurisdiction in particular seems responsible for the loss — England.

B. The English Experience and the Loss of Ingenuity.

The concept of patent law as the modern world knows it — i.e., as a legal device for rewarding innovations — was imported into England from Venice. Letters patent (open or public letters) granting exclusive franchises were well known in Britain by the mid-fifteenth century, but such letters had previously been used to encourage industrial growth or relocation, not as a reward for innovation.[56] The idea of using letters patent to reward innovation was introduced to England by an Italian, Jacobus Acontius, who came from an area dominated by the Venetian Republic and who may even have had "first hand" knowledge of the Venetian system as a patentee.[57] In 1559, Acontius sent Elizabeth I a petition reciting that, through "much expense in experiments," he had discovered "most useful things," but that without a royal prohibition on using machines such as his, he "shall have no returns" on his investments.[58] Acontius' royal grant, which occurred in 1565, contained the core thought of the patent system: "[I]t is right that inventors should be rewarded and protected against others making profit out of their discoveries.

In the ensuing years, English monarchs established a practice of rewarding innovation with the grant of a patent. The patents themselves would use language highly similar to that found in Venetian patent grants, stressing that the exclusive rights were conferred because the monarch wished to "favour ... ingenious and profitable inventions" and because, the inventors having

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[54] Id.

[55] Id. at 184.

[56] E. Wyndham Hulme, *The History of the Patent System Under the Prerogative and at Common Law*, 12 L. Q. Rev. 141, 142-44 (1896) (describing the English system of patents as a means of industrial protectionism).

[57] See Jeremy Phillips, The English Patent as a Reward for Invention: The Importation of an Idea, 3 J. Leg. Hist. 71, 75 (1982).

[58] Id. at 71.

expended "great travail and industry," it was "agreeable to justice, that the authors of so laudable and useful inventions should, in some good measure, reap the fruits of their studies, labours, and charges."[59] Early English patent grants thus show some that, along with the general idea of a patent system, the English also imported some idea that patents should be based on "ingenious" and "laudable" advances requiring study, labor and investment.[60] The English patent also seemed to have imported the subjective standard of invention used by Venice.

Over the next two and a half centuries, however, the English did nothing to advance the Venetian concept of invention. Indeed, the core thought that a patent should be based on more than mere novel and utility was utterly lost during this period. Some of the explanation for this loss involves factors that were outside the control of the English legal and political system. The Venetian concept of invention was primitive at best, and the need for an invention doctrine was almost certainly less then than today; a more static society needs the concept of nonobviousness or inventive step less than a more dynamic society. Still, the loss of ingenuity can be traced to specific failings in the English legal system, including institutional weaknesses, at least two influential missteps by the leading 17th commentator and, perhaps most importantly, a major distraction caused by a constitutional fight between the Crown and the Parliament. The English experience thus demonstrates the mistakes can occur during the development of legal doctrine. We begin our study with the constitutional problem.

The arrival of the concept of invention monopolies from Venice did not put an end to English Crown's unfortunate practice of granting other kinds monopolies to royal favorites. By the end of the 16th century, that practice had, to put it mildly, gotten out of hand. Patents conferred monopolies for vinegar, salt, horns, iron, bags, bottles and other common commodities.[61] Queen Elizabeth I even went so far as to reward one of her favorites, Sir Walter Raleigh, with a patent

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[59] *Letters Patent to Edward Lord Dudley* (Feb. 22, 1622), reprinted in 1 Web. Pat. Cas. 14. Other evidence also suggests that the English borrowed the idea of innovation patents from Venice. At least one sixteenth century English book attributes to Venice the idea of granting public rewards for invention, and the early English patents covering innovations also tended to follow the Venetian practice of issuing the grant with a term of years divisible by 5 (usually 10 or 20 years), rather than the pre-existing English practice of having the term of monopoly grants be divisible by 7 (usually 14 or 21 years). *See* Frumkin, *supra* note ___, 26 Trans. Newcomen Soc. at 50-51. As one historian has concluded, "one way or another, Italian influence shows like a thread in all incipient patent systems." Id. at 52. See also MacLeod, supra at note ___, at 10-11 (also concluding that the English patent system was borrowed from Venice).

[60] Id. See also William H. Price, The English Patents of Monopoly 7 (1913) (also tracing the English patent system back to the petition for a reward filed by Acontius); Hulme, supra note ___, at 148 & 151 (recognizing that Acontius "first suggested to the Crown that a monopoly was the most effectual method of rewarding an inventor" and that "the acceptance by the Crown of the Monopoly policy advocated by Acontius" produced a "revolution" in English system); Maximilian Frumkin, *Early History of Patents for Invention*, 26 Trans. Newcomen Soc. 47, 50 (1947) (similar).

[61] Rogers, at 264.

covering wine shops.[62] So many patents were issued that one entrepreneur sought and obtained a patent "for writing letters patent."[63] It was an indication of just how wrong things were that writing patents had become a lucrative industry in itself.

The English legal and political culture reacted to this abuse, but the ensuing constitutional fight distracted legal thinkers from the task of maintaining and refining a concept of invention. As a first step in curbing the abuse of the royal patenting power, Parliament pressured Queen Elizabeth to decree in 1602 that courts could determine the validity of letters patent according to the principles of common law.[64] Prior to this decree, the power of the courts to invalidate patents was quite limited. If the letter patent recited that it had been granted because of a new invention, then the patent could be invalidated if the court determine that no invention had been made. The theory in such cases was that the patent was based on a "false premise,"[65] and thus the invalidation was not an affront to royal power. Elizabeth's decree allowed the courts to consider the validity of non-innovation patents as well but, significantly, it did not specify the grounds on which such patents could be invalidated.

The famous case of *Darcy v. Allen* arose soon after Elizabeth's decree. The patent in that case covered the importation and sale of playing cards, and it was clearly based on favoritism rather than innovation. Though the defendant's attorneys challenged the validity of such patents, the difficulty with such a challenge was that it raised highly sensitive questions concerning royal constitutional power to grant monopolies and the legal precedents on the subject were sparse. Ultimately, the judges ruled for the defendant but gave no reasons for their decision. Because the defendant's attorney had relied on numerous grounds to defeat the patentee's suit — including some grounds that would not have invalidated the patent and some that would invalidate the patent while imposing relatively modest limits on the Crown's power to issue patents — the decision did not end the controversy over royal monopolies.

Twenty years after *Darcy*, the controversy over royal monopolies culminated with Parliament's passage in 1623 of the Statute of Monopolies.[66] This statute was destined to become

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[62] Bruce W. Bugbee, Genesis of American Patent and Copyright Law 37 (1967).

[63] Rogers, at 263.

[64] See Fox, supra note ___, at 77 (noting that Elizabeth's decree promised that no monopolies could be "put into execution but such as should first have a trial according to the law for the good of the people").

[65] See Jacob I. Corre, *The Argument, Decision, and Reports of Darcy v. Allen*, 45 Emory L.J. 1261, 1305 (1996).

[66] An Act Concerning Monopolies and Dispensations with Penal Laws, and Forfeitures Thereof, 21 Jac. c.3, 1. The proviso on invention patents reads:

> Provided also, that any declaration before mentioned shall not extend to any letters patents and grants of privilege for the term of fourteen years or under, hereafter to be made, of the sole working or making of any manner of new manufactures within this realm to the true and first inventor and inventors of such manufactures, which others at the time of making such letters patents and grants shall not use, so as also

famous in two branches of law. In what we now call antitrust (or, in Europe, competition law), the Statute is a renowned early precedent demonstrating the Western preference for competition over monopoly.[67] In patent law, the statute remained for more than two centuries was the sole statutory recognition of the English system for granting monopolies for innovations. Such is the importance of the statute that, even into the twenty first century, courts deciding patent cases continue to interpret and apply the language of the Statute.[68]

Yet perhaps because the Statute of Monopolies was directly primarily at ending the long controversy over abusive royal monopolies, it did not focus on innovation policy nor attempt to articulate intellectual justifications for the award of innovation monopolies. Rather, the Statute had an effect on innovation law only through a single proviso, which exempted patents for inventions from the statute's general prohibition on royal patent monopolies.[69] The crucial language permits the Crown to continue issuing patents for "any manner of *new* manufactures." Unlike the Venetian statute, mere novelty is sufficient to fall within the proviso; there is no explicit requirement of ingenuity.

It is easy today to criticize the Statute of Monopolies as deficient because it lost the Venetian concept of ingenuity. But the Statute itself was a tremendously positive development in England's general monopoly policy. The loss of ingenuity is better viewed as collateral damage from the decades of abusive monopolies by the Crown. Thought and energy was properly directed toward the more urgent task of ending those abuses. The concept of invention received less attention and accordingly suffered some degradation.

The controversy over royal monopolies was not, however, the only explanation for the loss of an ingenuity concept. Though it had no explicit requirement other than merely novelty, the Statute of Monopolies contained several textual bases from which a doctrine of invention could have

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> they be not contrary to the law nor mischievous to the state by raising prices of commodities at home, or hurt of trade, or generally inconvenient. The same fourteen years to be accounted from the date of the first letters patents or grant of such privilege hereafter to be made, but that the same shall be of such force as they should be if this act had never been made, and of none other.

[67] Earl W. Kintner, 1 Federal Antitrust Law §2.3, at 48 (1980) (citing the Statute of Monopolies as a "famous" declaration by Parliament of "its sense of the common law" against monopolies). In antitrust law, the Statute of Monopolies is often credited as originating the private action for treble damages. See James A. Rahl, Reforming American Antitrust in Foreign Commerce, 81 Mich. L. Rev. 1130, 1138 (1983); Edward D. Cavanagh, *Detrebling Antitrust Damages: An Idea Whose Time Has Come*?, 61 Tul. L. Rev. 777, 782 (1987).

[68] *See, e.g., Welcome Real-Time SA v. Catuity Inc.* [2001] FCA 445 (available at www.austlii.edu.au/au/cases /cth/federal_ct/2001/445.html), where the Federal Court of Australia recognized that the definition of patentable invention descends directly from the Statute of Monopolies. The Australian court interpreted this ancient language to sustain the validity of a business method patent directed to the operation of customer loyalty programs with so-called "smart cards" (*e.g.*, a credit or debit card containing a microprocessor).

[69] Thomas Webster, The Law and Practice of Letters Patent for Inventions 44-45 (London, Crofts and Blenkarn 1841) (reprinting the Statute of Monopolies, 21 Jac. 1, c.3).

been developed. No such doctrine did develop — or at least did not develop until the second half of the 19th century — because of missteps, institutional deficiencies and historical accidents.

One textual basis for developing an invention doctrine was the requirement that patents be awarded only to the "true and first inventor and inventors." This language could have been seized upon to demand that patentees actually have exercised an inventive faculty. Yet the structure of the statute did not lend itself to this reading. The statute appears to contemplate that any "new manufacture" would patentable, and the language "to the true and first inventor and inventors of such manufactures" seems merely to specify who would be the proper recipient of the patent. Moreover, the word "inventor" was, at the time, considered to extend not only to any *discoverer* but even to an *introducer* of a novelty.[70] Thus, the Statute permitted the continued issuance of so-called "patents of importation" — patents issued to the first person to introduce an existing foreign technology to domestic industry. Such patents were remnants of Mercantilism, but their survival in England created another barrier to further development of a more modern concept of invention.

The Statute of Monopolies also continued the discretion of the royal government to *refuse* patents, and the government could have demanded that patent applicants have demonstrated significant creativity as prerequisite for a patent. The textual basis for the government's continuing discretion was quite solid. The Statute of Monopolies expressly stated that, with respect to the granting of monopolies on new manufactures, the Statute was designed to keep the law the same as before — as "if this act had never been made" — and the Crown's preexisting power to grant monopolies was a discretionary power of royal prerogative. Furthermore, the Statute included broad language authorizing the denial of patents where they would be "mischievous to the state by raising prices of commodities at home, or hurt of trade, or generally inconvenient." This language provided not only a textual basis for the utility doctrine of patent law (the requirement that patented inventions be useful),[71] but also a basis for denying "inconvenient" patents under a broad range of

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[70] E. Wyndham Hulme, *On the History of Patent Law in the Seventeenth and Eighteenth Centuries*, 18 L. Q. Rev. 280, 281 (1902) (relying on older definitions of the word "invent" to conclude that "the proper interpretation of 'the first and true inventor' of the statute in 1623 was the true and first founder or institutor of a manufacture"). See also id. (observing that the concept "invention" in the modern sense, "i.e., the exercise of the inventive faculty, was not an essential qualification" under the Statute of Monopolies).

[71] See Edward Coke, The Third Part of the Institutes of the Law of England 184 (1641) (interpreting the language "nor mischievous to the state by raising prices of commodities at home" as requiring that "[i]n every such new manufacture that deserves a priviledge, there must be *urgens necessitas*, and *evidens utilitas*"). *See also Morgan v. Seaward*, 150 Eng. Rep. 874, 881 (Exch. 1837), in which Baron Parke stated that "[a] grant of a monopoly for an invention which is altogether useless may well be considered as 'mischievous to the state, to the hurt of trade, or generally inconvenient,' within the meaning of the [Statute of Monopolies]." *Id.* Parked also noted, however, the then-standard practice did not rely on the statutory language as the basis for invalidating useless patents: "It may be that the proper form of plea is to use the words of the statute, and not to plead the want of utility; though it would probably be too late to take that objection in the present stage." Id. Some precedent in the late 20th century suggested that the nonobviousness doctrine was also grounded in this statutory language. *See L'Oreal's Application*, [1970] RPC 565 (Pat. App. Trib. 1970) (citing the Statute of Monopolies and stating that, if a patent contains no "ground for non-obviousness," it has "contributed nothing to the stock of human knowledge" and therefore granting a patent "would be both hurtful to trade and generally inconvenient"); *Blendax-Werke's*

circumstances. Yet this possible basis for an invention doctrine was never exploited due to both institutional limitations and a misstep by Sir Edward Coke, who was the leading commentator in the field.

Soon after enactment of the Statute, Coke's influential commentary gave, as one example of an "inconvenient" patent, a new type of mill that would have replaced workers and thus threatened "to turn so many labouring men to idleness."[72] That example is shockingly Luddite, and disfavoring labor saving inventions would seem to be very bad innovation policy. Fortunately, Coke's commentary did not have the destructive impact that it could have had. There is no evidence that the English Crown generally denied patents due to fears of increased unemployment. Yet throughout the 17th and 18th centuries, the Crown authorities did continue to exercise considerable discretion in denying patents on the basis of ad hoc political grounds. For example, the government refused patents to inventions that threatened a particular source of royal taxes (e.g., by allowing a lower taxed good to be substituted for a higher-taxed one),[73] or that drew opposition from a politically powerful guild, company or trade association.[74] The royal discretion was not used to refine the concept of invention or to develop a requirement that patents cover a significant technological contribution.

The institutional structure of the English patent system provides a good explanation for why royal officials focused more on politics than on technological achievement. The English patent system of that time is often described as a "registration" system[75] because, unlike the current U.S. system, the executive branch officials would undertake no systematic examination of the patent application to ensure the bona fides of the alleged invention. As one historian describes the process, the novelty of the invention "was generally taken on trust,"[76] with the understanding that the courts could invalidate issued patents found to be non-novel. Still, the applicant had no *right* to obtain a patent, and the executive was entitled to exercise discretion. But since the officers charged with

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Application, [1980] RPC 491 (Pat. Ct. 1980) (same). But that justification was a mere afterthought, as the English nonobviousness doctrine developed in the late 19th century without any reliance on the text of the Statute of Monopolies.

[72] Edward Coke, The Third Part of the Institutes of the Law of England 184 (1641).

[73] See MacLeod at 22-24 (providing examples in which the royal government in the 16th and 17th centuries questioned or rejected patent applications due to concerns over tax revenues).

[74] Id. at 31 (detailing the government refusal to issue a patent for a new method of drawing gold and silver wire because of opposition by the London Gold and Silver Wire Drawers); id. At 43 (discussing the opposition of the Clockmakers Company to several petitions for patents).

[75] MacLeod, at 41.

[76] MacLeod, at 41.

administering the system were political officials,[77] they tended to consider political factors not technological factors in exercising discretion. An enormous a practical problem stood in the way of developing a concept of invention within the executive branch: The royal government would have to have hired a bureaucracy capable of distinguishing the worthy from the unworthy — the inventive from the non-inventive. In fact, the English continued to resist the idea of having technological examination of patent applications well into the 20th century, when the registration-style of patent system was finally abandoned. With such an institutional structure, there was little hope of the executive officials refining the concept of invention.

One last statutory basis for developing a doctrine of invention is the requirement that patents "be not contrary to the law." The history explains the meaning of that requirement. The Statute of Monopolies did not itself create a law of patents so much as abolish the royal abuses of the patenting power. Thus, English commentators have consistently read the Statute of Monopolies as "distinctly recogniz[ing] the existence of an old common law."[78]

The Statute of Monopolies thus left an opening — the common law — by which courts and commentators could have developed an invention doctrine. Moreover, in summarizing the theory under which the common law accepted patents for inventions, Coke echoed the original Venetian theory that patents reward inventors for their hard work and ingenuity and thereby encourage others to make similar efforts: "[T]he reason wherefore such a priviledge is good in law is, because the inventor bringeth to and for the common wealth a new manufacture by his invention, cost and charges, and therefore it is reason, that he should have a priviledge for his reward (and the incouragement of others in the like) for a convenient time."[79] Coke's commentary even retained some notion that a patent should be based on more than just novelty and utility. He opined that a patent could not be "consonant" to the pre-existing common law unless it was "substantially and essentially newly invented."[80]

Despite this possible basis for developing a more rigorous conception of invention, the English courts failed to so. The institutional structure of the English patent system again provides part of the reason for this failure. The English system for obtaining a patent was expensive and cumbersome. In the 17th and 18th centuries only a small number of persistent inventors were able to wring patents from the system. To some degree, the difficulty of obtaining a patent decreased the need for stringent legal requirement of invention. Part of the justification for the modern nonobviousness doctrine is that it prevents a profusion of paltry patents from clogging the channels of commerce and industry. But economically trivial patents can also be thwarted by an expensive application process.

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[77] The main officers holding discretion in the royal government were the law officers (the Attorney or Solicitor General) and the members of the Privy Council, which had power to revoke a patent. Id. at 41-42.

[78] Thomas Webster, Reports and Notes of Cases on Letters Patent for Inventions iii (London 1844).

[79] 3 Coke. Inst. 184.

[80] Coke, 3 Inst. 184.

The expense and difficulty of the application process is only part of the reason for nondevelopment of the invention doctrine. Another part of the problem can be traced to Coke's commentary. In explaining the pre-existing common law concept of invention, Coke referred to an unpublished 16th century case (*Bircot's case*) which he summarized as recognizing that "if the substance was in *esse* [in existence] before, and a new addition thereunto, though that addition make the former more profitable, yet it is not a new manufacture in law."[81] Such an addition — even a profitable one — should be disfavored because it was "to put but a new button on an old coat; and it is much easier to adde then to invent."[82] Coke's commentary thus targeted for special disfavor patents for improvements to existing technology.

In hindsight, Coke's view is plainly a misstep in the development of invention doctrine, but that misstep took time to correct. As late as 1741, one court adhered to Coke's view and invalidated the patent on a plow that was "not substantially and absolutely a new invention but barely and only a small additional improvement on an old invention, such as was frequently made on many utensils in husbandry."[83] At best, Coke's views could be read to support a "substantial" novelty standard of patentability, but that standard is a highly ambiguous and imperfect measure of invention.

Not until the late 18th century did the courts reject Coke's views.[84] Eliminating hostility to improvement patents was surely a positive development. As Lord Mansfield noted in 1776, "if the objection to the patent on the grounds of the invention being only an addition to an old machine were to prevail, that objection would go to repeal almost every patent that was ever granted."[85] Moreover, Coke's account of *Bircot's case* — with its assertion that addition is easier than invention like putting a new button on an old coat — had "more quaintness than solidity in the reason assigned."[86] Improvement patents are ubiquitous, and adding something useful and new to

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[81] Id.

[82] Coke, 3 Inst. 184.

[83] MacLeod at 68.

[84] *See*, *e.g.*, Morris v. Bramson, 1 Carpmael Pat. Cas. 30, 34 (1776); Boulton & Watt v. Bull, 1 Carpmael Pat. Cas. 117, 145 (Ct. Comm. Pleas 1795) (opinion of Eyre, L.C.J.) (criticizing Coke's commentary on patents as "sometimes not quite intelligibl[e]" and noting that, to the extent Coke was arguing that a mere addition to an existing manufacture would not support a patent, that principle "has been ... not adhered to"). Some cases kept an echo of Coke's view by, for example, requiring that "if there by any thing *material* and new, which is an improvement of the trade, that will be sufficient to support a patent." The King v. Arkwright, 1 Carpmael Pat. Cas. 53, 93 (K.B. 1785) (opinion of Buller, J.) (emphasis added). But materiality was measured by the utility of the addition to the trade, not by the technical difficulty in accomplishing the addition.

[85] *See* Morris v. Bramson, 1 Carpmael Pat. Cas. 30, 34 (1776).

[86] Boulton & Watt v. Bull, 1 Carpmael Pat. Cas. at 142 (opinion of Buller, J.). Buller thought that "arts and sciences ... were at so low an ebb, in comparison to that point to which they have been since advanced, and the effect and utility of improvements so little known, that I do not think that case [*Bircot's case*] ought to preclude the question [whether additions may be patented]." Id. American treatise writer Willard Phillips also noted that the rule in *Bircot's* case was abandoned by English courts in the late 18th centuries. See Willard Phillips, The Law of Patents

an existing machine is not always so trivial as Coke thought.

But correcting Coke's misstep had its own cost. In rejecting Coke's hostility to improvement patents, the English courts also eliminated the last vestiges of an invention doctrine from English law. Thus, in 1842, the court in *Crane v. Price* could declare that, "if the result produced by such a combination [of two previously known things] is either a new article, or a better article, or a cheaper article to the public, than that produced by the old method, that such combination is an invention or manufacture intended by the statute [of Monopolies], and may well become the subject of a patent."[87] *Crane* thus established that novelty and utility alone were sufficient to sustain patentability under English law. Technical difficulty had become wholly foreign to the English law.

In sum, the history from the 16th through to the mid-19th centuries shows the English law gradually forgetting or losing any concept of invention inherited from Venetian law. If a manufacture was new and useful in trade, then it was considered a patentable invention under English law. The English experience demonstrates that the evolution of legal doctrine is not linear. Major mistakes can occur and, more importantly, they can persist for decades or even centuries.

English law would eventually embrace an obviousness doctrine, but not until fairly late in the 19th century, several decades after American had recognized that novelty and utility were not the only prerequisites to a patents. In the middle of the 19th century, some English decisions employed a somewhat broader sense of the "novelty" requirement,[88] but it was not until the 1889 that the English precedents began to use the concept of obviousness.[89] Yet once English cases did adopt the obviousness doctrine, they did not, as American courts did, experiment with more stringent standard of invention. Perhaps because the English courts evolved from a system that focused almost exclusively on novelty, they did not believe it possible to impose a very stringent standard of invention.

III. The Rise of the Invention Standard: The American Contribution.

The origins of the modern nonobviousness doctrine can be traced back directly to a tiny

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for Inventions 130-33 (Boston 1837).

[87] *Crane v. Price*, 1 Web. Pat. Cas. 393, 409 (1842).

[88] For example, in Ormson v. Clarke, 143 Eng. Rep. 134 (1862), the court invalidated a patent on a boiler cast in a *single* piece rather than multiple pieces (which was how prior art boilers were made). The court's justification was, however, not obviousness but rather that there was no "new process" — i.e., no "novelty in the process of casting." See id. at 135 (opinions of, respectively, Williams, J., and Erle, C.J.).

[89] The first comprehensive recognition of the concept comes in *American Braided Wire Co. v. Thompson*, 6 R.P.C. 518, 528 (1889). See also *Molnlyke A.B. v. Proctor & Gamble Ltd.*, 1994 R.P.C. 49, 113 (crediting *American Braided Wire* with the first comprehensive use of the obviousness concept).

exception contained in the French Patent Act of 1791. In France, little came of the exception. But the French exception was copied into the laws of the United States, and here it flourished. As judges applied the exception in specific cases, it was narrowed in some respects, and expanded in others. By 1836, when the statutory language embodying the exception was repealed, the doctrine spawned by the statutory exception had already mutated into a more general requirement of patent law. That general doctrine survived, and indeed began to take on even more importance. The transformation of a small exception into one of the fundamental prerequisite for obtaining a patent was completed in Hotchkiss v. Greenwood. That case — as the quote at the beginning of this article shows — would become internationally famous. Yet *Hotchkiss*'s fame is only partially deserved. It was a signal event in development of a new patentability standard, but it grew out of earlier incremental experiments in the law. Those experiments were nourished by commentators and the common-law process.

A. Early American Patent Statutes: English, American and French Components.

The patent law of the United States has always required that an invention must be 1) *new* and 2) *useful* to be patentable. In the early history of the United States patent system, those two requirements formed the essence of the patentability standard. In this respect, the early U.S. law was thus following English law.

Yet although English law provided the baseline, American law had distinctive features. The country's first patent statute hinted of a possible third requirement for patentability. The 1790 Patent Act conferred discretion on the members of a patent board (consisting of the Secretary of State, the Secretary of War and the Attorney General) to grant a patent "if they shall deem the invention or discovery *sufficiently* useful *and important*."[90] Though that requirement is semantically quite different from the modern nonobviousness requirement, it can be viewed as similar if "sufficiently . . . important" is construed as referring to *technical* importance. The 1790 statute was, however, short-lived and no judicial decisions ever interpreted the requirement.[91]

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[90] Act of April 10, 1790, § 1, 1 Stat. 109, 110 (emphasis added).

[91] The "sufficiently useful and important" formulation was revived in 1836, see Patent Act of 1836, § 7, 5 Stat. 115, 120, and remained in force until the enactment of the Patent Act of 1952. See, e.g., Rev. Stat. § 4893; 35 U.S.C. §36 (1946 ed.). Nevertheless, the statutory language was little cited and little used. *See* P. J. Federico, *Commentary on the New Patent Act*, 75 J. Pat. & Trademark Off. Soc'y 161, 197 (1993) (originally published in 1954) (explaining that the 1952 Act's omitted the phrase "sufficiently useful and important" because "[t]he meaning of this old phrase was obscure and it had seldom been resorted to either in the Patent Office or in the courts"); Giles S. Rich, *Principles of Patentability*, 28 G.W. L. Rev. 393, 398 (1960) (citing Federico's views and agreeing that the "sufficiently useful and important" language was "disused and moribund"). The one Supreme Court discussion of this language occurs in *Reckendorfer v. Faber*, 92 U.S. 347, 351-58 (1876). Though the *Reckendorfer* opinion states that courts could review the Patent Commissioner's judgment concerning the "importance" of an invention, *id.* at 354-55, the decision also seems to recognize invention and importance as separate and distinct requirements, *id.* Yet, even if *Reckendorfer* were read as relying on the "sufficiently ... important" language as a basis for the invention doctrine, that reliance would have been a mere afterthought since the invention doctrine was created prior to 1876 and had previously been justified as an interpretation of the "sufficiently ... important" requirement.

The "sufficient importance" requirement in the 1790 Act seems to have been the basis for a provision in the patent bill that Thomas Jefferson drafted in 1791. Very soon after the enactment of the 1790 Act, Jefferson realized that the statute's administrative structure was fatally flawed. The Patent Board created by the statute consisted of federal cabinet members, and such high governmental officials did not have the time or, usually, the expertise to pass on the merits of patent applications. Jefferson's 1791 bill proposed abolishing the Patent Board and the establishing a so-called "registration" system of issuing patents similar to that used by the English: Patents would issue as a matter of course upon application, and no official would examine the application beforehand to try to determine the validity of the claim to a patent.[92] The switch from an examination to a registration system meant that there was no federal official to enforce the "sufficient importance" requirement prior to the issuance of the patent. To compensate for that loss, Jefferson's draft bill would have provided a new defense to be adjudicated in court: An infringement action could be defeated if the patented invention "is so *unimportant and obvious* that it ought not to be the subject of an exclusive right."[93]

This "unimportant and obvious" language has been cited as a very early forerunner of the modern nonobviousness requirement.[94] But despite the appearance of the word "obvious," the provision has only slight significance in the development of the invention standard. The 1790 Act itself had already pioneered the concept that unimportant inventions should not be patented. Jefferson copied that concept and narrowed it a bit so that patents would be denied only to inventions that were both "unimportant" *and* "obvious." Either that language is redundant or, if unimportant is interpreted to mean economically unimportant, the standard would not serve the important role of denying patents for important and valuable, but nonetheless technological trivial, developments.

Jefferson's proposal for invalidating "unimportant and obvious" patents was never enacted and, in fact, Jefferson himself seems to have proposed the defense only tentatively — this particular defense was set off in parentheses in Jefferson's draft.[95]

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[92] That proposal was not radical; the English patent system had always been a registration system.

[93] 5 Paul Leicester Ford, ed., The Writings of Thomas Jefferson, 1788-1792, 279 (G.P. Putnam's Sons New York 1895) (setting forth Jefferson's draft legislation of Feb. 7, 1791; emphasis added). Jefferson's draft included language that survives today as the basic description of what is patentable — "any new and useful art, machine, or composition of matter or any new and useful improvement on any art machine, or composition of matter." Id. at 278. Compare 35 U.S.C. § 101. Jefferson's draft did not include any limitation barring patents on varied proportions or forms. See 5 Ford, supra, at 278-80.

[94] See, e.g., Freidrich-Karl Beier, *The Inventive Step in its Historical Development*, 17 Intern'l Rev. Indus. Prop. & Copyright L. (IIC) 301, 305 (1986); Giles S. Rich, *Priniciple of Patentability*, 28 Geo. Wash. L. Rev. 393, 403 (1960).

[95] No other language in the entire draft bill is marked off in parentheses. The context — the parenthetical is included in a list of other defenses — might perhaps indicate that Jefferson was uncertain whether such a defense should be included.

Jefferson's draft was introduced into Congress on Feb. 7, 1791.[96] It was reintroduced in the next Congress[97] where it was debated, amended and enacted. In addition to the deletion of Jefferson's "unimportant and obvious" language, the bill was amended in one other significant respect. The act stated that "simply changing the form or the proportions of any machine, or composition of matter, in any degree, shall not be deemed a discovery."[98] This provision, which in American law would develop into the nonobviousness requirement, was nearly a verbatim translation of a provision in the French Patent Law of May 25, 1791.[99] Though American commentators have, it seems, remained oblivious to the origin of the "form or proportions" language in the 1793 American statute, French commentators have long understood that the American statute had copied from French 1791 act.[100]

The impact of the "form or proportions" language in the two countries could hardly be more different. In France, the language had no significant impact. Indeed, French law long maintained the position that, in most cases, a patent could be awarded merely upon proof of novelty and utility. Thus, as late as the mid-twentieth century, one commentator on French law observed:

> The most striking difference between the French law and that of the English-speaking countries appears to be the difference in emphasis on "invention." If in France the patent covers a new industrial product, or new means, or a new application of old means, to obtain an industrial product or result, the question whether the advance involves invention becomes of very minor importance, if indeed it does not disappear.[101]

As another commentator described it, "[u]nder the French system, therefore, there is an almost, if not complete, lack of any requirement of invention as it is understood in the Anglo-Saxon countries."[102]

In the United States, however, the language imported from France soon began to have a

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[96] 2 Annals 1937.

[97] 3 Annals 741.

[98] Act of Feb. 21, 1793, § 2, 1 Stat. 318, 321.

[99] The original French text is: "Ne seront point mis au rang des perfections industrielles les changements de formes ou de proportions, non plus que les ornements, de quelque genre que ce puisse être." Théodore Regnault, *De la Législation et de la Jurisprudence concernant les Brevets D'Invention* 177 (Paris 1825) (setting forth title 2, article 8 of the French Act of May 25, 1791).

[100] See id. at 177 n.2 (cross-referencing the later American statute); id. at 7 (setting forth a translation of the American statute with a cross-reference to title 2, article 8 of the French statute).

[101] O. M. Biggar, Book Review of *Traité de la brevetabilité: Le concept de cause et le brevet d'invention*, 4 U. Toronto L. J. 196, 197 (1941).

[102] Harold G. Fox, *Patents and Monopolies* 286 (U. Toronto 1947).

significant impact as common law courts interpreted the language in a line of precedents that began moving toward a more general doctrine. As early as 1816, a trial court interpreted the provision to mean that a patentable improvement must involve a change in the "principle of the machine," not "a mere change in the form or proportions."[103] This interpretation was expressly approved by the Supreme Court in 1822,[104] and later cases made clear that the change in "principle" was the key to patentability. Thus, as Chief Justice Marshall stressed, "it is not every change of form and proportion which is declared to be no discovery, but that which is simply a change of form or proportion, and nothing more. If, by changing the form and proportion, a new effect is produced, there is not simply a change of form and proportion, but a change of principle also."[105]

In determining whether a novel creation was patentable, the courts emphasized the concept of a "change in principle" to such an extent that the concept continued to thrive even after the 1836 patent act eliminated the statutory language barring patents on mere changes in "form" or "proportions." Indeed, the elimination of that statutory language seemed merely to have liberated the doctrine; it became free to grow into a much more complex and general rule. Indeed, in 1837, one year after the repeal of the statutory language, a treatise on American patent law by Willard Phillips, provided the first really clear articulation of the obviousness doctrine and specifically asserted the "form or proportions" language was one manifestation of the obviousness principle:

> The second section of the act of Congress of 1793, which authorizes a patent for an improvement, declares "that simply changing the form or proportions of any machine, or composition of matter, in any degree, shall not be deemed a discovery." This construction would undoubtedly have been put upon the law without any such express exception. It is indeed but a branch of the more general rule in giving a construction to the law, namely, that any change or modification of a machine or other patentable subject, *which would be obvious to every person acquainted with the use of it, and which makes no material alteration in the mode and principles of its operation*, and which no material addition is made, is not a ground for claiming a patent.[106]

Phillips had his causation backwards: The "more general rule" grew out of the express statutory exception, not the other way around. But Phillips was correct in asserting that American law was beginning to recognize a more general doctrine. For example, the 1846 circuit court decision in *Hovey v. Stevens* continued to apply the old rule that patentable development must be not only "new in form" but "also new in principle"[107] The *Hovey* court also added that, in deciding

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[103] Evans v. Eaton, 8 F. Cas. 846, 852 (C.C.D. Pa. 1816) (Washington, J., charging the jury)*, rev'd on other grounds*, 16 U.S. 454 (1818).

[104] Evans v. Eaton, 20 U.S. 356, 431 (1822).

[105] Davis v. Palmer, 7 F. Cas. 154, 159 (C.C.D. Va. 1827) (Marshall, C.J., sitting as Circuit Justice).

[106] Willard Phillips, The Law of Patents for Inventions 125-26 (Boston 1837).

[107] Hovey v. Stevens, 12 F. Cas. 609, 612 (C.C.D. Mass. 1846) (Woodbury, J., sitting as Circuit Justice).

whether the invention contained a change in "principle," the court would consider testimony that the change was "a very obvious change to any mechanic."[108] Thus, even before the middle of the nineteenth century, courts began to look to obviousness as at least one element in defining the concept of a "change in principle" that had become a precondition for patentability.

The change was, however, very gradual and not noticed by all. The 1849 treatise by George Ticknor Curtis — who would quickly become the leading authority in the nation on patent law — began with the admonition that "the subject of every patent should be 'new and useful,"[109] and included only the briefest possible mention of any additional limitation on patentability.[110] Indeed, Curtis's treatise reads much more like contemporary English law, and it plainly embraced the view that, if a change was sufficiently useful, it could be patented.[111]

B. The *Hotchkiss* Formulation.

Hotchkiss v. Greenwood, the Supreme Court's first major opinion in this area, replaced the early requirement of inventive "principle" with a more general doctrine that demanded a sufficient "degree of skill and ingenuity" as a condition for patentability.[112] The alleged invention in *Hotchkiss* was an doorknob made of clay or porcelain; the prior art included identical knobs except made of wood or metal. *Hotchkiss* would have been an easy case under the old statute prohibiting mere changes in form. But, as previously mentioned, the repeal of that statute had not deterred the courts from requiring something more than mere novelty to sustain a patent. Consistent with this trend, the trial court instructed the jury that the patent was invalid if "the knob of clay was simply the substitution of one material for another ... and no more ingenuity or skill required to construct the knob in this way than that possessed by an ordinary mechanic acquainted with the business."[113]

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[108] *Id*.

[109] George Ticknor Curtis, A Treatise on the Law of Patents for Useful Inventions § 1, at 3 (Boston 1849).

[110] In one section of his treatise, Curtis states that "if an alleged invention is absolutely frivolous and foolish, though it may have the element of novelty, in one sense, it is not the subject of a patent." Id. § 7, at 6. In the category of frivolous and foolish inventions, he includes "mere colorable variations, or slight and unimportant changes." Id. The employment of "an obvious substitute" was, for Curtis, an example of a unpatentable "colorable variation" but only if "if the consequences resulting from the change are unimportant." Id. at 7. By contrast, Curtis believed that a mere substitution could be patentable if "the utility of the change, and the consequences resulting therefrom, may be such, as to show that the inventive faculty may have been at work." Id. § 8, at 7. On this point, Curtis aligned himself with the views of the English courts and commentators, for he expressly cited *Crane v. Price* and the earlier English treatise by Webster. See id. § 8, at 7 n.3 & at 8 n.1.

[111] Id. § 9, at 8 (quoting the English view that "[i]f there be anything material and new which is an improvement of the trade, that will be sufficient to support a patent") (quoting Buller, J., in *Rex v. Arkwright*, Webs. Pat. Cas. 71).

[112] 52 US 248, 267 (1851).

[113] *Id.* at 265.

The jury returned a verdict for the defendant, and on appeal, the Supreme Court affirmed.

Parts of the Supreme Court's opinion harked back to the pre-existing law. For example, the Court stressed that the change at issue was a mere "formal" change,[114] echoing the old statutory rule barring patents on mere changes in "form." But *Hotchkiss* was much more than a recapitulation of the old statutory prohibition against formal changes. The Court broadly held that "*every* invention" must be the product of "more ingenuity and skill ... than were possessed by an ordinary mechanic acquainted with the business."[115] If that condition was not met, as the Court held it was not in *Hotchkiss*, then the "the improvement is the work of the skilful mechanic, not that of the inventor,"[116] and it could not be patented.

The holding in *Hotchkiss* can be viewed as including two parts, one of which is salutary and survives to this day; the other would lead to nearly catastrophic results for the patent system. The salutary feature is that *Hotchkiss* oriented the inquiry toward what the Court called the "ordinary mechanic acquainted with the business." This feature survives today; the statutory obviousness analysis must take place using the perspective of "a person having ordinary skill in the art to which said subject matter pertains."[117]

The troubling part of *Hotchkiss* required that an invention show "more ingenuity and skill" than is possessed by the ordinary mechanic. The subtle difference between this and the modern standard can best be understood by considering a technical problem that is solved after a few months of ingenious effort by someone skilled in the art. Under the *Hotchkiss* standard, it is not at all clear — clarity was not one of *Hotchkiss*'s strengths — that the resulting solution could be patented. Even if significant "ingenuity and skill" were involved in producing the solution, *Hotchkiss* demanded that, to be patentable, the solution had to be the product of *more* ingenuity and skill than possessed by the ordinary mechanic. The contrast with modern law is clear. Under the statutory nonobviousness standard, a technical advance is patentable if it is not *obvious* to the person of skill at the time of invention. If an advance requires months of effort to achieve, it may very well be held nonobvious even though the advance is attributable more to the persistent and painstaking application of ordinary ingenuity than to a greater level of ingenuity.

Thus, while *Hotchkiss* gave birth to a general doctrine of "invention," the direct predecessor of the modern nonobviousness standard, the test established by the Court would prove troubling both because it was vague and because it could be interpreted to be unreasonably demanding. Justice Woodbury argued in dissent that the Court's holding "open to great looseness or uncertainty in

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[114] *Id.* at 266.

[115] *Id.* at 267 (emphasis added).

[116] *Id.*

[117] 35 U.S.C. § 103(a).

practice,"[118] and his warning was prescient. *Hotchkiss* purported to demand *more* skill and ingenuity than that possessed by the ordinary mechanic, but it was unclear how much more skill and ingenuity was needed to sustain a patent.

C. Different Interpretations of *Hotchkiss* and the 1952 Statutory Rule.

Within a quarter century of *Hotchkiss*, the standard of invention already seemed to be moving quite high, with some Supreme Court cases describing the relevant distinction as being "between mechanical skill ... and inventive genius."[119] But the Court was not consistent. Sometimes the Court interpreted the *Hotchkiss* standard in a manner seemingly more lax than modern law — holding that patentability could be presumed where, because of the inventor's efforts, "a machine has acquired new functions and useful properties."[120] Other times, the Court used language quite similar to the modern standard. In an 1880 case, for example, the Court described a patentable invention as "involv[ing] something more than what is obvious to persons skilled in the art to which it relates."[121] And in an 1883 case, the Court contrasted invention, "which adds to our knowledge and makes a step in advance in the useful arts," with an unpatentable "trifling device, every shadow of a shade of an idea, which would naturally and spontaneously occur to any skilled mechanic or operator in the ordinary progress of manufactures."[122] This formulation too is very close to the modern obviousness test because it makes unpatentable only things that would "naturally and spontaneously" occur to persons of skill in the art, and it recognizes that any "step in advance" should be patentable, even if the step was made merely by diligent efforts of ordinary ingenuity.

The various interpretations of the invention standard became infamous; they would lead Judge Learned Hand to despair that the "invention" standard "is as fugitive, impalpable, wayward, and vague a phantom as exits in the whole paraphernalia of legal concepts. ... If there be an issue more troublesome, or more apt for litigation than this, we are not aware of it."[123]

But vagueness was only one possible failing of the *Hotchkiss* standard. The other was that the standard could be interpreted too stringently, and by the middle of the twentieth century, the Supreme Court seemed to doing just that. The 1941 decision in *Cuno Engineering Corp. v. Automatic Devices Corp.*[124] was seen as a particularly extreme example. The invention in *Cuno*

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[118] *Hotchkiss*, 52 U.S. at 270 (Woodbury, J., dissenting).

[119] Reckendorfer v. Faber, 92 U.S. 347, 357 (1876).

[120] Smith v. Goodyear Dental Vulcanite Co., 93 U.S. 486, 496 (1877).

[121] Pearce v. Mulford, 102 U.S. 112 (1880).

[122] Atlantic Works v. Brady, 107 U.S. 192, 200 (1883).

[123] Harries v. Air King Products Co., 183 F.2d 158, 162 (2nd Cir. 1950).

[124] 314 U.S. 84 (1941).

was an automatic electric cigarette lighter for cars. Prior art car lighters had to be held in place while they heated. If the user did not hold the lighter in place long enough, it would not be hot enough to light a cigarette. If held in too long, the lighter could overheat and burn out. The inventor in *Cuno* succeeded in building a lighter with a thermostatic control so that the lighter would click off when it reached the correct temperature. As a bonus, the click would alert the user that the lighter was ready. The Court acknowledged that the invention showed "[i]ngenuity" but nonetheless held it unpatentable because the amount of ingenuity was "no more than that to be expected of a mechanic skilled in the art."[125] A patentable invention, the Court held, "must reveal the flash of creative genius, not merely the skill of the calling."[126]

Cuno's "flash of creative genius" test was not unprecedented; it flowed rather naturally from one strand of the decisions interpreting *Hotchkiss*. Nonetheless the clarity with which the *Cuno* Court stated the test had the potential to be catastrophic for the patent system. Many technical advances are made by rather ordinary engineers who have nothing more than the "skill of the calling" — with the calling being the engineering of improvements on existing technologies. These engineers may not have many flashes of "genius;" they are not in contention for Nobel prizes. But their hard work does push forward the useful arts. If, ex ante, the engineers are confronting difficult problems with uncertain prospects of finding a solution, then the solution — if and when it is found — should be patentable, without regard to whether the solution was found by genius or tenacious plodding.[127] Otherwise, firms would may have inadequate incentives to underwrite this sort of work, and research into improvements in the useful arts could be severely curtailed.

Patent practitioners were generally not happy with the Court's increasingly stringent standard of invention. In fact, even some of the Justices themselves began to question whether they were going too far. In one particularly poignant passage, Justice Jackson lamented that the Court had developed such a "strong passion" for striking down patents under its increasingly stringent invention standard "that the only patent that is valid is one which this Court has not been able to get its hands on."[128] In sum, it seemed as if the Court was trying to resolve the vagueness of *Hotchkiss* by endorsing an impractically high standard.

In the midst of general unhappiness with the Court's invention standard — and just three years after Justice Jackson's famous lament — Congress stepped in and enacted section 103 of the 1952 Patent Act. The new statute provided that a new and useful advance would be viewed as unpatentable only if it "would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains."[129] This is not a ridiculously

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[125] *Id*. at 91-92.

[126] *Id*. at 91.

[127] *See* Robert P. Merges, *Uncertainty and the Standard of Patentability*, 7 High Tech. L.J. 1 (1993).

[128] Jungersen v. Ostby & Barton Co., 335 U.S. 560, 572 (1949).

[129] 35 U.S.C. § 103(a).

low standard of patentability; the standard still requires a fairly substantial contribution. But it was designed to end the Court's search for a distinction between ordinary and extraordinary ingenuity, and to focus the inquiry solely on obviousness. The statute also stated that "[p]atentability shall not be negatived by the manner in which the invention was made."[130] Though perhaps awkwardly phrased, this further provision was intended to clarify that the particular inventor's method and talents would be irrelevant to the inquiry. Thus, the inventor seized with a "flash of genius" would not be favored over an engineer with ordinary skill and ingenuity who worked diligently and ploddingly toward a useful advance.

Before examining the obviousness standard in the 1952 U.S. Patent Act in more detail, we should look once again at the English experience, for the English homed in on obviousness as the exclusive key to patentability decades before the U.S. law did.

[130] *Id.*

IV. English Refinement: The "Obviousness" Touchstone.

As previously discussed, English law had taken a misstep in the early 17th century when the Lord Coke's commentaries had suggested that "new additions" to existing manufacturers could not be patented. This view appeared to held sway until the late 18th century was squarely rejected by both the courts and the commentators. After rejecting Coke's views, the English courts struggled with a novelty and utility only approach to patentability for most of the 19th century. Compared to their American counterparts, the English courts were more cautious — changing precedent more slowly and more incrementally. This approach had its costs; the English courts did not recognize anything similar to the *Hotchkiss* inquiry until at least a quarter century after the United States. But the approach also had its benefits: Once they were willing to modify the law of patentability, the English courts very quickly focused on obviousness as the correct touchstone of patentability. Unlike their American counterparts, the English courts did not experiment with a more demanding standard. A consensus in favor of the obviousness standard developed much more quickly than in the United States, and the standard was codified in Britain two decades prior to codification in the United States.

There are three important lessons from the English experience. The first is that, even among nations at similar stages of economic development and with similar legal cultures, disuniformity in law may persist for decades. In the first half of the 19th century, when the courts and commentators in the United States were slowly building the basis for the invention doctrine eventually recognized in *Hotchkiss v. Greenwood*, English courts and commentators were building the intellectual case against any such development.

For example Thomas Webster, one of the most widely cited patent authorities both in his own country and in the United States, considered but ultimately rejected the possibility of using obviousness as a metric to judge patentability. In 1841, Webster published both a long treatise on English patent law and a shorter supplement devoted exclusively to the "subject-matter" that could be covered by patents. Webster had read the American treatise by Phillips,[131] and in the supplement on patentable subject mater, Webster raises the concept of obviousness in the specific context where the alleged invention is a new "application of known agents or things."[132] In that context, Webster asserts that, "wherever the only change is of so simple a nature, or so obvious, is to exclude all idea of skill, thought—always supposing no new manufacture, as above described, to be the result—the application is not such as can be the subject matter of letters patent."[133]

At first glance, that statement appears to be a fairly ringing endorsement of the obviousness principle. What's more, Webster recognizes that the problem of obviousness (at least in the context

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[131] Webster cited Phillips in his main treatise as an authority on the American law of patentable subject matter, see Thomas Webster, The Law and Practice of Letters Patent for Inventions 8 n. *x* (London 1841), and in this era, the rudimentary obviousness doctrine was developing as part of the patentable subject matter doctrine.

[132] Thomas Webster, On the Subject-Matter of Letters Patent 24 (London 1841).

[133] Id.

of so-called new applications) is directly tied to the advanced state of technological development.[134] Webster also recognizes that the problem of obvious applications (which he believes to be unpatentable) leads directly to "the more general question," which he saw as a "what amount of invention is sufficient to support a patent."[135] Yet after a lengthy analysis of that question, Webster ultimately arrives at the "general conclusion ... that any change, however minute, if leading to a beneficial result in the arts and manufactures, is sufficient support a patent."[136] Thus, much like the dissent in *Hotchkiss*, Webster believed that beneficial results — not obviousness — was the key to judging patentability.[137]

Webster's views were soon adopted by Chief Judge Tindal in the *Crane v. Price* case,[138] where the English Court of Common Pleas squarely rejected the notion that there was any requirement for patentability other than novelty and utility. *Crane* would remain good English law for decades. Thus in the middle part of the nineteenth century, the patent law of the United States was diverging from English law, and that disuniformity would remain for many decades.[139]

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[134] Webster asserts that the problem of new "applications" — with the attendant problem of obvious applications — occurs more frequently when the country enters "an advanced state of the arts and manufactures." Id. at 23. He recognized, however imperfectly and incompletely, that the problem of obviousness (again, at least in the field of new application) did not arise as frequently in "the first era of invention," when "manufactures are in their infancy." Id.

[135] Id. at 24.

[136] Id. at 36. See also id. at 34, where Webster discussed a case invalidating a patent on a method for constructing a ship's anchor. For Webster, the patent was invalid in part because the supposed new methods for construction had been "borrowed" from other areas, such as the methods for constructing hammers and pick-axes, that "would obviously and immediately present themselves." Id. But the obviousness of the borrowed method was, in itself, insufficient to Webster as a ground for invalidating the patent. Rather, he stresses that the patentee had also presented no evidence that the method had "superiority" over prior methods. Id.

[137] Compare *Hotchkiss*, 52 U.S. at 268 (Woodbury, J., dissenting) ("my view the true test of its being patentable was if the invention was new, and better and cheaper than what preceded it"). See also id. at 269 (relying on Webster's views on patentable subject matter).

[138] *Crane v. Price,* 134 Eng. Rep. 239, 248 (Ct. Com. Pl. 1842) (holding that the only questions to be decided in passing on the validity of the patent are whether the process produces a "better or a cheaper article" and whether the alleged invention was "new").

[139] The disuniformity between U.S. and English law is well illustrated in parallel provisions in the Norman and Webster treatise. Norman, the earlier of the two writers, held that, while "there may be cases in which the substitution of a different material may be an invention," Norman on Patents at 134, "[t]he substitution of one material for another is not, at least ordinarily, an invention for which a patent can be claimed," id. at133. Norman gave as an example that a patent could not issue for the first teapot if earthen teapots had previously be known. Id. at 134. Webster considered the precise same example (which was apparently based on a famous rhetorical question asked by a prominent attorney), but he resolved it in favor of patentability. To Webster, the silver teapot could not be patented if the same product had existed previously "for making similar infusions from other ingredients" and had merely been applied to the making of tea. Webster on Subject Matter at 25 n. *r*. But if only earthen not silver teapots had previously existed, then a patent could issue on the silver teapot because "[n]o one can say that a silver

Identifying the cause for the disuniformity is more difficult, but at least some of the reason appears to be pure historical accident. For example, because American statutory law had copied the French prohibition on patenting mere changes in "form or proportions," early American courts and commentators tried mightily to develop a theory to explain and to account for this limitation on patentability. English courts, by contrast, had the language of the Statute of Monopolies, which seemed to allow patents for all "new manufactures."

Another pure accident of circumstance concerns the views of the commentators, especially those of Webster. Webster's endorsement of a novelty and utility standard and the adoption of that view in *Crane v. Price* were not entirely unrelated events. Webster is listed as one of the attorneys who appeared for the patentee in *Crane*,[140] and though the case was argued to the panel of judges in the Court of Common Pleas in 1842, the trial had occurred in 1840, the year before Webster published his treatise on patentable subject matter.[141] Thus, Webster's rejection of a general obviousness standard may have been influenced by client interests, and the path of subsequent English law could have been affected by the resulting agreement between a leading commentator and an important court decision. By contrast, commentary was split in the United States, with Phillips articulating a general obviousness standard and Curtis following Webster and the English courts in rejecting such a test. The split in leading American commentators may have provided the *Hotchkiss* court with more flexibility in choosing which approach seemed correct.

The second major point to take from the English experience is the prevalence of international borrowing. Neither the English courts nor the English commentators can be fairly credited with independently developing obviousness doctrine. Rather the historical record seems quite clear that the English borrowed the idea from American legal system. For example, the first English commentator to mention obviousness as a least a potential factor in determining patentability, Webster, had read the Phillips treatise, which contained the first really sound articulation of obviousness. Though Webster ultimately rejected obviouness as any general principle of patentability, he did introduce the concept into English law for the limited purpose of deciding whether a new "application" of old subjects could be patented. That doctrine would grow and expand in English law, and there is at least some evidence that the English law was cognizant of the American developments. For example, in 1853, John Paxton Norman published a treatise that was the first English treatise to cite *Hotchkiss v. Greenwood* and that also broadened the use of obviousness beyond that contemplated by Webster. Webster had allowed obviousness to be used where there was a new "application" without any "adaptation" of the subject matter. Norman, who

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and an earthen pot are the same manufacture." Id. This disuniformity continued well into the final quarter of the nineteenth century. See, e.g., Thomas Terrell TheLaw and Practice Relating to Letters Patent for Inventions 33-34 (London 1884) (stating that a patent could be valid "although each principle or process in it was previously well known, provided that the mode of combining these processes was new and produced a beneficial result"); see also id. at 50 (requiring that a patent be a "substantial improvement" but judging the substantiality in terms of utility and allowing proof that the result is better or cheaper to suffice).

[140] Id. at 246.

[141] Id. At 243 & 245.

had benefit of *Hotchkiss*, gave the obviousness inquiry more prominence and stated that, even in the case of adaptations, patentability should turn on "whether [the old device's] capability of adaptation to such new purpose, without the necessity of modification, is obvious or not?"[142]

When the United Kingdom finally did recognize a third component to the patentability test, it adopted the most narrow vision of the invention tests that have been articulated by the American courts. It is easy to see why this occurred historically. The English courts were far more bound to precedent in American courts were. Thus, when they finally deviated from their novelty and utility only approach, they did so incrementally. The transition started in cases involving so-called "new applications," where a device or product was merely being shifted from one use to another, closely analogous use.[143] Doctrinally, the transition was accomplished by holding that obvious deviations from existing technology were not *really* new, but some judges candidly acknowledged that a legal fiction was being employed: The holdings of no novelty were really judgments that the new adaption was such as "naturally to suggest itself to a person turning his mind to the subject," while patents should be awarded only to those new adaptations that "require some application of thought and study."[144] From these new "adaptation" cases, the conceptual framework spread more generally to other types of patent cases.

English law was clearly a second mover with respect to the nonobviousness doctrine, and it moved at a seemingly glacial pace. But as a slow second mover, English law gained an advantage over the more innovative but less stable legal culture in the United States. While the U.S. legal system was considering the possibility of moving the patentability standard from obviousness all the way up to a genius standard during the late 19th and early 20th centuries, English law focused solely on obviousness. Indeed during this period, it became common for English commentators and courts to assert that a mere "scintilla" of invention would support a patentability.[145] Thus, although English law came to obviounsess more slowly, when it did come the country's legal culture seems to have more rapidly developed consensus that obviousness was the correct standard. That consensus led to earlier codification of the standard, which happened in 1932, a full two decades ahead of codification in the United States.

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[142] John Paxton Norman, A Treatise on the Law and Practice Relating to Letters Patent for Inventions 13 (London, 1853).

[143] A good example was the case of *Harwood v. Great Northern Ry. Co.*, 11 H.L.C. 654, 35 L.J.Q.B. 27 (1865), where the House of Lords invalidated a patent on a new use of a certain type of "fish-joint," a metal joint for holding together two beams or rails. The particular design of the fish-joint had been previously used to hold together wooden beams in the building of bridges. The House of Lords, per Lord Westbury, reasoned that "you cannot have a patent for a well-know mechanical contrivance merely when it is applied in a manner or to a purpose, which is not quite the same, but is analogous to the manner or purpose in or to which is has been hitherto notoriously used." 11 H.L.C. 682.

[144] Penn v. Bibby, 2 L.R. Ch. 127, 135, 36 L. J. Ch. 453 (1866).

[145] Robert Frost, A Treatise on the Law and Practice Relating to Letters Patent for Inventions 27 (London 2d ed. 1898); Vale Nicolas, The Law and Practice Relating to Letters Patent for Inventions 21 (1904).

Third and finally, in both England and the United States, neither the courts nor the commentators devoted much effort to justifying the obviousness doctrine or to articulating the policies behind the doctrine. The treatises and court cases are filled with discussions of logic and linguistics about what is the precise test for patentability. But only a few — a very few — passages supply any real intuition behind the doctrine. For example at the turn of the century, one insightful commentator identified what is a central question for all obviousness cases: "If this useful device is merely the outcome of ordinary skill, why was it not thought of before?"[146] Few commentators offered any real insight into how to answer that question. One notable exception is the treatise by Frost in 1898. Frost noted that valuable, but nonetheless obvious, developments could arise in circumstances where "the demand itself may be quite new, and the novelty of the demand may have led immediately to the production, without ingenuity, of an obvious article to satisfy it."[147] But beyond such isolated passages, commentators and courts offered precious little intuition to guide in the application of the newly announced obviousness doctrine.

V. Other American Innovations: The *Graham* Framework and the Teaching, Suggestion, Motivation Test

In the United States, the history of the nonobviousness doctrine during the last half-century has been dominated by two rather different developments, one at the Supreme Court of the United States and the other at an intermediate appellate court. At the Supreme Court, the newly codified obviousness standard was interpreted in a manner largely consistent with prior Supreme Court precedent on the standard for patentability, but with two significant clarifications. The Supreme Court's decisions came in the first 25 years after the enactment of the obviousness standard. Soon thereafter, Congress created a new intermediate appellate court with nationwide jurisdiction over nearly all patent cases. This Court, the Federal Circuit, has attempted a new innovation in the law of obviousness, though it appears now that this innovation is likely to be abandoned. Each of these elements are considered below.

A. The Supreme Court's Interpretation of the Obviousness Standard: Graham and Its Progeny.

In 1966, 14 years after the obviousness standard was codified in US law, the Supreme Court of the United States first interpreted the new statutory standard in the case of *Graham v. John Deere Co.*. The case is important for two major developments. First the Supreme Court interpreted the obviousness standard as largely an a codification of its own earlier precedents on the patentability standard, but in making that interpretation, the Court also definitively rejected its earlier suggestions that the patentability standard may require an exercise of genius. Suggestions that genius had been the correct standard had been made only intermittently. The larger bulk of the Court's precedents prior to the 1952 codification had looked to the abilities of a person of ordinary skill in the art and had required merely that the patentable invention demonstrates some level of skill beyond that

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[146] Thornton on Patents 3 (1910).

[147] Frost at 28 (2d ed. 1898).

ordinary level. Still, the explicit disavowal of a genius standard was significant in that it made clear that US law required only nonobviousness. In this respect US law became consistent with English law.

Another significant development in the *Graham* opinion was the establishment of a four-step framework for analyzing the obviousness question. Though this framework was faithful to the statutory language, its details were very much the Supreme Court's creation. To decide a question of obviousness, courts were first, to determine the scope and content of the prior art; second, to ascertain the differences between the prior art in the claims at issue; third, to resolve the level of ordinary skill in the art; and fourth, to determine the obviousness or nonobviousness of the subject matter based on the factors identified in the first three steps. In addition, courts could consider such secondary considerations such as commercial success, long felt on unsolved needs, and the failure of others. This framework had its strength in the first three steps, which focus attention on precise factors that should govern the obviousness decision. A similar framework was adopted by the English courts some two decades later,[148] and though explicit evidence of copying is not available, there is strong circumstantial evidence. The similarity between the frameworks alone — both are four-step tests and three of the four steps are substantially identical — suggests that the *Graham* decision had some direct or indirect influence on the U.K. courts.[149] Moreover, the patentee in the case was an American corporation that was simultaneously involved in litigation in the United States.[150] It would seem reasonable to assume that, at least, the plaintiff's American and U.K. counsel conferred with each other from time to time, and that the U.S. framework for obviousness analysis might have been transmitted to the overseas attorneys.

The weakness of the *Graham* decision is that, although its framework leads a court to develop a clear understanding of the differences between the claimed invention and the prior art, the framework tells courts little about how they are supposed to determine whether those differences are obvious or not. To solve this problem, the Supreme Court in *Graham* and in later cases fell back upon two things. First, the Court relied upon its older caselaw and applied the wisdom and the rules

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[148] See Windsurfing International Inc v Tabur Marine (Great Britain) Ltd, [1985] RPC 59 (Ct. App. 1984).

[149] The Windsurfing analysis requires the following steps to be followed:

> The first is to identify the inventive concept embodied in the patent in suit. Thereafter, the court has to assume the mantle of the normally skilled but unimaginative addressee in the art at the priority date and to impute to him what was, at that date, common general knowledge in the art in question. The third step is to identify what, if any, differences exist between the matter cited as being "known or used" and the alleged invention. Finally, the court has to ask itself whether, viewed without any knowledge of the alleged invention, those differences constitute steps which would have been obvious to the skilled man or whether they require any degree of invention.

Only the first step is substantially different from a step found in the *Graham* framework.

[150] See, e.g., Windsurfing International, Inc. v. Ostermann, 534 F. Supp. 581(S.D.N.Y. 1982); Windsurfing International, Inc. v. Inland Sailboats, Inc., 218 U.S.P.Q. (BNA) 1017 (N.D. Tex. 1982).

of thumb that had been developed in those older cases over the course of the century. Second, the Court relied on its own judgment. These two things seemed perfectly appropriate bases for decision in the absence of anything better. But it would have been better if the Court had tried to articulate a much greater detail the circumstances under which the obviousness doctrine was important for barring patents on novel developments.

B. The Rise of the Teaching, Suggestion, Motivation Test.

During the 30 years between 1976 and 2006, the Supreme Court heard no cases concerning the substance of the obviousness doctrine. In the Supreme Court's absence a new appellate court, the United States Court of Appeals for the Federal Circuit, took the lead in the development of obviousness law. The Federal Circuit's major contribution was the so-called teaching, suggestion, motivation test, which precludes the combination of any prior art components in obviousness analysis unless the prior art contains a teaching, suggestion, or motivation to support the combination.

The test grew out of a number of decisions in the 1970s holding patents invalid on the grounds that the relevant patented combination had been suggested in the prior art. These cases were unobjectionable; indeed, they may be considered obvious cases of obviousness. In the early 1980s, however, the Federal Circuit began to interpret these cases as holding that a suggestion to combine was *required* and that, without such a suggestion, no patented combination could be held invalid.

In defense of the test, it must be said that the Federal Circuit was making a valiant attempt to fill in the gap that the Supreme Court had left open in *Graham*. *Graham* told lower courts very much how they were to approach an obviousness question, but not how they were to decide that question. The teaching, suggestion, motivation test tempted to provide guidance about the precise metric for deciding the obviousness question. Also in favor of the test, the Federal Circuit justified the test with overt discussions of policy. The court stressed an important problem in obviousness analysis — the analysis always occurs retrospectively and is therefore subject to the problem of so-called hindsight bias. Generally speaking, such overt discussion of policy and of the pragmatic problems associated with the obviousness doctrine was a step in the right direction. At least the court was providing some intuition concerning the application of the obviousness doctrine.

Nevertheless, despite the positive attributes noted above, the teaching, suggestion, motivation test suffers from two serious defects. First, the test is flatly inconsistent with the Supreme Court authority on the obviousness doctrine. In a number of decisions, the Supreme Court has held that a patent generally may not cover a mere combination of old elements wherein each element performs its previously known functions. Under the Supreme Court test, such combinations are patentable only in limited circumstances, and the applicant seeking a patent on such combinations faces a heavy burden to establish patentability. Under the Federal Circuit test by contrast, any combination – including a combination of known elements with each element performing its known function – will be presumptively patentable. Unless the party challenging patentability can point to a teaching, suggestion, or motivation to make the combination, it will be patentable.

Second, the Federal Circuit's emphasis on hindsight bias fails to identify any positive policy in favor of the obviousness doctrine. If the problem of hindsight were the only relevant consideration in applying obviousness, the best solution would be to abolish the doctrine entirely. All obviousness inquiries suffer from the possibility of hindsight bias because they are inherently retrospective. Obviousness doctrine cannot be appropriately applied unless the courts understand the positive policies to be advanced by the doctrine. Only then can those positive policies be balanced against the potential problem of a hindsight bias as well as the other difficulties inherent in having inexpert courts making retrospective technical judgments.

Indeed, when the positive policies behind the obviousness doctrine are considered, the teaching, suggestion, motivation test can be seen as failing at precisely the point where the obviousness doctrine is most necessary. Teachings, suggestions, and motivations are *least* likely to appear in the prior art where sudden changes have brought about new conditions giving new value to obvious but previously unimportant combinations. In such circumstances, the prior art would not have documented the combination because it would have been doubly uninteresting — both technologically obvious and economically unimportant. Yet theory predicts that cases of sudden change are precisely the situations in which the obviousness doctrine has the most work to do.

The teaching suggestion motivation test is now highly likely to be overturned by the Supreme Court. Interestingly enough, even before the Supreme Court has acted, the Federal Circuit has already begun dismantling the teaching, suggestion, motivation test by interpreting it as exceptionally flexible and by permitting the test to be satisfied by all manner of implicit and indeed nonexistent teachings, suggestions, or motivations. This line of cases, which began after the Supreme Court showed interest in granting certiorari to review the validity of the test, reveals the theoretical weakness of the basic test: If the test is interpreted with rigor so as to require a fairly undeniable teaching, suggestion or motivation, the test will accomplish the goal of curbing any potential hindsight bias but at the cost of limiting obviousness doctrine to the most extreme and most easily proven cases of obviousness. If, by contrast, the doctrine is interpreted "flexibly" so as to permit courts, juries or experts to derive implicit teachings from the prior art, then the test has little or no capacity to constrain hindsight bias.

The downfall of the teaching, suggestion, motivation test also seems to provide additional evidence of the crucial link between obviousness doctrine and rapid change. Criticism of the teaching, suggestion, motivation test has been most prevalent in the electronics and software industries, where technological change has been highly rapid in the last quarter-century. Thus, a constrained obviousness doctrine created difficulties for industries that, theory would predict, needed the doctrine most.

VI. Conclusions.

Obviousness doctrine was unknown for hundreds of years after the creation of patent law. Those older patent systems functioned reasonably well despite the absence of what is now seen as a major component of patent law because there was simply less need for the doctrine. Social change and technological development were so incremental that useful, valuable, new developments were highly likely to be the product of inventive effort rather than some other change not occasioned by

the inventor's work. As the pace of social change increases obviousness become more and more important to proper functioning of a patent system. Indeed it is possible that, in the future, the standard of patentability may continue to rise gradually as the pace of social change quickens.

Th history of obviousness also has significant implications for our view of how law develops. The first and most obvious point concerns the prevalence of international borrowing. Nation-states do not seem to create new legal conceptions independently nearly as frequently as they borrow them from other nations. Thus, for example, United States borrowed from France the concept that some mere changes in form and proportion should be unpatentable. After United States courts and commentators developed the French concept into a more general doctrine, English commentators and eventually courts borrowed the more developed doctrine from the United States. The United States, in turn, borrowed back from the English the key statutory construct after the English doctrine was transformed from a common-law to a statutory rule. Finally, the English courts seem to have partially borrowed the framework that the Supreme Court constructed in the *Graham* case for evaluating obviousness questions. These do not appear to be instances of independent creation. The particular forms of expression are simply too close for it to be supposed that legal thinkers created such highly similar doctrine independently. Moreover, it is quite clear from the historical record that at least some of the influential legal thinkers in each jurisdiction had access to legal materials from the other jurisdiction and were looking to the other jurisdiction for guidance.

A second important point is the degree of disuniformity that is seen across nations and the speed with which this disuniformity dissipates. Nations with similar legal cultures and industrial capabilities such as the United States and Great Britain sometimes maintain significant differences in their law for periods of decades. The speed of convergence to a single "common" law seems extraordinarily slow.

Third and finally, the analysis applied in legal materials, including cases and treatises, supplies some answer as to why the speed of convergence is so extraordinarily slow. Legal documents tend to avoid overt discussions of policy except in very rare instances. In place of policy analysis, legal instruments often resort to an excessive degree of language parsing and to discussions of logic. Indeed, even when courts are trying to change the law, they often deny that they are doing so by creating clever reconstructions of the language that previously defined the relevant doctrine. Thus, for example, in the 19th century the English courts, when they finally began to adopt a general obviousness doctrine, denied that they were doing so. Instead they claimed initially that the patents that were being invalidated were simply not really new. Similarly, when the Federal Circuit began to abandon its teaching, suggestion, motivation test in 2006, the Court denied that it was doing anything new even though it was changing its decisional law dramatically.

The hope for the future has to be that, in fashioning and explaining doctrine, courts and commentators can provide better justifications and discussions of the principles animating the doctrine. Courts will always find it necessary to create canonical verbal formulations to articulate *what* the law is. But those verbal formulations do not themselves provide any intuition for *why* the law is. Without such intuition it is difficult to apply the law well, and all but impossible to continue the law's development.