2011

Negativing Invention

Jacob S. Sherkow
New York Law School

Negativing Invention

Jacob S. Sherkow[*]

Since 1952, the patent statute has forbidden courts from discriminating against, or "negativing," inventions according to how they were made, be it "long toil and experimentation" or a "flash of genius." Now, in addressing whether an invention is "obvious," courts must only examine whether the invention was obvious according to the arts pertinent to that invention—the "analogous" rather than "nonanalogous" arts. This article shows that this dichotomy has actually promoted method-of-invention discrimination in patent law because the subjectivity of the analogous art inquiry has increasingly "analogized" wide fields of prior art as technology has progressed. This, in turn, has the effect of "negativing" inventions made by "long toil and experimentation" relative to "flash of genius" inventions because the latter are more capable of drawing upon disparate arts less susceptible to analogizing. This article further examines the consequences of this effect as "negativing" the underlying policy justifications for the patent monopoly and concludes by calling for a more cabined approach to the analogous art inquiry.

TABLE OF CONTENTS

[*] Law Clerk to the Hon. Nicholas G. Garaufis, U.S. District Court for the Eastern District of New York; J.D., Michigan; M.A., Columbia (Biotechnology); B.Sc., McGill. My most sincere thanks to Margo A. Bagley, Scott Dodson, David L. Schwartz, Sean B. Seymore, and Mark D. West for their insightful comments, suggestions, corrections, and, of course, their time. Also, special thanks to David C. Weiss for his comments and tremendous support in the publishing process. And my heartfelt appreciation to Amanda E. Fein for helping me crystallize this idea when it was too vague in my mind and for lovingly supporting me until it was on paper. The views expressed in this article are mine alone and should not be attributed to the U.S. District Court for the Eastern District of New York or its judges.

I. INTRODUCTION

There are many ways to invent something, from the whimsical—"by accident, by a vision in a dream, by a sudden flash of genius"[1]—to the laborious—"long toil and experimentation."[2] In 1952, Congress attempted to end a century-old debate as to whether patents should exclusively favor one method over the other. In the newly crafted nonobviousness statute, Congress allowed inventions created by all means to be brought before the Patent Office, famously declaring: "Patentability shall not be negatived by the manner in which the invention was made."[3] Whether this is, in fact, how the statute truly operates has been thus far untested in legal scholarship. Interestingly, a closer examination of the operation of the nonobviousness statute suggests that, despite the statutory directive, patent law continues to discriminate against particular methods of invention. This Article examines how the nonobviousness inquiry's use of prior art references favors inventions

1. Oscar Mayer Foods Corp. v. ConAgra, Inc., Nos. 94-1247, 94-1248, 1994 WL 712488, at *4 (Fed. Cir. Dec. 22, 1994).

2. 35 U.S.C.A. § 103 (West 2006) (1952 Historical and Revision Notes).

3. *Id.* § 103(a).

conceived under more whimsical methods, such as a "flash of genius," over laborious ones, despite Congress's intent to the contrary.

Prior to 1952, the patent statute generally required inventions to possess only two characteristics: novelty (whether an identical invention had been previously made) and utility (whether the invention had any practical use).[4] The legislature and the judiciary, however, believed that these requirements were insufficient to ensure that patents would not be awarded to less-than-patent-worthy inventions. Consequently, both institutions attempted to enact or read into the patent statute a third patentability requirement that focused on the invention's "inventiveness."[5] Neither of these proved workable, and in 1941 Congress set to work on crystallizing a third statutory requirement to patentability[6] after the Supreme Court invalidated a patent because the invention failed to "reveal the flash of creative genius"[7]—a decision that was roundly condemned.[8]

In 1952, Congress enacted the nonobviousness statute, which denied patentability 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."[9] Further, in an effort to guarantee patents to all manners of inventions, the statute commanded that "[p]atentability shall not be negatived by the

4. *See id.* § 103 (1952 Historical and Revision Notes); *see generally* John F. Duffy, *Inventing Invention: A Case Study of Legal Innovation*, 86 TEX. L. REV. 1 (2007) (recounting the invention of the nonobviousness statute in 1952).

5. Duffy, *supra* note 4, at 22. In 1790, Thomas Jefferson had attempted to introduce language in the original Patent Act that denied patents to "unimportant and obvious" inventions, but he did so "only tentatively—this particular defense was set off in parentheses in Jefferson's draft" of the Act. *Id.* at 36 (citing Thomas Jefferson, Draft of a Bill to Promote the Progress of the Useful Arts (Feb. 7, 1791), *in* 5 THE WRITINGS OF THOMAS JEFFERSON, 1788–1792, at 278–80 (Paul Leicester Ford ed., 1895)). In 1793, Congress amended the patent statute to prohibit the patenting of inventions that merely changed the "form or proportions" of old inventions. *Id.* This "statutory exception" planted the seed that gave rise to a third patentability requirement but was "very gradual and not noticed by all." *Id.* at 38. The language was removed altogether in 1836. *Id.* at 34. In 1822, the Supreme Court required patentable inventions to embody a change "in [the] principle" of prior inventions. Evans v. Eaton, 20 U.S. 356, 431 (1822). And in 1850, the Court further required inventions to show a "degree of skill and ingenuity." Hotchkiss v. Greenwood, 52 U.S. 248, 267 (1850).

6. Giles S. Rich, *Why & How Section 103 Came to Be*, 14 FED. CIR. B.J. 181, 186–87 (2005).

7. Cuno Eng'g Corp. v. Automatic Devices Corp., 314 U.S. 84, 91–92 (1941).

8. *See infra* notes 90–94 and accompanying text.

9. 35 U.S.C.A § 103(a).

manner in which the invention was made."[10] The Revision Notes explained that this requirement made "immaterial whether [the invention] resulted from long toil and experimentation or from a flash of genius."[11] Scholars then and since have heralded the importance of this change.[12]

Yet all of this praise has glossed over an "obvious" question: Is the process of invention truly immaterial? Or do the federal courts favor one method of invention, say, a flash of genius, over another, such as long toil and experimentation? An examination of how the courts determine which prior art is "the art to which [the] subject matter [of the invention] pertains"[13] proves insightful.

Courts have traditionally set to this task by dividing prior art references into "analogous" and "nonanalogous" art. Generally, courts use analogous arts against the invention sought to be patented in nonobviousness inquiries, while they do not do so with nonanalogous arts.[14] As this article will show, the delineation between analogous and nonanalogous arts is not clear. Since the passage of the nonobviousness statute, the Federal Circuit and its predecessor court have provided little workable guidance on the methodology for making this determination.[15] As technology has progressed, the subjectivity of the "analogous arts test" has caused

10. *Id.*

11. *Id.* (1952 Historical and Revision Notes).

12. *See* Duffy, *supra* note 4, at 1–2 (quoting ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, PATENT LAW AND POLICY 612 (4th ed. 2007); NONOBVIOUSNESS—THE ULTIMATE CONDITION OF PATENTABILITY (John F. Witherspoon ed., 1980); FED. TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY ch. 4, at 2 (2003)) (calling the statute "legal innovation" and highlighting several monikers of the nonobviousness statute as given by other scholars: the "'final gatekeeper of the patent system,' the 'ultimate condition of patentability,' and 'the heart of patent law'"); Lee Petherbridge & R. Polk Wagner, *The Federal Circuit and Patentability: An Empirical Assessment of the Law of Obviousness*, 85 TEX. L. REV. 2051, 2063 (2007) (concluding that the nonobviousness statute "balance[s] the public's interest in preventing the spurious issue of patents with the public's competing interests in rewarding innovation and in receiving disclosure of nonobvious inventions"); Giles S. Rich, *Escaping the Tyranny of Words—Is Evolution in Legal Thinking Possible?*, 14 FED. CIR. B.J. 193, 206 (2005) (calling the statute "an evolution in legal thinking").

13. *See* 35 U.S.C.A § 103(a).

14. *See, e.g.*, Regent Lighting Corp. v. FL Indus., Inc., No. 94-1162, 1995 WL 331122, at *4 (Fed. Cir. June 2, 1995) ("The Thomas references are within the inventor's field of endeavor, in view of what is claimed, and are accordingly relevant prior art. The Thomas references are therefore relevant to the consideration of obviousness under § 103 and are not 'nonanalogous.'").

15. *See infra* notes 124–148 and accompanying text.

courts to widen the scope of analogous arts, a result of the increasing interdisciplinarity of the "subject matter" of many inventions.[16] This has not had a neutral effect on the method of invention. Rather, this "analogizing" of prior art has favored "flash of genius" inventions, which often draw on multiple, disparate disciplines less susceptible to analogizing, over "long toil and experimentation" inventions, which typically require basic research in a related field.[17] This style of "analogizing" has the effect of "negativing" inventions according to the manner in which they were made.[18]

This Article proceeds as follows. Part II describes the history of nonobviousness and the waxing and waning focus on the method of invention. Part III examines courts' applications of nonobviousness through their characterization of analogous versus nonanalogous arts, demonstrating courts' increasingly expansive views of pertinent arts for nonobviousness determinations. Part III then explains that this expansive view results in a focus on the method of invention despite Congress's attempt to eliminate such a requirement. Part IV discusses several problems inherent in the courts' expansive allowance of pertinent arts for nonobviousness determinations. Specifically, it disfavors inventions of precision, discourages inventions that have unpredictable synergistic effects, and runs counter to the principal purpose of the patent monopoly—letting inventors recoup the costs of invention—by favoring creative and largely cost-free synthesizers over diligent and more cost-prone inventors operating in a narrow field. Part V concludes by suggesting that a more constrained interpretation of the pertinent arts in nonobviousness determinations better aligns with the purpose of the nonobviousness statute.

II. THE HISTORY OF NONOBVIOUSNESS AND THE METHOD OF INVENTION

A. The First Patent Systems

A review of the history of the nonobviousness requirement shows a focus on the method, not merely the product, of invention. The world's first patent system, as we would consider one today, began in

16. *See infra* notes 148–179 and accompanying text.

17. *See infra* notes 180–220 and accompanying text.

18. *See infra* notes 220–279 and accompanying text.

Venice, Italy in the early- to mid-fifteenth century.[19] The Venetian Republic, one of the precursor states to modern Italy, granted monopolies to inventors for industrial devices and processes.[20] By 1474, Venice had passed the world's first patent statute, the Venetian Act of March 19, 1474.[21] The requirements were, by modern standards, low: an inventor could obtain a monopoly if the device or process was a new and useful invention. And, in a precursor to the nonobviousness statute, the Venetian Act demanded that the invention was the result of the inventor's "'skill and experience,' 'pertinent thoughts and labors,' or 'efforts of study and ingenuity.'"[22]

The Venetian Act contained many facets of a modern patent system: a cursory application process, a simple administrative examination, a remedy for infringement, and an allowance for licenses.[23] The Venetian Act also had a primordial nonobviousness requirement: it restricted patentability to only "ingenious" inventions.[24] What constituted an "ingenious" invention, however, is not entirely clear, and there is little in the way of medieval Venetian scholarship to explain.[25] At least one scholar in the field has argued that the "ingenuity" stricture of the Venetian Act required the invention to "not be a trifling, all too obvious application of known technology."[26] Other scholars have rejected this interpretation and instead focused on "the moral significance of [the] labor" involved in producing the invention.[27]

19. Duffy, *supra* note 4, at 21–23; Craig Allen Nard & Andrew P. Morriss, *Constitutionalizing Patents: From Venice to Philadelphia*, 2 REV. L. & ECON. 223, 233–37 (2006).

20. Duffy, *supra* note 4, at 21–23.

21. *Id.* at 22; Nard & Morriss, *supra* note 19, at 234.

22. Duffy, *supra* note 4, at 21–22 (quoting Giulio Mandich, *Venetian Patents (1450–1550)*, 30 J. PAT. OFF. SOC'Y 166, 173–75 (1948)).

23. *Id.* at 22; Nard & Morris, *supra* note 19, at 234 ("[T]o paraphrase the noted American philosopher Alfred North Whitehead, all Western patent systems consist of but a series of footnotes to the Venetian patent statute.").

24. Duffy, *supra* note 4, at 22 ("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.*'").

25. *See generally* Mandich, *supra* note 22.

26. *Id.* at 177.

27. Adam Mossoff, *Rethinking the Development of Patents: An Intellectual History, 1550-1800*, 52 HASTINGS L.J. 1255, 1257 (2001).

The debate is interesting, though, for another reason: even the first nonobviousness requirement contained a subtle acknowledgement of the different methods of invention. An ingenuity requirement that focused on whether an invention was trivial, or an obvious application of known technology,[28] inherently favored inventions made by creative as opposed to laborious processes. This is because creative inventions that span disciplines are less likely to be construed as *obvious*—that is, easily understood[29]—precisely because no one has *conceived* of them previously. An ingenuity requirement that focuses on the inventor's efforts, however, plainly favors inventions forged in the "burning of the midnight oil" over creative inventions coined solely in the mind. Regardless of which interpretation is right, it is apparent that the Venetian Act's ingenuity requirement, the world's first attempt at defining nonobviousness, at least established a conflict over whether patent law should favor one method of invention over another.

It is difficult to trace the immediate development of nonobviousness from Venice because, although the Venetian Act was imported elsewhere into Europe, the ingenuity requirement largely disappeared. In England, for example, one early patent application cited the Venetian Act and alternatively referenced the invention's "ingenious" advancement of ideas and "expense in experiments."[30] Because the Crown did not issue written decisions regarding the reasons for granting patents, it is difficult, if not impossible, to determine how it viewed the competing models of invention. After the Statute of Monopolies of 1623 codified the practice of obtaining a letters patent,[31] its silence regarding ingenuity or obviousness made it unnecessary for future patent applications to discuss the matter.

28. *See* Mandich, *supra* note 22, at 183–84.

29. *See Obvious Definition*, DICTIONARY.COM, http://dictionary.reference.com/browse/obvious (last visited Sept. 27, 2011).

30. Duffy, *supra* note 4, at 23–24.

31. Letters patents were the first industrial monopolies, generally granted to foreigners possessing a particular manufacturing skill to import and improve that skill in the granting country. In England,

> a patentee was supposed to: (i) work the patent, i.e., bring a foreign industry into the realm, (ii) not be inconvenient to other subjects, i.e., not interfere with established industries, and (iii) train apprentices, i.e., create a self-sufficient industry within the realm through which English subjects can make a living.

Mossoff, *supra* note 27, at 1261.

Similarly, early French patents drew on the principles of the Venetian Act.[32] Nonetheless, the concept of inventive merit was wholly absent in contemporaneous French patent grants, and patents could be granted to inventions upon a simple showing of novelty and utility.[33] Further complicating the matter, the examination process shrouded patent applications in secrecy,[34] shedding no light on whether the French Crown had a preference for creative, interdisciplinary inventions over laborious, empirically determined ones, or even whether it recognized such a distinction. Any insight the French system may have shone on its early Venetian counterpart was, therefore, also lost. The requirement that inventions be "ingenious," in the Venetian Act's phrasing, would not reemerge until the 1790s, after revolutions—legal and otherwise—took place in the United States and France.

B. The Rise of Method-of-Invention Bias in U.S. Patent Law

Shortly after the French Revolution in 1789, the newfound Republic was the first to attempt to codify an ingenuity requirement into a patent statute since the Venetian Republic did so over three hundred years earlier. In the French Patent Law of May 25, 1791, France forbade inventions that were mere "*changemens de formes ou de proportions*" (changes to an old invention's forms or proportions).[35] After fitful starts to the American patent statute, enacted two years earlier, this language was copied directly into the American 1793 Patent Act.[36] Interestingly, where the "form or proportions" language lay dormant in French jurisprudence, it took hold in the United States.[37]

32. F. D. Prager, *The Early Growth and Influence of Intellectual Property*, 34 J. PAT. OFF. SOC'Y 106, 107–08 (1952) ("[The Venetian system] was then adopted in Germany, France, the Netherlands and England in practically the same form, during practically the same, short period between 1500 and 1550.").

33. Duffy, *supra* note 4, at 36–37.

34. Frank D. Prager, *Proposals for the Patent Act of 1790*, 36 J. PAT. OFF. SOC'Y 157 (1954).

35. Loi du 25 mai 1791 décret portant règlement sur la propriété des auteurs d'inventions et découvertes en toute genre [Law of May 25, 1791 decree on regulations on the ownership of the authors of inventions and discoveries], COLLECTION GÉNÉRALE DES DÉCRETS RENDUS PAR L'ASSEMBLÉE NATIONALE [GENERAL COLLECTION OF DECREES BY THE NATIONAL ASSEMBLY], May 1791, p. 169.

36. Act of Feb. 21, 1793, ch. 11, § 2, 1 Stat. 318, 321 (repealed 1836); *see also* Duffy, *supra* note 4, at 36–37 (discussing the interplay between the French and American statues).

37. Duffy, *supra* note 4, at 37.

U.S. courts, however, did not read the "form or proportion" language literally and rejected some inventions that were clearly beyond a change in mere "form or proportion." In *Evans v. Eaton*, the inventor of an improved hopper boy, a device that raked and cooled freshly milled flour, sued for infringement.[38] After a trial that found the patent invalid, the Supreme Court similarly expressed skepticism that such an invention came within the ambit of the patent statute. Writing for the Court, Chief Justice Marshall acknowledged that the invention was an improvement over several aspects of the art—"an improved elevator, an improved conveyor, an improved hopperboy, an improved drill, and an improved kilndryer"[39]—but nonetheless queried whether such advancements, even in combination, were "a mere change in the form or proportions"[40] of other hopper boys. The Court concluded that the "form or proportion" language under the statute required "an improvement in the principles of a machine, art, or manufacture . . . if only in the form or proportion, it has not the merit of a discovery which can entitle the party to a patent."[41]

The *Evans* Court's focus on the "principle" of the invention took hold in American jurisprudence. Chief Justice Marshall, sitting as a District Judge in Virginia, again expounded on this idea five years later in *Davis v. Palmer*.[42] The case centered on a mouldbourd to a plow, a wedge that assists the plow in turning over the plowed field. The patentee had claimed an improved mouldboard that better assisted its user to plow a field circularly as opposed to linearly.[43] Thus, the improvement changed the widely used mouldboard plow little aside from the angle and shape of the mouldboard itself. The Chief Justice instructed the jury:

> 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

38. Evans v. Eaton, 16 U.S. 454 (1818); *see also* Theodore R. Hazen, THE HOPPER-BOY OF OLIVER EVANS, http://www.angelfire.com/journal/millrestoration/hopper.html (last visited Sept. 7, 2011).

39. *Evans*, 16 U.S. at 517.

40. *Id.* at 475.

41. *Id.* at 476.

42. Duffy, *supra* note 4, at 37 (citing Davis v. Palmer, 7 F. Cas. 154 (C.C.D. Va. 1827) (No. 3645)).

43. *Davis*, 7 F. Cas. at 159.

> proportion, a new effect is produced, there is not simply a change of form and proportion, but a change of principle also.[44]

This de facto third requirement for patentability—"a change of principle"—became so entrenched, that even after Congress left it out of the Patent Act of 1836, it nonetheless survived. In 1842, the Supreme Court upheld a jury verdict that found the defendant non-infringing because of differences in "principles" of the two contested inventions, despite the fact that the two were quite similar methods of "forming the ribs of saw-gins."[45] In 1846, the Circuit Court of Massachusetts continued to require inventions to be not only "new in form [but] new in principle."[46] And in *Wilson v. Simpson*, in 1850, the Supreme Court heard arguments as to whether the patentee committed fraud by licensing his invention because the invention was "identical with the principle of [another's earlier] machine."[47] This non-statutory regime of "the principle of the invention," however, would only survive for fourteen years.

In 1850, the Supreme Court decided *Hotchkiss v. Greenwood*.[48] At the time, the newly founded United States Patent and Trademark Office received approximately 2,000 patent applications a year—*triple* the number it received when it opened its doors only ten years earlier.[49] Even in 1850, the nascent examination system had come under fire for allowing too many patents for "ordinary improvements" to inventions rather than real advances.[50] The *Hotchkiss* patent claimed a doorknob, identical in other respects to earlier doorknobs, but the handle consisted of clay rather than wood or metal.[51] This, the patentee argued, was its patentable improvement.[52] The Supreme Court was rightfully unimpressed, and upheld the lower court's finding of invalidity.[53] But the Court went further, extending its holding beyond the "new principle" language

44. Duffy, *supra* note 4, at 37 (citing *Davis*, 7 F. Cas. at 154).

45. Carver v. Hyde, 41 U.S. 513, 513 (1842).

46. Hovey v. Stevens, 12 F. Cas. 609, 612 (C.C.D. Mass. 1846) (No. 6745).

47. 50 U.S. 109, 121 (1850).

48. 52 U.S. 248 (1850).

49. *U.S. Patent Activity, Calendar Years 1790 to Present*, USPTO.GOV, http://www.uspto.gov/web/offices/ac/ido/oeip/taf/h_counts.htm (last visited Sept. 27, 2010).

50. *Hotchkiss*, 52 U.S. at 252.

51. *Id.* at 252.

52. *Id.*

53. *Id.* at 272.

that had been in place, with or without statutory authority, for at least three decades.[54] Rather, the Court focused on the "ingenuity," or lack thereof, of the invention. Concluding that, as compared to prior work, "[t]he difference is formal, and destitute of ingenuity or invention,"[55] the majority finished its opinion:

> [U]nless more ingenuity and skill in applying the old method of fastening the shank and the knob were required in the application of it to the clay or porcelain knob than were possessed by an ordinary mechanic acquainted with the business, there was an absence of that degree of skill and ingenuity which constitute essential elements of every invention. In other words, the improvement is the work of the skillful mechanic, not that of the inventor.[56]

As tempered as the Court's words may have been, its effect was anything but. The amorphous concept of "ingenuity," as a third patent requirement, would survive almost a century, with no help from Congress, until the Supreme Court took up the issue again in 1941.[57] In the meantime, "ingenuity" floundered in the courts with little consistency in its application and much ire from jurists.[58]

54. *See supra* notes 37–49 and accompanying text.

55. *Hotchkiss*, 52 U.S. at 266.

56. *Id.* at 267.

57. *See infra* notes 69–102 and accompanying text.

58. C & A Potts & Co. v. Creager, 155 U.S. 597, 606 (1895) ("The answer to this requires the consideration of the often-recurring question, which has taxed the ingenuity of courts ever since the passage of the patent acts, as to what invention really is."); McClain v. Ortmayer, 141 U.S. 419, 426–27 (1891) ("To say that the act of invention is the production of something new and useful does not solve the difficulty of giving an accurate definition, since the question of what is new, as distinguished from that which is a colorable variation of what is old, is usually the very question in issue. To say that it involves an operation of the intellect, is a product of intuition, or of something akin to genius, as distinguished from mere mechanical skill, draws one somewhat nearer to an appreciation of the true distinction, but it does not adequately express the idea. The truth is, the word cannot be defined in such manner as to afford any substantial aid in determining whether a particular device involves an exercise of the inventive faculty or not."); Aro Equip. Corp. v. Herring-Wissler Co., 84 F.2d 619, 622 (8th Cir. 1936) ("There is no strict formula to determine what constitutes invention"); A.O. Smith Corp. v. Petroleum Iron Works Co., 73 F.2d 531, 538 (6th Cir. 1934) ("That which constitutes invention has, of course, never been successfully defined."); Kirsch Mfg. Co. v. Gould Mersereau Co., 6 F.2d 793, 794 (2d Cir. 1925) ("Objective tests may be of value vaguely to give us a sense of direction, but the final destination can be only loosely indicated. An invention is a new display of ingenuity beyond the compass of the routineer, and in the end that is all that can be said about it. Courts cannot avoid the duty of divining as best they can what the day to day capacity of the ordinary artisan will produce."); *see also* Duffy, *supra* note 4, at 41.

Professor Duffy recounted the inconsistency with which courts applied the ingenuity test, "in a manner seemingly more lax than modern law" would allow.[59] Justice Woodbury was prescient in his dissent in *Hotchkiss*, asserting that "the test adopted . . . has not the countenance of precedent, either English or American; and, at the same time, it seems open to great looseness or uncertainty in practice."[60]

Yet, the limited usefulness of the invention standard announced in *Hotchkiss* provides great insight into the movement of the federal courts from a relatively neutral position on the method of invention to a clear preference of favoring inventions created in more creative and abstract ways—a move from the province of the workbench to the realm of the mind. The pre-*Hotchkiss* invention standard, a change in the "principle" of the invention, did not materially favor one method of invention over another. Changes in the "principle" of a machine could come through either a bout of ingenuity or diligent plodding at the workbench. Whether differences in the method of, for example, forming the ribs of saw-gins constituted a change in the principle of their manufacture[61] was a question that made irrelevant whether differences in the method were either conceived on paper or tested and tried in the workshop.

Courts recognized from the outset that, apart from genius, bench experimentation that created new and useful things was valuable to the patent system, and that improvements over old inventions, assumedly "discovered" by experimentation, may produce a "new effect [that is] not simply a change of form and proportion, but a change of principle also."[62] This is not to say that the principle-of-the-invention standard made it easy to patent workbench inventions; the Supreme Court's skepticism of Oliver Evans's hopper-boy despite "an improved elevator, an improved conveyor, an improved hopper-boy, an improved drill, and an improved kiln-dryer" attests to that.[63] But the principle-of-the-invention standard was at least neutral as to whether Mr. Evans's created each of the listed improvements of his hopper-boy by

59. Duffy, *supra* note 4, at 41.

60. *Hotchkiss*, 52 U.S. at 270.

61. *See* Carver v. Hyde, 41 U.S. 513, 513 (1842).

62. Duffy, *supra* note 4, at 37 (citing Davis v. Palmer, 7 F. Cas. 154, 159 (C.C.D. Va. 1827) (No. 3645)).

63. *See* Evans v. Eaton, 16 U.S. 454, 462 (1818).

experimentation, or whether he "ingeniously" conceived of a way to combine them.

The *Hotchkiss* standard, in contrast, was not so neutral. It, for the first time in American patent jurisprudence, required a measure of invention above that of an "ordinary mechanic."[64] Further, its focus on "ingenuity," irrespective of whether the courts were able to satisfactorily define it,[65] suggested a patentability standard that favored creative, synthetic inventions over workbench experimentation, regardless of how well-improved the actual resulting invention might have been.[66] The *Evans* case serves as a useful point of comparison: whereas before *Hotchkiss*, the Evans hopper-boy *may* have been patentable, after *Hotchkiss* it was likely that it would summarily *not be* patentable.[67] Serial improvements to components of a greater machine, as was Evans's device, would surely be construed as no more "genius" than improvements made by an ordinary, albeit talented, mechanic. Other scholars have also recognized *Hotchkiss*'s shift away from a method-of-invention neutral standard.[68] This trend would come to its pinnacle almost a century after *Hotchkiss*.

C. Cuno Engineering *and the Nonobviousness Statute*

In 1927, Herbert Mead of Detroit, Michigan applied for a patent entitled "Cigar Lighter."[69] The title did not do the invention justice; Mead invented the automatic cigar and cigarette lighter for automobiles substantially still in use today.[70] Prior cigarette lighters were not automatic.[71] They needed to be continually depressed by the user until they heated up.[72] This had a number of problems: it distracted the operator's attention away from the road, the heating element would often become too hot for use as a result of over-

64. *Hotchkiss*, 52 U.S. at 267.

65. *See supra* cases cited at note 58.

66. *See Hotchkiss*, 52 U.S. at 267.

67. *Compare Evans*, 16 U.S. at 462, *with Hotchkiss*, 52 U.S. at 267.

68. Duffy, *supra* note 4, at 40 ("*Hotchkiss* could have meant that if a person having ordinary ingenuity and skill could *eventually* produce the innovation (perhaps after months or years of persistent effort), then the innovation would not be patentable.").

69. U.S. Patent No. 1,736,544 (filed Nov. 19, 1929).

70. *See* Cuno Eng'g Corp. v. Automatic Devices Corp., 314 U.S. 84, 85–86 (1941).

71. *Id.* at 87.

72. *Id.*

pressing, and repeated overheating of the lighter would cause the heating element to burn out faster.[73] Mead's invention solved all of these problems in one fell swoop: a single press of the lighter would hold it in place; a thermostat in the lighter would recognize when the lighter reached the appropriate temperature and, when it did, would properly eject it.[74] Further, the ejection of the lighter would make a clicking sound to alert the operator to its readiness, thus allowing the operator to direct his attention to the road and not the lighter while the lighter was heating up.[75]

Mead's invention showed both "ingenuity" and technical skill. The prior art was replete with problems: the base sockets were often "large and cumbersome," there was no way to keep the lighter in the base socket without it heating, and none had a thermostatic control.[76] One merit to Mead's invention was that he *conceived* of the ability to solve all of these problems in a single device. At the same time, Mead's invention displayed an impressive degree of technical skill: he was able to shrink the base socket to a size small enough to fit on a car dashboard *and* successfully implant the thermostat in the lighter *and* connect this to a spring that would automatically decouple the lighter from the base socket once it achieved the desired temperature.[77]

In 1940, Mead's invention became the subject of patent litigation in New York and Illinois.[78] After a trial, both district courts found the patent valid and not infringed. The Second Circuit reversed, and found them valid and infringed.[79] The Seventh Circuit, meanwhile, found the patent invalid.[80] The Supreme Court granted certiorari to resolve the conflict.[81]

In a short opinion, the Court delved into the prior art concerning automatic thermostats.[82] It concluded that Mead's

73. *Id.*

74. *Id.*

75. *Id.*

76. *See id.* at 93 (Stone, C.J., concurring).

77. *See id.*

78. *See* Automatic Devices Corp. v. Cuno Eng'g, 34 F. Supp. 146 (D. Conn. 1940).

79. Automatic Devices Corp. v. Cuno Eng'g, 117 F.2d 361 (2d Cir. 1941).

80. Automatic Devices Corp. v. Sinko Tool Mfg. Co., 112 F.2d 335 (7th Cir. 1940).

81. Cuno Eng'g Corp. v. Automatic Devices Corp., 314 U.S. 84, 85 (1941).

82. It noted the presence of automatically controlled thermostats in an electric heater (U.S. Patent No. 852,326), a flat iron (U.S. Patent No. 1,025,852), a coffee cooker (U.S. Patent No. 1,318, 168), a bread toaster (U.S. Patent No. 1,372,207), and a cigar lighter (U.S.

combination of the automatic thermostat into the portable cigar lighter was "new and useful."[83] But it nonetheless decided that Mead's invention "does not rise to the dignity of a patentable device."[84] Relying on *Hotchkiss*, the Court declared that inventions could not be patentable if they were merely an "adaptation or combination of old or well-known devices for new uses."[85] The Court concluded that to be patentable, an invention "must reveal the flash of creative genius, not merely the skill of the calling."[86] Therefore, it concluded that even though "[i]ngenuity was required to effect the adaptation, [it was] no more than that to be expected of a mechanic skilled in the art."[87]

Despite the Court's stated reliance on *Hotchkiss*, *Cuno* was in fact an extreme departure. *Hotchkiss*, however vague, required "ingenuity" and nothing more. *Cuno* required more than "ingenuity"—it required that that ingenuity "reveal the flash of creative genius."[88] *Ordinary* ingenuity was no longer good enough; *extraordinary* ingenuity was required. And however ingenious a device may be, that ingenuity could not have come about through a slow and organic process of creation: *Cuno* required it show a "flash" of that ingenuity.[89]

Cuno caused more problems than it solved. Its language provided virtually no guidance to the lower courts; it merely cajoled them to strike down as invalid all but the most "ingenious" of inventions.[90] Scholars, practitioners, and jurists roundly condemned

---

Patent No. 1,844,206). *Id.* at 88–89.

83. *Cuno*, 314 U.S. at 90.

84. *Id.* at 90 n.4.

85. *Id.* at 91.

86. *Id.*

87. *Id.* at 91–92.

88. *See id.* at 91.

89. *See* Duffy, *supra* note 4, at 42 ("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 by tenacious plodding."); *see also* Andrew B. Dzeguze, *The Devil in the Details: A Critique of KSR's Unwarranted Reinterpretation of "Person Having Ordinary Skill,"* 10 COLUM. SCI. & TECH. L. REV. 1, 24–25 (2009).

90. *See* Dzeguze, *supra* note 89, at 24–25.

Cuno as formlessly antagonistic to patents.[91] Justice Robert H. Jackson later strongly rebuked his brethren for its jurisprudence.[92] Judge Learned Hand, post-*Cuno*, called patent validity "as fugitive, impalpable, wayward, and vague a phantom as exists in the whole paraphernalia of legal concepts."[93] Federal Circuit Chief Judge Giles Rich later described the judicial reaction as "furor."[94]

The near universal rebuke of *Cuno*, however, paved the way for reform.[95] In 1941, shortly after the attack on Pearl Harbor, President Roosevelt established the National Patent Planning Commission.[96] Although the express purpose of the Commission was to investigate the use and license of government-owned patents, presumably to further the war effort,[97] the body eventually served as a vehicle to address the "flash of genius" standard established in *Cuno*.[98] From the Commission, Chief Patent Examiner Pasquale ("Pat") J. Federico and then-New York Patent Law Association President Giles S. Rich were tasked with an overhaul of the patent statute.[99] While the two-person drafting committee made many recommendations for the new patent act, their most notable addition was § 103: the nonobviousness statute.[100] In an effort to dispel the muddle surrounding what constituted an "invention"—and the means for making one—Federico and Rich focused on whether an invention

91. *Id.*; *see also* Laurence B. Dodds & Francis W. Crotty, *The New Doctrinal Trend*, 30 J. PAT. OFF. SOC'Y 83, 83 (1948) ("This fallacious impression is based on a preconceived notion that the truly great inventions of history have 'burst full-blown from Athene's brow' during some incandescent flash of the inventor's genius and that all true inventions are born by a similar parthenogenetic process. As a matter of fact, the record establishes that the majority of the great and classic inventions which have been tested in the Courts were hemmed about by the near inventions of many others and that, in each case, they represented that small advance which converted failure into commercial success.").

92. Jungersen v. Ostby & Barton Co., 335 U.S. 560, 572 (1949) (Jackson, J., dissenting) (complaining of a lack of "adequate tests of invention by the Patent Office" but chastising the Court for its "strong passion . . . for striking [patents] down so that the only patent that is valid is one which this Court has not been able to get its hands on").

93. Harries v. Air King Prods. Co., 183 F.2d 158, 162 (2d Cir. 1950).

94. *See* Rich, *supra* note 12, at 209.

95. Dzeguze, *supra* note 89, at 25; *see also* Rich, *supra* note 12, at 187.

96. Adam B. Jaffe & Josh Lerner, *Reinventing Public R&D: Patent Policy and the Commercialization of National Laboratory Technologies*, 32 RAND J. ECON. 167, 170 (2001).

97. *Id.*

98. *See* Dzeguze, *supra* note 89, at 25.

99. *See generally* Rich, *supra* note 12.

100. *Id.*

was "nonobvious" at the time it was made.[101] The language drafted by Judge Rich and Pat Federico remains today in § 103:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole 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. Patentability shall not be negatived by the manner in which the invention was made.[102]

The second sentence is of particular note. In an effort to proscribe the "flash of genius" standard in *Cuno*—indeed, to completely do away with any concern over the manner in which a patentable invention was made—the drafters explicitly stated in the Revision Notes: "[I]t [is] immaterial whether [the invention] resulted from long toil and experimentation or from a flash of genius."[103] The recommendations were embodied in the Patent Act of 1952 and summarily passed both houses without debate.[104]

For many scholars, the nonobviousness statute struck the appropriate chord in requiring something more in a patentable invention than novelty and utility alone, without relying on subjective, amorphous standards like "invention," "creativity," and "ingenuity."[105] On his own work, Judge Rich remarked, "Since 1952 there has been no void, but a carefully worked out statutory substitute for the rough-hewn stopgap the courts produced which the courts themselves said they could not explain."[106]

---

101. *Id.*

102. 35 U.S.C.A. § 103(a) (West 2006).

103. *See id.* (Revision Notes); *see also* Duffy, *supra* note 4, at 43.

104. *See* Neil A. Smith, *Remembrances and Memorial: Judge Giles Sutherland Rich 1904-1999*, 82 J. PAT. & TRADEMARK OFF. SOC'Y 597, 601 (2000) (quoting Giles S. Rich, Speech to the New Jersey Patent Law Association, Jefferson Medal Dinner (May 18, 1955) ("The New Patent Act went through both houses on consent calendars, and those houses relied on the unanimous recommendations of their respective committees, and when Truman signed the bill, we got the new law.")).

105. *See* Duffy, *supra* note 4, at 43 ("[Nonobviousness] is not a ridiculously 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."); Jeanne C. Fromer, *The Layers of Obviousness in Patent Law*, 22 HARV. J.L. & TECH. 75, 80–81 (2008).

106. Rich, *supra* note 12, at 207.

But many scholars take for granted that the method-of-invention requirement has, in fact, been eliminated.[107] From a distant view, this is not absurd: if *Cuno* represented the zenith of the method-of-invention requirement, then § 103's statutory prohibition against such analysis should have been its nadir. Yet, a closer examination of the operation of nonobviousness analysis since 1952 reveals that this is not so. Buried in § 103 itself, the section's focus on "the art to which said subject matter pertains," lives a method-of-invention bias. As technology has progressed, a broadening scope of "the art" in § 103 favors inventions created by "creativity," "ingenuity," and "flashes of genius" over those made by diligent experimentation. "Creative" or "ingenious" inventions, after all, are more likely to draw upon disparate arts than those "hemmed about by the near inventions of many others . . . represent[ing a] small advance which converted failure into commercial success."[108] Despite § 103's attempt to overturn over a century of history, the method-of-invention requirement has, in fact, lived on.

III. ANALOGOUS VS. NONANALOGOUS ARTS

A. "The Art to Which Said Subject Matter Pertains"

Nonobviousness is relative: nonobvious for whom, and as compared to what? In many instances, the inventive solution to a problem may not be obvious to some but quite obvious to others.[109] This may be due to a number of reasons, such as difficulty conceiving of the invention, trouble reducing the invention to practice, and technological limitations impeding both.[110] The patent statute seeks to confine this universe of inquiry by narrowing its focus to "the art to which said subject matter pertains."[111] The line-

107. *E.g.*, Duffy, *supra* note 4, at 43 ("The statute also stated that '[p]atentability shall not be negatived by the manner in which the invention was made.' 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.").

108. Dodds & Crotty, *supra* note 91, at 83.

109. *See id.*

110. *See* Fromer, *supra* note 105, at 88–89 (discussing the differences among obviousness in reduction to practice, conception, and technical feasibility).

111. 35 U.S.C. § 103(a) (2006). The statute also attempts to limit the nonobviousness inquiry characteristically, to "a person having ordinary skill in the art," and temporally, to "the

drawing exercise the statute creates for the courts, therefore, is whether the art in question "pertains," or is pertinent to, the subject matter of the invention.[112]

In drafting § 103, it is doubtful that Pat Federico and Judge Rich intentionally imbued the nonobviousness statute with some particular meaning by choosing the word "pertains" as the vehicle for comparison of prior art to the particular invention.[113] Nonetheless, the word's expansive definition[114] should give a careful judge pause. To guide the pertinence question, courts have since relied on the older common law distinction between "analogous" and "nonanalogous arts."[115]

Analogous arts can be grouped into two categories: The first, those arts "from the same field of endeavor, regardless of the problem addressed."[116] As an example, hair brushes and toothbrushes can properly be deemed analogous "brush arts," even though a hair brush is used to straighten and give volume to its object, hair, while a toothbrush is used to clean its object, teeth.[117] The second category includes those arts that exist in a different field of endeavor from the invention but solve the same problem or have

---

time the invention was made," but discussions of these limitations are beyond the scope of this Article.

112. This is necessary because, unlike the novelty inquiry, which requires that all elements of the invention be present in a single prior art reference, the nonobvious inquiry allows elements from separate prior art references to be combined. Without this requirement, every antedated reference, regardless of its relevance to the invention, becomes a potentially patent-defeating piece of prior art.

113. *See generally* Rich, *supra* note 12 (lamenting the problems that arise from giving too much meaning to particular words in the patent statute).

114. *Pertains Definition,* THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE 1312 (4th ed. 2009) ("To have reference; relate . . . . To belong as an adjunct, part, holding, or quality . . . . To be fitting or suitable.").

115. *See, e.g.*, *In re* Flick, 210 F.2d 832, 835 (C.C.P.A. 1954) ("It is well settled that the pertinence of a reference depends on whether it would suggest to one skilled in the art to do what appellants have done. This is also true when considering a reference alleged not to be in the analogous art.").

The first reference to "analogous arts" prior to the nonobviousness statute appeared in *In re McLaughlin*, 36 F.2d 438, 440 (C.C.P.A. 1929), for a method of making ready-to-eat chocolate cakes. There, the examiner found a similar method using corn meal, and the inventor protested, claiming that baking with corn meal and powdered chocolate were not "analogous arts." Other cases through the 1930s and beyond discuss this distinction. *See, e.g.*, *In re* Beaumont, 58 F.2d 458, 459 (C.C.P.A. 1932); *In re* Fischer, 62 F.2d 97, 98 (C.C.P.A. 1932); *In re* Raleigh, 62 F.2d 200, 202 (C.C.P.A. 1932).

116. *In re* Johenning, No. 93-1217, 1994 WL 374505, at *2 (Fed. Cir. July 15, 1994).

117. *In re* Bigio, 381 F.3d 1320 (Fed. Cir. 2004).

the same purpose as the invention sought to be patented.[118] Cone-shaped caps for oil decanters can therefore be construed as analogous art with respect to cone-shaped caps for bags of popcorn, even though the "oil can" art is not in the same field of endeavor as the "popcorn bag" art.[119]

Inversely, nonanalogous arts are those from a different field of endeavor from the invention.[120] These can be disparate arts, say, rocket science and dairy science, or from related arts to which an inventor should not be reasonably expected to look for prior art.[121] In *In re Oetiker*, for example, the Federal Circuit reversed a Patent Office finding of obviousness when the examiner found that the applicant's metal clamp for a garment hose was too similar to other plastic clamps used in clothing. The appellate court concluded that although both inventions were clamps, an inventor interested in perfecting the clamping of garden hoses could not be reasonably expected to scour the art of pantyhose.[122]

This distinction between the analogous and nonanalogous arts has served as a short-hand for pertinent art under § 103. That is, analogous art is art to which the subject matter of the invention pertains and can therefore be used in obviousness determinations. Nonanalogous art, meanwhile, is not pertinent and cannot be used in obviousness determinations under the statute.[123] Questions of nonobviousness, and therefore validity, often rest on whether the examiner or the court construes a particular prior art reference as analogous or nonanalogous art.

B. The Subjective Nature of the Analogous Art Test

As mentioned, the characterization of prior art as analogous or nonanalogous is principally an exercise in line-drawing. In *Bigio*, the hair brush versus toothbrush case, the majority's opinion raises the question: Why were the arts in question characterized as

118. *In re* Clay, 966 F.2d 656, 659 (Fed. Cir. 1992).

119. *See In re* Schreiber, 128 F.3d 1473 (Fed. Cir. 1997). Although the Federal Circuit eventually affirmed the PTO's rejection of the invention on novelty rather than obviousness grounds, the case contains a substantive discussion of whether the oil decanter occupied the same "field of endeavor" as the invention.

120. *See In re Clay*, 966 F.2d at 659.

121. *See In re* Oetiker, 977 F.2d 1443 (Fed. Cir. 1992).

122. *Id.* at 1446–47.

123. *See In re Clay*, 966 F.2d at 659.

"analogous" to begin with? Could not the court have equally construed the respective arts as the "dental art" and the "hair art"? Why not the "straightening arts" and the "cleaning arts"? The same query applies to *Schreiber* (popcorn shakers vs. oil cans)[124] and *Oetiker* (hose clamps vs. garment clamps).[125] Taking the "object approach" from *Bigio*—that is, assessing analogous arts based on the "object" of the invention, such as "a brush"—why was it proper for the court to analogize popcorn shakers and oil cans as "dispensers," but improper for the court to analogize hose clamps and garment clamps as "clamps"?

There has yet to be any case in Federal Circuit jurisprudence that makes clear the answers to these questions. Nor is there anything inherent about the technologies at issue in *Bigio*, *Schreiber*, or *Oetiker* that would naturally lead one to the same conclusion as the Federal Circuit. It is doubtful that there exists in the arts of brushes and dispensers some element that predisposes them to analogy across applications, which the art of clamps happens to lack. How, then, to conceive of *Schreiber*, *Oetiker*, *Bigio*, and others, as part of a consistent whole?

Perhaps they can't be. In *Bigio*, the applicant complained that the analogous art test "is unworkable because the lack of clear guidelines leaves the application of this test to a [patent] examiner's subjective judgment."[126] The *Bigio* majority dismissed these concerns by responding that the analogous art inquiry is "neither wholly subjective nor unworkable. [The] test for analogous art requires the PTO to determine the appropriate field of endeavor by reference to explanations of the invention's subject matter in the patent application, including the embodiments, function, and structure of the claimed invention."[127] Yet this very characterization of the analogous art test belied the subjective, and at times, arbitrary nature of the inquiry. How does one define "subject matter"? And in referencing the applicant's explanations, what is it, exactly, that the examiner should be looking for? The majority's opinion does not answer these basic concerns.

Nor has the Federal Circuit been consistent on the proper approach to determining which art is analogous on the face of a

124. 128 F.3d at 1473.

125. 977 F.2d at 1443.

126. 381 F.3d 1320, 1325 (Fed. Cir. 2004).

127. *Id.*

patent application. Perhaps too charitably, one Washington patent attorney has conceded that, historically, "the case law appears erratic on this issue."[128] More vehemently, another has written that "the courts have tended to define what comprises analogous art in a very broad manner," chastising the doctrine as "subjective"—a damning modifier in patent law analysis.[129] Another has aptly summarized the schizophrenia of analogous art inquiries:

> Some were made on the basis of whether references were reasonably pertinent to the inventor's problem. Others discussed similarity of elements, problems and purposes, or similarities and differences in structure and function. Still others reached their result on the basis of what was deemed the "invention as a whole."[130]

In a telling example, one recent case struggled with three different conceptions of analogous art. In *Mykrolis Corp. v. Pall Corp.*, the Massachusetts District Court considered the validity of a patent for semiconductor coating fluid.[131] The court struggled with how best to draw the analogous art. It considered "filtration devices or fluid separation devices"; "fluid separation devices having an easily replaceable and disposable fluid separation module"; and "such devices as are used in industrial processes or the manufacturing environment, as opposed to medical applications."[132] Finding none of these particularly satisfactory, the court simply concluded that the asserted "references appear to at least be reasonably pertinent to the problem the [plaintiff's] inventions sought to solve."[133] In other words, even though the district court could not discern the contours of the analogous art, it nonetheless concluded that the prior art references asserted by the examiner seemed "reasonably pertinent to the problem" faced by the inventor, thus bypassing the entire analogous art inquiry.

This struggle to define "the analogous art" lends credence to the notion that the analogous arts test is wholly subjective, contrary to

128. Jeffrey T. Burgess, *The Analogous Art Test*, 7 BUFF. INTELL. PROP. L.J. 63, 70 (2009).

129. *See* Hilary K. Dobies, *New Viability in the Doctrine of Analogous Art*, 34 IDEA 227, 229 (1994).

130. *Id.* at 229–30 (citations omitted).

131. No. Civ.A.03-10392-GAO, 2005 WL 81920, at *5 (D. Mass. Jan. 12, 2005).

132. *Id.*

133. *Id.*

the Federal Circuit's rebuke of the inventor's criticisms in *Bigio*.[134] Systemically looking at the issue across district court opinions, even the most generous view of the test finds a schizophrenic approach to defining an analogous art.[135] As in *Mykrolis*, other courts, including the Federal Circuit, have circumvented the analysis entirely.[136] It is difficult to conclude that the analogous arts test, therefore, is anything other than a "subjective" inquiry, a matter of judicial discretion or juridical whim, inappropriate for the supposed "objective" intent of measuring obviousness against a person having ordinary skill in the art.

This criticism of the analogous art test's objectivity has not escaped the notice of dissenting circuit court judges. In *In re Mlot-Fijalkowsi*, the dissent disagreed with the majority's finding that an asserted reference was analogous. The dissent subtly pointed out that the majority did not undertake a thorough analysis of whether the two references were actually analogous, but that its finding was merely "premised on its conclusory statement that they are 'from the pertinent related dye arts.'"[137] In *In re Metz*, the dissent criticized the majority for finding that there existed the "hologram arts," which had the effect of analogizing "[t]he use of holograms in window treatments to filter out infrared (heat) radiation . . . to the use of

134. *In re* Bigio, 381 F.3d 1320, 1325 (Fed. Cir. 2004).

135. *See* Dobies, *supra* note 129, at 229.

136. Wyers v. Master Lock Co., 616 F.3d 1231, 1238 (Fed. Cir. 2010) (quoting *In re* Clay, 966 F.2d 656, 659 (Fed. Cir. 1992)) (bypassing the issue of whether prior art references were in an analogous art and summarily concluding that "[e]ven if the prior art padlocks were not within the same field of endeavor, they are nonetheless clearly 'reasonably pertinent' to the problem that the inventor was trying to solve" with little discussion); Sentry Prot. Prods., Inc. v. Eagle Mfg. Co., No. 1:01CV2240, 2003 WL 25539702, at *6 (N.D. Ohio Sept. 30, 2003) (concluding that a prior patent was "reasonably pertinent" to the problem solved by the invention in dispute, without defining the field of endeavor of the invention); NB Jackets De P.R. v. Microseal Corp., No. 84C6544, 1986 WL 2056, at *5 (N.D. Ill. Feb. 4, 1986) ("Although we have not definitively specified the inventor's field of endeavor as either microfilm jackets or plastics bonding, the [asserted references] disclose inventions so similar in purpose and function to plaintiff's invention that their relevancy is not seriously in doubt."); *cf.* Fraser v. Continental Realty Corp., 356 F. Supp. 704, 707 (S.D. W. Va. 1972), aff'd, 474 F.2d 1341 (4th Cir. 1973) (concluding that analyzing a patent under the doctrine of equivalents "involves the intricacies of technical interpretations of the art at a given time . . . . This means that objectivity is difficult when the opinions of experts in a given field of endeavor are clothed in subjectivity. Cold, practical analysis on this issue in so many cases is next to impossible").

137. *In re* Mlot-Fijalkowski, 676 F.2d 666, 671–72 (C.C.P.A. 1982) (Miller, J., dissenting).

holograms in detecting biochemical fluorescence."[138] And finally in *Bigio*, Judge Newman chastised her colleagues, stating that she could not find "any ground on which a person seeking to design an improved hairbrush would deem the toothbrush art to be a source of usable technology, and thus 'analogous.'"[139]

While commentators have disagreed on the best means for utilizing the analogous art test, most, if not all, see the test as being as loosely applied as did the applicant in *Bigio*. Arguing for more flexibility to invalidate "obvious" internet patents, Professor Bagley has suggested using the analogous art doctrine.[140] With Congressional action and PTO reform being more difficult to implement, Bagley lauds "[t]his uncertainty regarding application of the doctrine of analogous art [as it] may be fortuitous in the context of Internet business model patents because it demonstrates the elasticity of the doctrine."[141] Responding to Bagley, Professor Takenaka does not disagree that "a serious flaw inherent to the doctrine of analogous art is its arbitrary nature of defining the applicable scope."[142] Another commentator, while concluding that the analogous art test resides in "practicable boundaries," still recognizes that under the doctrine "the subjective view of the examiner may affect the ultimate determination of patentability."[143] One practicing patent attorney has found that "[a]n issue that is so apparently subjective can allow an advocate some wiggle room in which a powerfully persuasive argument can sway a fact finder even in a seemingly hopeless situation."[144]

The result of the "elastic," "subjective," or "broad" analogous arts test lies in its effect. The analogous arts inquiry allows courts to draw the analogous arts in a way that suits them, be it to limit a patent's analogous art to its "field of endeavor," or to conclude that

138. No. 97-1263, 1998 WL 670185, at *7 (Fed. Cir. Sept. 22, 1998) (Newman, J., dissenting).

139. *Bigio*, 381 F.3d at 1327 (Newman, J., dissenting).

140. Margo A. Bagley, *Internet Business Model Patents: Obvious by Analogy*, 7 MICH. TELECOMM. & TECH. L. REV. 253, 270 (2001).

141. *Id.*

142. Toshiko Takenaka, *International and Comparative Law Perspectives on Internet Patents*, 7 MICH. TELECOMM. & TECH. L. REV. 423, 428 (2001).

143. Jeff J. Maday, Note, *In re* Bigio: *Brushing Your Hair with a Toothbrush? The Interplay Between the Broadest Reasonable Interpretation Rule and the Analogous Art Doctrine*, 7 TUL. J. TECH. & INTELL. PROP. 313, 323 (2005).

144. Burgess, *supra* note 128, at 70.

a prior art reference is "at least . . . reasonably pertinent to the problem the [plaintiff's] inventions sought to solve."[145] Defining the field of a patent's analogous art allows a court to choose the scope of the obviousness inquiry: the broader the analogous art, the greater number of prior art references that can potentially be held against the inventor, and the more likely that the patent will be found invalid as obvious. In this sense, the power to construe a reference as "analogous" or "non-analogous," therefore, is nothing short of the power to invalidate patents or reject patent applications.

This suggests that the standard of "inventiveness" has come full circle. Saddled with an unworkable standard of "creative ingenuity" in 1941 that gave the courts too much discretion to invalidate otherwise inventive patents,[146] patent law moved to what it perceived to be a more objective, and less discretionary, standard of "nonobviousness" in 1952.[147] But this very same "objective standard" ended up incorporating the older common law—and mainly subjective—analogous art test, which now similarly gives courts considerable, and perhaps too much, discretion to deny patents on the basis of obviousness. The patentability inquiry, therefore, has replaced one "fugitive, impalpable, wayward, and vague . . . phantom" with another.[148]

C. The Trend Towards Analogizing

As technology has progressed, so has the analogous arts test. While the elasticity of the test potentially lends itself to either expansion or contraction, the courts have uniformly broadened, as opposed to narrowed, what they perceive to be analogous arts. This stems, perhaps, from the courts' recognition that technological advancement has become increasingly interdisciplinary.

In 1895, the Supreme Court in *C & A Potts & Co. v. Creager* found a "peculiar intuitive genius" in "the idea that a device used in one art may be made available in another."[149] But by 1966, the

145. Mykrolis Corp. v. Pall Corp., No. Civ.A.03-10392-GAO, 2005 WL 81920, at *5 (D. Mass. Jan. 12, 2005), *aff'd in part, dismissed in part sub nom.* Entegris, Inc. v. Pall Corp., 490 F.3d 1340 (Fed. Cir. 2007).

146. *See* Jungersen v. Ostby & Barton Co., 335 U.S. 560, 572 (1949) (Jackson, J., dissenting).

147. 35 U.S.C. § 103(a) (2006).

148. Harries v. Air King Prods. Co., 183 F.2d 158, 162 (2d Cir. 1950).

149. 155 U.S. 597, 607–08 (1895).

Court had dispensed with the notion that using technology from one field to solve problems in another was genius at all. That year, in *Graham v. John Deere Co.*, Justice Clark delivered the famous lines:

> Technology, however, has advanced—and with remarkable rapidity in the last 50 years. Moreover, the ambit of applicable art in given fields of science has widened by disciplines unheard of a half century ago. It is but an evenhanded application to require that those persons granted the benefit of a patent monopoly be charged with an awareness of these changed conditions. The same is true of the less technical, but still useful arts. He who seeks to build a better mousetrap today has a long path to tread before reaching the Patent Office.[150]

Justice Clark's words have been an apt prophesy of the technological revolution that succeeded his opinion in *Graham*. Shortly after his opinion, the invention of the computer microprocessor collapsed a number of previously disparate technologies into a single field: computer science.[151] The electronics and telecommunications fields, once separate disciplines, merged into a single computer-assisted field. The merger "erased the boundaries between data processing and data transmission and between data, voice, and video communications [and] blurred the lines between single-processor computers, multi-processor computers, local networks, metropolitan networks, and long-haul networks."[152]

Beginning in the 1990s, the rise of nanotechnology similarly saw the merger of the physical, chemical, and engineering sciences.[153] In inventing machines that measured less than one one-hundred-thousandth of a meter, the field sought to combine the techniques of "information technology, polymer research, optics, biochemistry and medicine and micromechanics."[154] Technologies previously thought to be wholly separate from one another, such as molecular biology

150. 383 U.S. 1, 19 (1966).

151. *See generally* William Aspray, *The Intel 4004 Microprocessor: What Constituted Invention?*, 19 IEEE ANNALS OF THE HISTORY OF COMPUTING 4 (July 1997).

152. Lance Leonard Barry, *Cézanne and Renoir: Analogous Art in Patent Law*, 13 TEX. INTELL. PROP. L.J. 243, 246–47 (2005) (citations omitted).

153. M. Meyer & O. Persson, *Nanotechnology-Interdisciplinarity, Patterns of Collaboration and Differences in Application*, 42 SCIENTOMETRICS 195, 198 (1998).

154. JOACHIM SCHUMMER & DAVIS BARD, NANOTECHNOLOGY CHALLENGES: IMPLICATIONS FOR PHILOSOPHY, ETHICS AND SOCIETY 189 (2006).

and mechanical engineering, have been, in the nanotechnology context, conceived of as a single, unified art.[155]

This trend has given the courts cause to broaden what they consider to be an "analogous art." If interdisciplinary solutions to technological problems are the norm, then it would stand to reason that the insight to those solutions—that is, the prior art—also normally lies outside of the discipline at hand.[156] In a famous patent case involving weather engineering,[157] the Court of Claims opined that "[h]uman knowledge cannot be compartmentalized or pigeonholed, and the courts have recognized this in evaluating the relevancy of art that comes before them in a[n obviousness] context."[158] There, the court found that the inventor's patent for "cloud seeding"—dispersing chemicals throughout the air in order to form clouds—was obvious in light of antecedent patents that disclosed a system for the "airborne delivery and fusing" of objects.[159] The inventor vainly attempted to characterize the older patents as nonanalogous prior art, but the court concluded that given the interdisciplinary nature of modern invention, "it is unrealistic to assume or demand that the cloud seeder confine his reading to *The Journal of Weather Modification*."[160]

The seeming folly of the subject matter in *Weather Engineering* aside, this trend towards analogizing arts has driven courts, in applying the analogous arts test, to rope in widely disparate fields of invention to invalidate patents, even to levels of absurdity. In *George J. Meyer Manufacturing Co. v. San Marino Electronic Corp.*, the court found a glass-bottle inspecting system, used to check for defects in glass bottles, analogous to a military missile tracking

155. M. Knoblauch & W.S. Peters, *Biomimetic Actuators: Where Technology and Cell Biology Merge*, 61 CELLULAR AND MOLECULAR LIFE SCI. 2497, 2506 (2004) ("It is fascinating to see how not only experimental approaches but also theoretical concepts merge in this no-man's land between established disciplines.").

156. *See* Barry, *supra* note 152, at 246 ("In today's world, questions arising in a particular industry are answered not only by those inside the industry but by those trained in scientific fields having no 'necessary relationship' thereto.") (quoting George J. Meyer Mfg. Co. v. San Marino Elec. Corp., 422 F.2d 1285, 1288 (9th Cir. 1970)).

157. That is, the science of controlling the weather, which is often practiced by using such methods as firing rockets filled with inorganic solvents into clouds. For a popular article on the subject, see J.R. Fleming, *The Climate Engineers*, WILSON Q., Spring 2007, at 46.

158. Weather Eng'g Corp. of Am. v. United States, 614 F.2d 281, 287 (Ct. Cl. 1980).

159. *Id.*

160. *Id.*

system.[161] The invention involved placing a glass bottle over a light source, which would then shine a light through the bottle's glass and into a photoelectric cell.[162] Depending on the refraction of the light, the photoelectric cell could determine if the bottle was defective, and if so, where the defect was located.[163] The court analogized this to a missile targeting system that optically tracked missiles against the sky.[164] The "analogous art," according to the court, was "the detection of foreign objects in a field of view by electro-optical techniques."[165] Despite the court's conclusion, it is difficult to envision Coke bottle engineers combing NASA literature to solve the problem of the flawless soda bottle. To paraphrase the court in *Weather Engineering*, it seems unrealistic to assume or demand that the bottle engineer should expand his reading to *The Journal of Aerospace Engineering*.[166]

Recently, the Supreme Court's opinion in *KSR International Co. v. Teleflex Inc.* has furthered this trend.[167] In *KSR*, the patentee had claimed an adjustable gas pedal connected to a modular sensor that could be used in computer controlled automotive systems.[168] While the prior art included both adjustable gas pedals and modular sensors, no one had previously been able to combine the two technologies.[169] Concluding that combining these two technologies would have been obvious to a person having ordinary skill in the mechanical and electrical engineering arts, the Court deemphasized the Federal Circuit's "teaching, suggestion, or motivation" ("TSM") test: that is, finding an inventive combination obvious if the prior art contained a teaching, suggestion, or motivation to create the combination.[170] By chastising the Federal Circuit for relying almost

161. 422 F.2d at 1289–90.

162. *Id.* at 1286.

163. *Id.* at 1287.

164. *Id.* at 1287–88.

165. *Id.* at 1288.

166. *See* Weather Eng'g Corp. of Am. v. United States, 614 F.2d 281, 286–87 (Ct. Cl. 1980).

167. 550 U.S. 398 (2007).

168. *Id.* at 405–06.

169. *Id.* at 407–09. This was likely due to a problem inherent in the modular sensor throttle art. Modular sensors, at least at the time, measured the distance the pedal was pushed by the driver from a fixed point. An adjustable gas pedal, therefore, would be a variable distance from the fixed point depending on where it was positioned, much like a moving target. *See id.* at 408–09.

170. *Id.* at 418.

exclusively on this test, the Supreme Court, in effect, expanded the circumstances where combinations of prior art were obvious, rejecting "rigid and mandatory formulas" and "formalistic conceptions" of obviousness in favor of a "common sense" approach based on the "diversity of inventive pursuits and of modern technology."[171]

This "common sense" approach appears to be a one-way ratchet: because the Federal Circuit's previous TSM test was, in the words of the Supreme Court, a "*narrow* conception" of obviousness—not simply an incorrect conception—the Court gave its blessing to *widening* the obviousness inquiry.[172] Therefore, post-*KSR*, obviousness should not be limited to the TSM test, or any test, but should be *expanded* to include "common sense" and the thrust of new technology. In tune with this conception of *KSR*, the Court brought back from the dead a facet of the obvious inquiry that the Federal Circuit had buried long ago: the "obvious to try" standard.[173] That is, despite the content of the prior art, if it would have been obvious to a person having ordinary skill in the art to *try* combining certain elements to achieve a predictable result, that combination would be obvious under § 103.[174] A number of commentators have also suggested that *KSR* has consequently broadened the analogous art inquiry.[175]

Although Justice Clark's statement that "the ambit of applicable art in given fields of science has widened by disciplines unheard of a half century ago,"[176] the results of the analogous art test

171. *Id.* at 418–19.

172. *See id.* at 419 (emphasis added).

173. *Id.* at 421 ("[T]he fact that a combination was obvious to try might show that it was obvious under § 103."); *see also In re* Deuel, 51 F.3d 1552, 1559 (Fed. Cir. 1995) ("'Obvious to try' has long been held not to constitute obviousness." (quoting *In re* O'Farrell, 853 F.2d 894, 903 (Fed. Cir. 1988))).

174. KSR Int'l, Co. v. Teleflex Inc., 550 U.S. 398, 421 (2007).

175. *E.g.*, Christopher A. Brown, *Developments in Intellectual Property Law*, 41 IND. L. REV. 1139, 1148 (2008) ("[T]he Court views patentable subject matter as inventions that are closer toward the 'flash of genius' end of the inventive spectrum."); Dzeguze, *supra* note 89, at 40; Sean B. Seymore, *Heightened Enablement in the Unpredictable Arts*, 56 UCLA L. REV. 127, 135 (2008) ("Thus, the post-*KSR* PHOSITA is not a plodder but a creative individual."); Gregory Mandel, *The Non-Obvious Problem: How the Indeterminate Nonobviousness Standard Produces Excessive Patent Grants*, 42 U.C. DAVIS L. REV. 57, 115–16 (2008); Theresa Stadheim, *How* KSR v. Teleflex *Will Affect Patent Prosecution in the Electrical and Mechanical Arts*, 91 J. PAT. & TRADEMARK OFF. SOC'Y 142, 152 (2009) ("After *KSR*, the test for analogous art is much broader.").

176. Graham v. John Deere Co., 383 U.S. 1, 19 (1966).

incorporating this rapid scientific interdisciplinarity seem far beyond those predicted or intended by *Graham*. It is one thing to charge an inventor seeking to "build a better mousetrap" with more prior art references than he would have been responsible for fifty years ago; it is another to analogize glass making with rocket science,[177] or to declare that meticulously engineered inventions are not patentable because they would have been obvious to try.[178] Given the subjective nature of the analogous art test, and the trend towards increasingly analogizing disparate arts, the test serves mainly as a proxy to invalidate "less mysterious inventions a judge can understand" but validate "complex inventions difficult for judges to understand."[179] This byproduct of increased analogization has contained an inherent method-of-invention bias.

D. Analogizing Prior Art and the Method of Invention

The trend towards analogizing prior art has not treated all patents equally. Rather, the interdisciplinary application of the analogous art test has discriminated against patents based on their methods of invention. Specifically, the increasing trend to analogize prior art has favored patents made more creatively and abstractly, as in, perhaps, a "flash of genius,"[180] over those made more experimentally and laboriously, i.e., through "long toil and experimentation."[181] This arises because certain scientific disciplines typically create inventions by more laborious and empirical processes, while other disciplines' inventions germinate primarily from the mind alone.

177. *Compare id.* ("He who seeks to build a better mousetrap today has a long path to tread before reaching the Patent Office."), *with* George J. Meyer Mfg. Co. v. San Marino Elec. Corp., 422 F.2d 1285, 1288 (9th Cir. 1970) ("These considerations lead us to believe that today the word 'art' includes not only the knowledge accumulated with respect to a problem in a particular industry but that accumulated in those scientific fields the techniques of which have been commonly employed to solve problems of a similar kind in the particular and closely related fields. In the bottle inspection field the sciences of optics and electronics had been widely used and as new electronic and optical techniques were developed to solve, in related fields, problems of the kind presented by bottle inspection, then those techniques became part of the relevant art.").

178. *KSR*, 550 U.S. at 421.

179. *See* Irah H. Donner, *Combating Obviousness Rejections Under 35 U.S.C. § 103*, 6 ALB. L.J. SCI. & TECH. 159, 199 (1996); *see also* Twin Disc, Inc. v. United States, 10 Cl. Ct. 713 (1986).

180. *See* 35 U.S.C.A. § 103 (West 2006) (1952 Revision Notes).

181. *See id.*

Inventions in chemistry, for example, are typically, if not always, the product of experimentation. In order to patent a particular chemical, an inventor must overcome two technical hurdles: synthesis or extraction and discerning the compound's function. In the synthesis step, the inventor of a chemical must determine how to either extract the chemical from a product in nature, such as extracting a chemical from the bark of a particular tree, or how to design a method to synthesize it through other chemical processes.[182] In the function step, the inventor must determine the function of the chemical compound.[183] Because all patents must have "utility" under 35 U.S.C. § 102, an inventor cannot obtain a patent for a chemical compound without knowing how it can be used.[184] While any empiricist worth his salt, so to speak, will likely have a general idea how his novel compound may work, this ultimately needs to be confirmed by experiment before obtaining a patent.[185] Thus, although an invention "need not be actually reduced to practice" to obtain a patent,[186] in the chemistry context at least, an inventor needs to come quite close to reduction.

The Federal Circuit noted this effect in *Pfizer, Inc. v. Apotex, Inc.*[187] There the plaintiff complained that it was only able to create the patented invention amlodipine besylate, a salt used to better deliver drugs orally, "through the use of trial and error procedures."[188] Because it was unclear whether the compound would work as the plaintiff intended, the plaintiff noted that the mere *conception* of the invention required "routine experimentation" and

182. *See generally*, JORDAN GOODMAN & VIVIEN WALSH, THE STORY OF TAXOL: NATURE AND POLITICS IN THE PURSUIT OF AN ANTI-CANCER DRUG (2001). The successful cancer drug, Taxol, was originally extracted from the bark of the Pacific yew tree. Because of the immaturity of the art of chemical synthesis at the time, Taxol could only be extracted from the tree's bark and could not be inorganically synthesized. Although cellular assays of the drug proved promising, manufacturing was an immediate concern: it would take the bark of almost 400,000 trees to deliver an annual supply to American patients. Recent research has developed an alternative to stripping yew tree bark, but Taxol still cannot be wholly synthesized inorganically.

183. Brenner v. Manson, 383 U.S. 519, 532–33 (1966) (discussing the utility requirement of chemical patents).

184. *Id.*

185. *See id.* at 522 (discussing the predictability of steroid homologues).

186. *See* Hyatt v. Boone, 146 F.3d 1348, 1352 (Fed. Cir. 1998) ("The filing of a patent application serves as conception and constructive reduction to practice of the subject matter described in the application.").

187. 480 F.3d 1348 (Fed. Cir. 2007).

188. *Id.* at 1366–67.

"routine testing."[189] In concluding that the plaintiff's invention was obvious, the court noted that "the length, expense, and difficulty" of merely conceiving the invention "require[d] extensive time, money, and effort to carry out."[190] This is the peculiar nature of chemistry in the patent context: because neither the synthesis of a chemical compound, nor its function, can be hypothesized in the abstract, the invention of a particular compound often requires a good deal of "long toil and experimentation."[191]

The same is true in molecular biology. The functional unit of biological reactions, proteins, cannot be invented in the abstract. An inventor of a protein must, typically, either find the protein as it exists in nature and extract it, or invent the protein through a random synthesis and screening process.[192] Still, the inventor must engage in two final steps before the protein can be patented. She must sequence the protein into its comprising string of amino acids, and then, as in chemistry, determine its function.[193] Like chemical compounds, the sequence of a protein and its biological function cannot be hypothesized in the abstract.[194] Experimental confirmation is required to determine *what* the protein is, i.e., its sequence, and *how* the protein functions, i.e., its use.[195] Without this "routine experimentation" and "routine testing," the inventor's protein generally cannot be patented.[196]

Other disciplines do not require such "extensive time, money, and effort" to produce an invention. A person having ordinary skill in the art of electrical engineering, for example, will generally be able

189. *Id.* at 1367 (citing *In re* Yates, 663 F.2d 1054, 1056 n.4 (C.C.P.A. 1981)).

190. *Id.*

191. *See* Brenner v. Manson, 383 U.S. 519, 532–33 (1966); *Pfizer*, 480 F.3d at 1366–67.

192. *See generally*, Helen M. Berman & Rochelle C. Dreyfus, *Reflections on the Science and Law of Structural Biology, Genomics, and Drug Development*, 53 UCLA L. REV. 871 (2006) (discussing the patenting process of biological materials).

193. *See id.* at 874–79 (discussing these aspects of protein invention).

194. *See id.* at 879–83.

195. *See id.* at 891 ("[T]he value in finding sequences and structures is an intermediate value. It lies in learning about the gene or the protein in its natural context; it does not derive from isolation and purification as it does in the classic human intervention cases. Rather, for genetic material and proteins, the effort that patent law is intended to encourage resides in the next set of steps that must be undertaken—converting that knowledge through long, intricate, and risky experimentation into commercial products.").

196. *See id.* at 892 (discussing the circumstances when a newly isolated protein can be patented); *Pfizer*, 480 F.3d at 1367.

to predict how a circuit will function without undergoing any testing or experimentation.[197] Because of this, the problems that lay in designing electrical circuits are problems of creativity; the solutions to these problems are creative solutions rather than empirical discoveries. Unlike chemistry or biology, therefore, one can conceive an invention based on an electrical circuit—from its components to predicting how it will function—entirely in the mind.

The famous patent case of *Kearns v. Chrysler Corp.* describes this principle in the context of the invention of the intermittent windshield wiper.[198] Prior to Robert Kearns's invention, all automatic windshield wipers in cars continuously wiped a car's windscreen at a constant speed.[199] Because the human eye blinks intermittently, rather than continuously, this proved some irritation to many drivers, including Kearns.[200] Kearns, a Wayne State University engineering professor, invented a windshield wiper that wiped the windscreen intermittently rather than continuously, and obtained a patent for his invention in 1967.[201] Notably, Kearns's invention was the simple combination of an electrical circuit, motor, and spring, all of which had existed in the prior art for decades, and the combination of which could easily be predicted by any electrical engineer of even mediocre skill.[202] While Kearns certainly experimented with his invention, the invention itself was a product entirely of Kearns's mind.[203] Unlike a chemist or biologist who *must* experiment with his materials to bring his invention in a patent-ready state, once Kearns conceived of the appropriate circuit, motor, and spring combination

197. *See* Seymore, *supra* note 175, at 136 ("In electrical engineering, for example, a PHOSITA can easily predict what will happen when circuits are combined.").

198. 32 F.3d 1541 (Fed. Cir. 1994). The inventor of the intermittent windshield wiper, Robert Kearns, brought a large number of relatively successful suits against numerous car manufacturers beginning with *Kearns v. Ford Motor Co.*, No. 8-70740 (E.D. Mich. 1978). In 2008, the subject of these suits was made into a movie, starring Greg Kinnear as Kearns. The movie suggested that Kearns came up with the idea of the intermittent windshield wiper primarily as a thought experiment, with some, but little, validation at the bench. The movie was appropriately named "Flash of Genius." I confess to having seen it.

199. *See* U.S. Patent No. 3,351,836 (filed Dec 1, 1964) (describing the prior art).

200. JOHN SEABROOK, FLASH OF GENIUS: AND OTHER TRUE STORIES OF INVENTION 1 (2008).

201. *See id.*; U.S. Patent, *supra* note 199.

202. *See* John Seabrook, *The Flash of Genius*, THE NEW YORKER, Jan. 11, 1993 (Clifford Sadler, of Ford's executive department, is quoted as saying the following about the technology behind Kearns's patent: "Even in 1963, the resistor-capacitor timing device was a standard piece of engineering—it was sophomore-in-college stuff.").

203. *See* SEABROOK, *supra* note 200, at 7.

for his intermittent wipers, he did *not need* to conduct any further experiments before submitting his invention to the patent office.

These differences in the methods of invention among disciplines subject themselves to different treatment in the analogous art inquiry. Because inventions made in more laborious disciplines typically require more trial-and-error than creative disciplines, the solutions to problems in laborious disciplines typically come from a narrow range of often-used but related art. The universe of materials with which to solve problems is limited, and inventors seeking solutions in the more laborious disciplines must often draw on the same techniques, repeat familiar methods, and seek inspiration from similar sources as previous inventors in the field. This was readily apparent with the plaintiff's invention in *Pfizer, Inc. v. Apotex, Inc.*[204] There, the inventor's "trial-and-error" was "*routine* testing" and "*routine* experimentation."[205] In order to solve the problems of chemical stability and the stickiness of the chemical compound to machine manufacturing equipment—frequent problems in drug manufacturing—the inventor experimented by combining the chemical compound, amlodipine, with a number of "acid addition salts."[206] The "work on this project was 'expected to be straightforward.'"[207] Further, when the inventor selected besylate from a variety of salts, it did so because it had "good solubility, . . . good stability, nonhygroscopicity and good processability"—all "basic considerations by a person skilled in the art for selecting a suitable pharmaceutical salt" according to the examiner.[208] Although these trials took years and not a small amount of research capital to complete,[209] the procedures and inspirations for finding that "perfect" "acid addition salt" were not novel but routine experimental tools of the art of pharmaceutical chemistry.[210]

The creative disciplines on the other hand can draw upon a wider, more diverse range of prior art, precisely because the inventions in those disciplines can be primarily formed in the mind.

204. 480 F.3d 1348 (Fed. Cir. 2007).

205. *Id.* at 1367.

206. *Id.* at 1354.

207. *Id.*

208. *Id.* at 1355.

209. *See id.* at 1353–54 (recounting Pfizer's four years of research into inventing amlodipine besylate).

210. *Id.* at 1355.

The inspiration to solve the problems those inventions address often comes from unlikely or far-removed sources. And because such inventions can be wholly conceived of, without experiment, the universe of materials to bring them into existence is theoretically limitless. This, too, was the case with Robert Kearns's windshield wipers. While the materials Kearns used in creating his invention were surely the workhorses known to all garage-shop engineers—circuit, motors, and springs—his inspiration of combining those units into a coherent, working whole was far from rote. First, the very concept of the intermittent wiper came from principles outside the typical realm of electrical engineering: human biology. Kearns conceived of the idea for intermittent, as opposed to continuous, wipers from the intermittent blinking of the human eye.[211] Second, a large part of Kearns's invention was to utilize two aspects of a wet car windshield generally unconsidered by electrical engineers: the drag forces created by a moving car against the windshield, a principle of aerodynamics; and the lubricating force of the wet windshield on the wipers, a principle of hydrodynamics.[212] Both of these principles were integral to the function of the "brake resistor"—the critical component in Kearns's invention that made the wipers slow down and seemingly stop, so it would appear that they wiped only "intermittently."[213] It is telling, too, that Kearns cited only three prior art references in his patent application related to electronically controlled windshield wipers.[214] Although Kearns generally conceived of this process entirely in his mind, the arts he drew upon—electrical engineering, human biology, aerodynamics, and hydrodynamics—were relatively disparate.

It is thus more likely, therefore, that an invention created in a laborious discipline will be found to consist of "analogous arts" than will an invention created in a creative discipline.[215] Because invention in laborious disciplines requires not just research, experimentation, and validation but the *same* research, experimentation, and validation

211. *See* SEABROOK, supra note 200, at 1.

212. *See* U.S. Patent, *supra* note 199.

213. *See id.*

214. *Id.* (citing U.S. Patent Nos. 2,357,152 (continuous electric windshield wiper), 3,219,901 (intermittent control of windshield wiper), and 3,262,042 (electronic circuit for windshield wiper)).

215. *See* Stadheim, *supra* note 175, at 150 ("Furthermore, in the electrical and mechanical arts, we will have problems with very broad inclusion of analogous art, and with the bias against patents for incremental improvements.")

that *all* inventors in the discipline must use,[216] the inspirations and solutions to those inventions will routinely draw upon similar, and consequently, more "analogous" arts. And because invention in the more creative disciplines does not necessarily need to limit itself to similar sets of concepts, methods, or ideas,[217] inventions in the creative disciplines will, relative to inventions in laborious disciplines, be less likely to draw on what courts will find to be "analogous" arts.

It is this effect that contravenes the spirit, if not the letter, of § 103's decree that "[p]atentability shall not be negatived by the manner in which the invention was made."[218] Because the trend of analogizing prior art has essentially allowed courts to increase their scrutiny over—and invalidate—a number of patents, the analogous art test displays a bias against inventions made in laborious disciplines relative to inventions made in creative ones. Contrary to § 103, the analogous art test, therefore, makes *material* "whether [the invention] resulted from long toil and experimentation or from a flash of genius."[219] Put simply, the analogous art test allows courts to negative invention "by the manner in which the invention was made."[220]

IV. NEGATIVING INVENTION

The elastic and expansive nature of the analogous arts test "negatives" invention in several ways. It negatives inventions of precision because those inventions are more likely to draw on prior art that could be considered "analogous," and consequently succumb to an obviousness determination. It negatives "unpredictable," and sometimes synergistic inventions, because those inventions are more likely to require experimentation and

216. *See* Pfizer v. Apotex, 480 F.3d 1348, 1365 (Fed. Cir. 2007) (describing the "routine procedures" of analytical testing in chemistry).

217. *See* Barry, *supra* note 152, at 246–47 (citation omitted) ("In today's world, questions arising in a particular industry are answered not only by those inside the industry but by those trained in scientific fields having no 'necessary relationship' thereto."); *see generally* Amy L. Landers, *Ordinary Creativity in Patent Law: The Artist Within the Scientist*, 75 MO. L. REV. 1 (2010) (discussing the role of creativity in invention).

218. 35 U.S.C.A. § 103(a) (West 2006).

219. *See id.* (1952 Revision Notes); *see also* Brown, *supra* note 175, at 1148 ("[T]he Court views patentable subject matter as inventions that are closer toward the 'flash of genius' end of the inventive spectrum."); Seymore, *supra* note 175, at 135 ("Thus, the post-*KSR* PHOSITA is not a plodder but a creative individual.").

220. *See* 35 U.S.C.A. § 103(a).

confirmation using techniques found in "analogous arts." And, by favoring creative-type inventions, which need little capital to invent, over toil and experimentation-type inventions, which often need greater amounts of research capital, it negatives the principal purpose of the patent monopoly: to allow inventors to recoup the costs of designing their inventions.

A. Negativing Inventions of Precision

Many inventions are inventions of precision rather than grandeur; they seek to improve upon the prior art in a discrete and minute quantity or quality. An invention for a missile guidance system, for example, may seek to improve targeting by only a few inches.[221] An inverter-controller to regulate electrical currents may find the optimal calibration of input to be the difference between mere microseconds.[222] And, in the life sciences, such as chemistry or biology, the difference between a new and useful invention and the prior art is, often and literally, a single atom.[223]

An analogous arts test that favors inventions made by creative flashes of genius over technical plodding at the workbench inherently disfavors these inventions of precision. This is because inventions of precisions are more often the product of, and require, the sort of technical drudgery discouraged by the analogous arts test.[224] In

221. *See In re* Vaidyanathan, 381 F. App'x 985 (Fed. Cir. 2010) (reversing a rejection for a patent application of an increased-precision missile guidance system); GEORGE M. SIOURIS, MISSILE GUIDANCE AND CONTROL SYSTEMS 645 (2004) (describing "good" accuracy as a missile's "strike within a few feet of its aimpoint").

222. *See* O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co., 521 F.3d 1351, 1356–57 (Fed. Cir. 2008) (adding a 32-microsecond delay to an inverter-controller's feedback circuit over the prior art).

223. *See, e.g.*, Daiichi Sankyo Co. v. Matrix Labs., Ltd., 619 F.3d 1346, 1356 n.4 (Fed. Cir. 2010) ("In fact, a difference of only a single oxygen atom between Example 6 of the '902 patent and olmesartan [the prior art], as noted by [the accused infringer], is of greater significance than it superficially appears, as it is the difference between functional groups, specifically an isopropyl and a hydroxyisopropyl."); Singh v. Brake, 317 F.3d 1334, 1344 (Fed. Cir. 2003) ("[R]eplacing a functional group on a chemical compound can often have highly unpredictable results. We noted [previously] that even a change as seemingly trivial as replacing an isopropyl group with the isosteric cyclopropyl group at issue in that case could result in either a significant improvement or reduction in the activity of the compound against a particular biological target."); *see also* John C. Stolpa, Comment, *Toward Aligning the Law with Biotechnology? The Federal Circuit's About Face in* Enzo Biochem, Inc. v. Gen-Probe, Inc., 4 MINN. INTELL. PROP. REV. 339, 351 (2003) (discussing precision-of-invention in the biotechnology context).

224. *See* Scott v. Finney, 34 F.3d 1058, 1062 (Fed. Cir. 1994) (citation omitted)

Daiichi Sankyo Co. v. Matrix Laboratories, Ltd., the only improvement the invention at issue, a drug for heart disease, made over the prior art was the replacement of a nitrogen atom with an oxygen atom in an otherwise complex chemical compound made up of dozens of atoms.[225] Despite the seeming insignificance of this advance, chemical substitutions like those described in *Daiichi Sankyo* often demand years of research.[226] The analogous art test generally disfavors such inventions because, as with *Pfizer v. Apotex*,[227] the methodology behind this research often draws heavily upon that already in the prior art.[228]

As a further example, the district court in *Altana Pharma AG v. Teva Pharmaceuticals USA, Inc.*, considered a drug patent that purported to inhibit the stomach's natural production of gastric acid to alleviate the symptoms of acid reflux disease.[229] The patentees attempted to create a drug with a specific acid-affinity, or pKa, that would only begin dissolving the medication once it reached the patient's stomach.[230] The prior art had already determined this pKa range: between 1.0 and 5.0.[231] But further research was still required. It took years to develop a non-toxic, effective, and soluble drug that also happened to fall between these pKa values.[232] The resulting chemical compound was certainly new, useful, and nonobvious, in the lay sense of these words, even though it was created through rather ordinary and unimaginative processes. An analogous arts test that would thwart this invention because it utilized research and experimentation techniques typical to the field, to reach a pKa value already known from prior research, would be the bane of piquant-loving gastronomists and pharmaceutical industrialists everywhere.

("Complex inventions and problems in some cases require laboratory tests that 'accurately duplicate actual working conditions in practical use.'").

225. 619 F.3d at 1350–51.

226. *See id.* at 1347–49 (discussing research programs to develop hydrophilic angiotensin receptor blockers).

227. 480 F.3d 1348 (Fed. Cir. 2007).

228. *See* notes 187–191 and 204–210 and accompanying text.

229. 532 F. Supp. 2d 666, 668 (D.N.J. 2007).

230. *Id.* at 678 (describing the invention as a "compound stable enough to survive [some] regions of the body, but not so stable as to be unreactive in the [higher-acidity stomach] cells, where the compound needs to react to inhibit acid production").

231. *Id.*

232. *Id.* at 668–71.

Sometimes these sorts of inventions, although not pioneering inventions created by epiphany, herald great advances in the field through simple, incremental improvements.[233] In the *Daiichi Sankyo* case, for example, the Federal Circuit noted that the single chemical substitution "is of greater significance than it superficially appears."[234] The addition of the oxygen molecule to the prior-art compound increased the compound's lipophilicity,[235] or ability to bind to fats, a critical property in effective drug development.[236] As the drug in *Daiichi Sankyo* was developed to prevent heart disease, an analogous arts test that would invalidate the compound under a *Cuno*-like determination of obviousness, may mean the difference between the patent holder's continued development of the drug or its abandonment—or, to put it extremely, life and death. If nothing else, the differences in outcomes among these cases—*Daiichi Sankyo* (nonobvious), *Pfizer* (obvious), and *Altana Pharma* (likely obvious)—illustrates the risk to pharmaceutical inventors of relying too heavily on traditional trial-and-error research techniques.

An analogous art test that discriminates against these inventions based on their method of invention has the potential to negative some of the most important, although ploddingly created, advances. Some scholars have been sharply critical of this sort of bias against

233. *See* John F. Duffy, *The Thirteenth Annual Honorable Helen Wilson Nies Memorial Lecture In Intellectual Property Law: Innovation and Recovery*, 14 MARQ. INTELL. PROP. L. REV. 237, 241 (2010) ("Many patented innovations are incremental advances that build on pre-existing technologies in relatively standard ways. Recognizing this truth does not denigrate the value of those innovations and certainly does not suggest that they should be denied patent protection. Even on the forefront of scientific research, 'normal science' usually dominates, with valuable but incremental additions to existing structures."); Book Note, *Biotechnology and the Federal Circuit: By Kenneth J. Burchfiel*, 9 HARV. J.L. & TECH. 577, 582 (1996) ("[In] the useful art of chemical research . . . small incremental inventions may be without commercial utility but may still be vital to the development of the field as a whole.").

234. Daiichi Sankyo Co. v. Matrix Labs., Ltd., 619 F.3d 1346, 1356 n.4 (Fed. Cir. 2010).

235. *Id.* at 1356 (citation omitted) ("As the district court in this case put it, 'a person of ordinary skill in the art would not select the '902 patent compounds as leads only to disregard one of their distinguishing characteristics, specifically their increased lipophilicity at the 4-position.'").

236. BRUCE C. BAGULEY & DAVID J. KERR, ANTICANCER DRUG DEVELOPMENT 270 (2002) ("Lipophilic character is an important parameter influencing cellular uptake, and while hydrophilic drugs may be able to access active carrier mechanisms for cell entry, lipophilic drugs equilibrate rapidly by passive diffusion. Lipophilic character is also important in determining binding to proteins, which are generally present in serum components of the culture medium and which in turn modulate drug uptake by reducing free-drug concentrations.").

incremental improvements.[237] In discussing the state of the "flash of genius" requirement after *Cuno*, Professor Duffy lauds those "rather ordinary engineers who have nothing more than the 'skill of the calling'—with the calling being the engineering of improvements on existing technologies."[238] As for the patentability of such advances, Duffy counsels that "[i]f, 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 by tenacious plodding."[239]

B. Negativing Unpredictable Inventions

Patent law has long distinguished between "predictable" and "unpredictable" inventions.[240] Professor Seymore has described predictable inventions as those "rooted in well-defined, predictable factors."[241] Precisely because the result of predictable inventions can be *predicted*, an inventor can create a predictable invention entirely in his mind. He is free to draw upon a wide variety of fields and combine elements from these fields as he sees fit, without concern that the combination of these elements will lead to unknown or

237. *See, e.g.*, Alan L. Durham, *Natural Laws and Inevitable Infringement*, 93 MINN. L. REV. 933, 957 n.207 (2000) ("With some sense of irony, courts often contrast groundbreaking, invaluable, but unpatentable discoveries in natural science with humble, incremental, but patentable advancements in technology."); J.H. Reichman, *Of Green Tulips and Legal Kudzu: Repackaging Rights in Subpatentable Innovation*, 53 VAND. L. REV. 1743, 1744 (2000) (discussing, generally, "[h]ow to enable entrepreneurs to appropriate the fruits of their investments in cumulative and sequential innovation without impeding follow-on innovation and without creating barriers to entry"); Stadheim, *supra* note 175, at 150 ("Furthermore, in the electrical and mechanical arts, we will have problems with very broad inclusion of analogous art, and with the bias against patents for incremental improvements.").

238. *See* Duffy, supra note 4, at 42 (citation omitted); *see also* Duffy, *supra* note 233, at 241.

239. Duffy, *supra* note 4, at 42.

240. *See, e.g.*, *In re* Crounse, 363 F.2d 881, 884 (C.C.P.A. 1966) (discussing obviousness against applicant's contention that his invention was unpredictable); *see also* Landers, *supra* note 217, at 38–42 (discussing the unpredictability of the inventive process); Sean B. Seymore, *Serendipity*, 88 N.C. L. REV. 185, 194–95 (2009) (discussing the concept of "serendipity" in unpredictable technologies); Seymore, *supra* note 175, at 136–39 (discussing predictable and unpredictable arts); Stadheim, *supra* note 175, at 150–51 (discussing obviousness in the context of the predictability of electrical engineering inventions); Stolpa, *supra* note 223, at 151 ("The [USPTO] Guidelines make a clear distinction between technologies that are new and unpredictable and those that are established.").

241. Seymore, *supra* note 175, at 136 (discussing predictable and unpredictable arts).

unexpected results. Unpredictable inventions are inherently limited in this regard. If an inventor seeks to use elements far removed from her field—sometimes even in a closely related field—she will not be able to predict the result of that combination of elements. As such, she will need to engage in a "set of routine, well-established formulae"[242] to determine her invention's result. Those "routine, well-established formulae" are more likely to be analogous arts. Several cases demonstrate this at work.

In *Oetiker*, the metal clamp-garment clamp case, the Federal Circuit reversed the PTO's conclusion that a prior art reference, describing a plastic clamp in garments was analogous to the patentee's invention using a metal clamp for hoses.[243] The invention's effects, however, were likely predictable: the patentee's hose clamps surely did not yield any surprising or unexpected results. Indeed, according to the court, it was a simple improvement on the inventor's earlier hose-clamp invention.[244] But the inventor's addition of a "preassembly hook," a hook that supposedly maintained the form of the clamp before its first use and disengaged upon the user's first clamping, was nonetheless a creative and yet simple way to solve an apparent manufacturing problem.[245]

More recently, in *K-Tec, Inc. v. Vita-Mix Corp.*, the plaintiff sued for infringement of its patent for powerful blenders.[246] The invention improved upon the blending jar to reduce "cavitation," or the formation of air pockets caused by the movement of the blender's blades—long a problem in the blending art.[247] According to both the plaintiff and the defendant, cavitation is the artifact responsible for "freeze up," or incomplete blending in smoothie making.[248] To solve these problems, the inventor used several design solutions to reduce

242. *See* Landers, *supra* note 217, at 38 ("[A] distinction may be drawn between predictable processes and the unpredictable results of that process. For example, one may apply a set of routine, well-established formulae to test a hypothesis that yields surprising—and therefore creative—results.").

243. *In re* Oetiker, 977 F.2d 1443, 1446–47 (Fed. Cir. 1992).

244. *Id.* at 1446.

245. *Id.* at 1447.

246. 729 F. Supp. 2d 1312, 1314–15 (D. Utah 2010). The plaintiff K-Tec, now Blendtec, is the maker of the "Total Blender," a home blender powerful enough to successfully blend iPods, sneakers, and golf clubs, among other household goods, as demonstrated online. *See* WILL IT BLEND?, http://www.willitblend.com (last visited Jul. 31, 2011).

247. *K-Tec, Inc.*, 729 F. Supp. 2d at 1317, 1326.

248. *Id.* at 1326.

cavitation that were otherwise well-known in other hydrodynamic fields.[249] For this creative combination of fields, which yielded at least arguably predictable results, the court nonetheless granted summary judgment to the plaintiff on the issue of validity.[250] It found that the defendant's asserted prior art references, mainly to food storage units, were nonanalogous because they were not within the field of the plaintiff's endeavor.[251]

The Federal Circuit's decision in *Daiichi Sankyo Co. v. Apotex, Inc.*, on the other hand, demonstrates a court's willingness to analogize prior art for unpredictable inventions that arise from diligent plodding at the lab bench rather than flashes of creative genius.[252] Prior to the invention in *Daiichi Sankyo v. Apotex*, medications for ear infections caused by bacteria, or otological infections, posed some health risks; in some instances, the medications caused deafness in the treated ear.[253] This was primarily because the medications could only be used for certain ear infections[254] difficult for practitioners and pediatricians to diagnose.[255]

To solve this problem, the inventor in *Daiichi Sankyo v. Apotex* sought to create a drug that was sufficiently safe, efficacious, and simple to prescribe, facilitating prescription by treating physicians rather than specialists.[256] After finding a potential drug candidate, Daiichi Sankyo then performed a series of toxicity and efficacy tests on animals and eventually patented the drug, ofloxacin.[257] Like other

249. *Id.* at 1321.

250. *Id.* at 1327.

251. *Id.* at 1321, 1327.

252. *See* Daiichi Sankyo Co. v. Apotex, Inc., 501 F.3d 1254 (Fed. Cir. 2007).

253. *See* Daiichi Pharmaceutical Co. v. Apotex, Inc., 441 F. Supp. 2d 672, 678 (D.N.J. 2006), *rev'd*, *Daiichi Sankyo Co.*, 501 F.3d at 1254.

254. *See id.* (discussing the medical condition, otitis externa).

255. *See* PETER ROBB & ALEX WATSON, ENT IN PRIMARY CARE 41 (2007) (discussing the need for referrals in cases of otitis externa); *see also* DALE BERG, ADVANCED CLINICAL SKILLS AND PHYSICAL DIAGNOSIS 36 (2d ed. 2004) (discussing the difference between otitis externa and otitis externa maligna).

256. *See Daiichi Pharmaceutical Co.*, 441 F. Supp. 2d at 678 ("Prior to the time of [Daiichi Pharmaceutical's] patent, none of the available ototopical eardrop preparations were free from the ototoxic safety concern. All of the otic formulations for ear drops listed in the Physicians Desk Reference . . . carried contraindications to their use in the face of a nonintact ear drum.") (citations omitted).

257. *Id.* at 679 ("Daiichi began conducting tests to establish the safety and efficacy of ofloxacin."); *id.* at 680 n.16.

drugs in the field, ofloxacin worked by inhibiting a bacterial enzyme, gyrase, that allowed bacterial replication.[258] After Apotex threatened to manufacture a generic version of the drug, Daiichi Sankyo brought suit against Apotex for infringement.[259]

Apotex sought to invalidate the patent by asserting several prior art references directed at otologists.[260] One taught using another gyrase inhibitor, ciproflaxin, but cautioned that it "should be used only in difficult cases and exclusively by the otologist."[261] The District Court concluded that because Daiichi Sankyo's invention was specifically directed to making gyrase inhibitors safe for prescription by general practice physicians, the ciproflaxin reference, which specifically limited itself to otologists, did not render Daiichi Sankyo's compound obvious.[262]

The Federal Circuit, however, disagreed, concluding that, although the purpose of the invention was to put ear medications in the hands of general practitioners, the applicable field of endeavor was ear specialists with a background in drug development.[263] As such, the appellate court concluded that the ciproflaxin reference, with its exclusive call to otologists, was an invalidating prior art.[264] The court's basis for recentering the field of endeavor, and by consequence, any analogous arts, was not grounded in any similarity between general practitioners and specialists. Rather, it based its conclusion on the fact that Daiichi Sankyo had performed animal safety testing on its invention, something it considered "outside the realm of a general practitioner or pediatrician."[265]

In effect, the Federal Circuit held Daiichi Sankyo's testing *against* it in its review of the analogous art; because Daiichi Sankyo had performed safety research routine to one field, the field of endeavor, and consequently, the prior art, must fully encompass that field as well. The court noted Daiichi Sankyo's contention that the research was required because "[o]ne cannot extrapolate a safety profile for one antibiotic to another," but dismissed its objections as

258. *Id.* at 682–83.
259. *Id.* at 676.
260. *Id.* at 686–87.
261. *Id.* at 689 (internal quotation marks omitted).
262. *Id.* at 689–90.
263. Daiichi Sankyo Co. v. Apotex, Inc., 501 F.3d 1254, 1257 (Fed. Cir. 2007).
264. *Id.* at 1258–59.
265. *Id.* at 1257.

unsupported.[266] The court, therefore, analogized two arts—general practice medicine and otological drug development—not on the basis of any intrinsic similarities between them, but because the plaintiff performed research, required by the invention's unpredictable nature, that was routine in another field, even though the art in that field taught away from the intended use of the invention.

C. Negativing the Purpose of the Patent Monopoly

Perhaps the principal purpose of the patent monopoly—that is, allowing a patentee to exclude others from practicing his invention—is to allow the inventor to recoup his development costs.[267] Often, this requires some research—often costly research—on the part of the inventor.[268] As the invention becomes more complex, the research required to bring the invention to a patent-ready state typically increases. Consequently, the costs of that research should increase as well. As the complexity of an invention increases, therefore, the incentives behind the patent monopoly become more fully realized: the more costly an invention is to invent, the more defensible the patent monopoly's purpose in allowing the inventor to recoup costs in making the invention.

In *Scott v. Finney*, for example, the Federal Circuit hinted at this problem: "Complex inventions and problems in some cases require laboratory tests that accurately duplicate actual working conditions in practical use."[269] It contrasted this with "[l]ess complex inventions and problems [that] do not demand such stringent testing."[270]

266. *Id.* at 1259 n.3.

267. *See, e.g.*, John M. Golden, *Principles for Patent Remedies*, 88 TEX. L. REV. 505, 517 (2010) ("Under a standard economic understanding, the basic purpose of a patent is to enable a rights holder to price above marginal cost so that the rights holder has a greater opportunity to recoup costs of developing or disseminating the invention.").

268. *See, e.g.*, David M. Treadway, Comment, *Has the Supreme Court Forgotten the Patentee? Recent Patent Licensing Decisions Contradict Patent Policy, Harm Licensors, and Alter Negotiation*, 33 U. DAYTON L. REV. 303, 319 (2008) ("Many industries, especially ones with high development costs, depend on strong patent protection to ensure that investors recoup development costs necessary to create new products.").

269. 34 F.3d 1058, 1062 (Fed. Cir. 1994) (internal quotation marks omitted) (citing Elmore v. Schmitt, 278 F.2d 510, 513 (C.C.P.A. 1960).

270. *Id.*

"[T]he character of the testing," the court explained, "varies with the character of the invention and the problem it solves."[271]

This "character of the invention" can be drawn across the spectrum of inventiveness. On one end lies inventions created by a "flash of creative genius"; on the other, plodding inventions discovered only by "long toil and experimentation." Because inventions that reside on the flash-of-creative-genius end of the spectrum are typically products of the mind,[272] they require little actual research. The only thing required to bring such inventions into being—and into the patent office—is the inventor's inventiveness. Inventions on the opposite end of the inventive spectrum, however, inherently require such research. It is difficult to envision an invention residing on the long-toil-and-experimentation end of the spectrum that does not, in fact, require long toil and experimentation. Under this rubric, flash-of-genius inventions "do not demand such stringent testing"[273] as long-toil-and-experimentation inventions that may "require laboratory tests that accurately duplicate actual working conditions in practical use."[274] Consequently, inventions created by more laborious research methods should, on the whole, cost more to bring to patentability than inventions created by more whimsical means.

An analogous art test that vitiates § 103's dictate against negativing patentability based on the method of invention does not follow this principal purpose of the patent monopoly. By discriminating against inventions made by long toil and experimentation in favor of inventions conceived of by flashes of genius, the analogous art test will increasingly invalidate higher-cost inventions in favor of lower-cost inventions. By doing so, inventors who have spent more capital developing their inventions, for whom the patent monopoly is directed, are less likely to recoup their costs than inventors who have spent little to no capital developing theirs.

The design of semiconductor chips, for example, provides sharp focus to this claim. Advances to semiconductor chips are measured by speed, determined by the layout or "architecture" of electrical elements on those chips—pins, resistors, transistors, capacitors—that

271. *Id.*

272. *See* discussion *supra* Part III.D.

273. *See Scott*, 34 F.3d at 1062.

274. *See id.* (internal quotation marks omitted) (citing *Elmore*, 278 F.2d at 513).

define that speed.[275] Semiconductor manufacturers must expend enormous amounts of capital in research and development to increase the speed of their semiconductors.[276] But while these advances to chip architecture are generally patentable, both Congress and scholars have construed these advances to be, at least according to traditional patent law canons, "rarely inventive."[277] The lack of inventiveness attributed to semiconductor design is, in no small part, due to the analogous art test: because all of the same electrical elements are present on every semiconductor—pins, resistors, transistors, and capacitors—any suggestion of a differing arrangement typically comes from teachings in an analogous art.[278] Further, once a patentable advance in chip architecture is made, it is easy for a competitor to obtain the benefit of that advance by reverse engineering the chip and making a slight, noninfringing modification to its design.[279] As such, semiconductor manufacturers risk their research capital on two fronts: at the patent office and in the open marketplace. While Congress eased this burden on semiconductor manufacturers with the passage of the Semiconductor Chip Protection Act,[280] the analogous art test's discriminatory effect on research-intensive fields with a narrow field of prior art lives on.

V. CONCLUSION

Despite a seeming historical trend to the contrary, patent law still concerns itself with the manner in which inventions are made. Obviousness analysis, codified in the patent statute in 1952, requires

275. *See* Kate Greene, *Novel Chip Architecture Could Extend Moore's Law*, TECH. REV. (Jan. 16, 2007), *available at* http://www.technologyreview.com/infotech/18063/ (discussing chip architecture and speed performance).

276. *See* Michael Riordan, *The Incredible Shrinking Transistor*, TECH. REV. (Nov. 1, 1997), *available at* http://www.technologyreview.com/computing/11620/.

277. Pamela Samuelson, Randall Davis, Mitchell D. Kapor, & J.H. Reichman, *A Manifesto Concerning the Legal Protection of Computer Programs*, 94 COLUM. L. REV. 2308, 2346 (1994) ("[S]emiconductor chip[] . . . industrial designs are rarely inventive. Congress recognized that the chip industry's products were both patentable and vulnerable to rapid imitative copying that undermined innovators' ability to recoup research and development costs; this undermined incentives to make the substantial investments necessary to develop new chip designs.").

278. *See* Tech. Licensing Corp. v. Videotek, Inc., 545 F.3d 1316, 1325 (Fed. Cir. 2008); Cornell Univ. v. Hewlett-Packard Co., 313 F. Supp. 2d 114, 128 (N.D.N.Y. 2004).

279. *See* Samuelson et al., *supra* note 277, at 2346.

280. 17 U.S.C. §§ 901–914 (2006); *see* Samuelson et al., *supra* note 277, at 2400 nn.379–81 (discussing the act).

the courts to assess all prior art "pertinent" to the field of the invention, i.e., the "analogous arts." What an "analogous art" is however, is left up to the courts to define. Unfortunately, few general principles, if any, as to how a court should reach a determination of "analogousness" can be gleaned from cases addressing the issue.

Because technology has become increasingly interdisciplinary, courts have extended what they consider to be analogous arts far beyond those conceived of in the adoption of the obviousness statute. This trend towards analogizing prior arts discriminates against inventions made by more research-focused methods over those made by creative flashes of genius, because the methods used to create such empirically driven inventions are more likely to be considered analogous arts than arts collected for invention in more creative-type inventions. This progression of analogous arts jurisprudence has three effects: One, it increasingly negatives inventions of precision. Two, it invalidates patents in inventions where synthesis and utility are generally unpredictable. And three, it discourages inventors from recouping the cost of research-expensive inventions—the very purpose of the patent monopoly.

While an analogous arts test that negatives invention in this manner may not be wholly unworkable—or removable, given its historical pedigree—courts should be wary of these effects in their decisions to analogize prior arts, and cabin their analysis appropriately.