

A Great Invisible Crashing: The Rise and Fall of Patent Eligibility Through *Mayo v. Prometheus*

N. Scott Pierce*

Despite its apparent simplicity, satisfaction of the statutory threshold for patent eligibility in the United States has become increasingly uncertain and, recently, almost impossible to predict in some fields. The Supreme Court has acknowledged the existence of the many lower-court tests for patent eligibility that have evolved, and has even encouraged the development of additional tests. Behind all of these tests, however, is a fundamental premise dating back to English common law that limits patentable subject matter to the physical application of a naturally-occurring principle. In Mayo v. Prometheus, the Supreme Court effectively supplanted all previous criteria for patent eligibility with a requirement that any application of the laws of nature, naturally-occurring physical phenomena or abstract ideas be “inventive,” thereby hopelessly confusing satisfaction of 35 U.S.C. § 101 with requirements for patentability under other sections of the statute. Mayo, in short, annihilates the last vestiges of any rational attempt to distinguish patent eligibility from patentability. By failing to separately define “inventive” beyond its meaning under those other portions of the statute, the Court severely undermines the predictability upon which the economic benefits of patent law depends.

* Principal, Hamilton Brook Smith & Reynolds, Concord, MA; Adjunct Professor at Suffolk University Law School. He can be reached at (978) 341-0036 and at scott.pierce@HBSR.com. The author is solely responsible for the views of this article, which do not necessarily represent those of his Firm, or any client or organization.

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[I]t will be a spectacle: the fall of a crystal palace.
But coming down in total blackout, without one
glint of light, only great invisible crashing.

—*Thomas Pynchon*¹

INTRODUCTION

Title 35 of the United States Code provides the standard for patent eligibility in section 101, providing that “[w]hoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”² Despite its apparent simplicity, proper application of this statutory provision requires an understanding of the history of patent eligibility, beginning with its roots in England.

“Letters of protection” began in England as a way to encourage foreign craftsmen to immigrate to England and bring their skills with them.³ A patent could be obtained under English “patent custom” for technology that was new to the realm—even if previously known elsewhere—so long as the imported technology on which it was based did not deleteriously affect employment.⁴ Further, the patentee was obligated to practice the invention upon pain of revocation of the patent.⁵

As the scope of protection expanded beyond imported manufactures and the threat of competition with existing technology became more apparent, the requirement to practice an invention in exchange for an exclusive right was displaced by a requirement to put the public in possession of the invention.⁶ Early

¹ THOMAS PYNCHON, *GRAVITY’S RAINBOW* 1 (Penguin Press 2012) (1973).

² 35 U.S.C. § 101 (2006).

³ CHRISTINE MACLEOD, *INVENTING THE INDUSTRIAL REVOLUTION: THE ENGLISH PATENT SYSTEM, 1660–1800*, 10 (1988).

⁴ *Id.* at 12–13.

⁵ Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents (Part 2)*, 76 J. PAT. & TRADEMARK OFF. SOC’Y 849, 857 (1994).

⁶ See *Liardet v. Johnson*, (1788) 1 Web. P.C. 53 (K.B.); 1 Carp. 35 (“The meaning of the specification is, that others may be taught to do the thing for which the patent is granted; and if the specification is false, the patent is void, for after the term the public ought to have the benefit of the discovery.”); see also H.I. DUTTON, *THE PATENT SYSTEM*

fears that patent protection might be overly broad or granted too readily and for slight improvements only reinforced the country's need for an adequate description of the invention and the necessity of having a means by which to "recognize innovations."⁷ By the late eighteenth century, at about the time the first patent acts in the United States were being drafted and enacted, both products themselves and the processes for their manufacture and use were becoming viewed in England as applications of naturally-occurring principles.⁸ American courts generally followed suit, as will be seen.⁹

Over the last two hundred years, technological changes have forced courts to struggle not only with patentable distinction, but also with the scope of patent eligibility. In doing so, a wide variety of tests have been developed—particularly over the last one hundred years—that have tended to obscure the original premise that patent eligibility must flow from the physical application of a naturally-occurring principle. Even in the Supreme Court's recent decision regarding the scope of patentable subject matter, *Bilski v. Kappos*,¹⁰ there is little to guide the public in distinguishing between "an *application* of a law of nature or mathematical formula to a known structure or process [that] may well be deserving of patent protection"¹¹ and limitation of "an abstract idea to one field of use or adding token post-solution components [that] did not make the concept patentable,"¹² both of which were invoked by the Court in holding that a claimed method of hedging risk "would preempt use of this approach in all fields, and would effectively grant a monopoly over an abstract idea."¹³ Federal

AND INVENTIVE ACTIVITY DURING THE INDUSTRIAL REVOLUTION 1750–1852, 75 (1984) (quoting E. Wyndham Hulme, *On the Consideration of the Patent Grant, Past and Present*, 13 L. Q. Rev. 313, 317–318 (1897)) ("Lord Mansfield concluded that 'the doctrine of the instruction of the public by means of the personal effects and supervision of the grantee was definitely and finally laid aside [in *Liardet v. Johnson*] in favor of the novel theory that this function belongs to the patent specification.'").

⁷ See MACLEOD, *supra* note 3 at 51–55.

⁸ See, e.g., *Hornblower v. Boulton*, (1799) 101 Eng. Rep. 1285 (K.B.); 8 T.R. 95.

⁹ See *infra* Part I.B.

¹⁰ *Bilski v. Kappos*, 130 S. Ct. 3218 (2010).

¹¹ *Id.* at 3230 (quoting *Diamond v. Diehr*, 450 U.S. 175, 187 (1981)).

¹² *Id.* at 3231.

¹³ *Id.*

Circuit cases that have issued since *Bilski* and the Supreme Court's apparent encouragement to lower courts to continue to develop new tests of patent eligibility reflect a continuing potential for confusion.

The origin of all of the tests that have been developed to date can be traced to the idea of the physical application of a naturally-occurring principle. However, links between these tests and this underlying premise have become sporadic and circumstantial. For example, a growing tendency among courts to confuse *patent eligibility* under 35 U.S.C. § 101 with *patentability* under other sections of the statute—such as novelty,¹⁴ nonobviousness¹⁵ and even enablement¹⁶—has led to calls to forego application of tests for patent eligibility except as a last resort.¹⁷ The recent decision by the Supreme Court in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*¹⁸ has rendered superfluous all tests developed by the lower courts for determining patent eligibility under section 101 by grounding patent eligibility in “inventive application” and “inventive concept.”¹⁹ As applied by the Court in *Mayo*, statutory eligibility is a function of the “creative value of the

¹⁴ See 35 U.S.C. § 102(a) (2006).

¹⁵ See 35 U.S.C. § 103(a).

¹⁶ See 35 U.S.C. § 112.

¹⁷ See, e.g., *MySpace, Inc. v. GraphOn Corp.*, 672 F.3d 1250 (Fed. Cir. 2012).

In the case before us, for all these reasons the proper course of action is the one that the trial court and the panel majority has followed: decide the case on the question of compliance with §§ 102 and 103 as Congress has instructed, and decline the dissent's invitation to put the parties and this court in the swamp that is § 101 jurisprudence.

Id. at 1262; see also Dennis Crouch & Robert P. Merges, *Operating Efficiently Post-Bilski by Ordering Patent Doctrine Decision-Making*, 25 BERKELEY TECH. L.J. 1673 (2010).

We take a different approach; rather than try to cut through the complexity of *Bilski*, or predict how it will be applied, we talk about how to avoid it. . . . We propose that the § 101 issue of *Bilski* be considered only when doing so is absolutely necessary to determine the validity of a claim or claims in a patent.

Id. at 1673.

¹⁸ *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289 (2012).

¹⁹ See *id.* at 1299.

discovery”²⁰ that is intended to somehow “balance . . . considerations [that] may differ from one field to another.”²¹

The idea that the physical application of a naturally-occurring principle is *the* underlying criterion for patent eligibility is a linchpin of patent law; failure to abide by it will result in uncertainty as to whether newly developed technologies will meet the threshold requirement of patent eligibility as a “process, machine, manufacture, composition of matter, or any new and useful improvement thereof.”²² Moreover, abandonment of the application-of-principle standard will dangerously expand the potential scope of exclusionary rights into areas that may hinder economic growth.

Part I of this Article charts the rise of physical application of naturally-occurring principle as a threshold for patent eligibility, beginning with the first English patents, and following the development of this doctrine in the United States under the early Patent Acts. In Part II, the fall of physical application of naturally-occurring principle as a threshold is charted through to the Supreme Court decision of *Bilski v. Kappos* and its immediate aftermath. Part III argues that the Supreme Court’s recent decision in *Mayo v. Prometheus* completes the fall, predicating an ensuing unpredictability in statutory eligibility that will undermine the patent system as we know it and may, ultimately, lead to diminished reliance on patents as a means for advancement of economic development.

I. THE RISE OF APPLICATION OF NATURALLY-OCCURRING PRINCIPLE AS A THRESHOLD FOR PATENT ELIGIBILITY

A. *Early Patent Protection in England*

In the fourteenth century, during the reign of Edward III, non-exclusive “letters of protection” were granted to foreign craftsmen for the purpose of “encouraging them to settle in England and to

²⁰ *Id.* at 1303.

²¹ *Id.* at 1305.

²² 35 U.S.C. § 101 (2006).

transmit their skills to native apprentices.”²³ Later, during the middle of the sixteenth century, exclusive protection was introduced for the same purpose.²⁴ However, an exclusive right would be granted only if it would not harm existing industries.²⁵ Further, “inventions” had to be practiced—under penalty of revocation.²⁶ These policies eventually eroded, so that by the end of the sixteenth century monopolies were often granted on the basis of influence, and without reference to importation.²⁷ As a result of dissatisfaction with “abuse of the royal prerogative,” many such patents were revoked in 1601 and, again, under King James I in 1621, culminating in the Statute of Monopolies in 1624.²⁸

The Statute of Monopolies declared void most monopolies granted by royal prerogative.²⁹ Exempted from the statute were

any letters patent and grants of privilege for the term of fourteen years or under, hereafter to be made, of the sole working or making of any manner of new manufactures within this realm, to the true and first inventor and inventors of such manufactures, which others at the time of making such letters patent and grants shall not use.³⁰

Sir Edward Coke, who had introduced the predecessor to the bill of 1624 in 1621, and participated in consideration of the bill of 1624, understood the term “inventor” to embrace importers of “manufactures”³¹ and considered novelty to be only a function of whether the subject matter was actually being used in England at

²³ MACLEOD, *supra* note 3, at 10.

²⁴ *Id.*

²⁵ *See id.* at 13 (“Employment was sacrosanct, and the inventor who threatened it was denied official recognition and protection by patent.”).

²⁶ *See id.* at 12.

²⁷ *See id.* at 14.

²⁸ *See id.* at 14–15.

²⁹ *See* Statute of Monopolies, 1624, 21 Jac. 1, c. 3, § 6.

³⁰ *Id.*

³¹ *See* MACLEOD, *supra* note 3, at 18 (“[Coke] followed Elizabethan practice in understanding ‘inventor’ to include the importers of manufactures and technical devices.”).

the time a patent was applied for.³² Absolute novelty was not material. Both of these interpretations were consistent with earlier attempts to promote the immigration of skilled artisans in order to introduce new technology to England.³³

Although the question of what, in fact, constituted a manufacture was not one that Coke considered to be difficult,³⁴ nor one that appears to be squarely addressed until the case of *Boulton v. Bull* in 1795,³⁵ a number of cases appeared to shift the eligibility and scope of protection afforded by patent grant. For example, as described by MacLeod, a patent sought by Benjamin Lund and Francis Hawksbee in 1727 was challenged by the Company of Copper Miners of England on the basis that each refinery “goes upon the same principles in refining, yet scarce any two exactly pursue the same method and form in practice.”³⁶ The patent was granted because the petitioners, Lund and Hawksbee, only applied for a patent for making brass “*in a particular furnace*, which had never been used before, without pots.”³⁷

A similar result occurred in *Morris v. Bramsom* in 1776,³⁸ in which the patent that issued was upheld following an enquiry by the jury to the effect that, if the only objection to the patent were on the basis of it being an addition to an old machine, “that objection would go to repeal almost every patent that was ever granted.”³⁹ Following *Morris*, it was generally considered that a patent of addition can be good but “it must be for the addition only, and not for the old machine too.”⁴⁰ Another case, *Liardet v. Johnson*,⁴¹ required that a specification enable one skilled in the

³² See *id.* (“Similarly, it was not a question of whether the manufacture or device concerned had ever been used in England before, but whether it was in use at the time the patent was applied for.”).

³³ See *supra* text accompanying note 23.

³⁴ See *id.* (“[I]t must be granted to the first and true inventor,” and . . . ‘it must be of such manufacture, which any other at the making of such letters patent did not use.’ Coke did not anticipate any difficulties in the interpretation of these clauses.”).

³⁵ *Boulton v. Bull*, (1795) 126 Eng. Rep. 651 (C.P.); 2 H. Bl. 463.

³⁶ See MACLEOD, *supra* note 3, at 51.

³⁷ *Id.* at 51–52.

³⁸ *Morris v. Bramsom*, (1776) 1 Carp. 30 (K.B.).

³⁹ *Id.* (quoting *Boulton*, 126 Eng. Rep. at 664).

⁴⁰ *Id.* (quoting *Boulton*, 126 Eng. Rep. at 664).

⁴¹ *Liardet v. Johnson*, (1788) 1 Web. P.C. 53 (K.B.); 1 Carp. 35.

relevant art or trade to practice the invention without undue experimentation and consequently, as stated by MacLeod, “[f]or the first time, the recognized quid pro quo for the award of a patent was the disclosure of the invention.”⁴²

We can see from these cases the seeds of modern patent law. Specifically, novelty became a substitute for importation and lack of interference with an existing industry, and the enabling role of the description of a patented invention replaced the earlier requirement to work the invention as the price for obtaining exclusionary rights. The question remained, however, of what constituted the scope of a “manufacture” under section 6 of the Statute of Monopolies. The answer to that question would come toward the end of the eighteenth century in the context of a standard that would allow both novelty in application of principle and adequacy of specification to replace the previous requirements of importation and practice of the invention.

In 1769, James Watt obtained a patent directed to an improvement on a steam engine. Watt followed the advice of his friend, William Small, to not include in his patent specification “drawings nor descriptions of any particular machinery, but [to] specify in the clearest manner that you have discovered some principles.”⁴³ Watt’s invention was directed to an improvement of the Newcomen steam or “fire” engine.⁴⁴ The employment of a separate condenser to draw steam made it no longer necessary to

⁴² MACLEOD, *supra* note 3, at 49; *see also* Turner v. Winter, (1787) 99 Eng. Rep. 1274 (K.B.) 1276; 1 T. R. 602 (“[I]t is sufficient if persons of skill can understand the process by means of the specification,” and that “a man of science may be able to produce the thing intended without the necessity of trying experiments.”); DUTTON, *supra* note 6, at 75.

[I]n King v. Arkwright (1785), [Buller, J.] held . . . “the end and meaning of the specification is to teach the public after the term for which the patent is granted what the art is, and it must put the public in possession of the secret in as ample and beneficial way as the patentee himself uses it.”

Id.

⁴³ JENNY UGLOW, *THE LUNAR MEN* 243 (2002).

⁴⁴ *See id.* at 101.

condense vapor in the cylinder containing the piston, thereby significantly improving the engine's efficiency.⁴⁵

Watt's patent was tested in *Boulton v. Bull*, which was heard in the Court of Common Pleas in 1795.⁴⁶ The defendants challenged the validity of the patent by arguing that a patent cannot consist merely of principles, but must, rather, be "embodied and reduced into practice."⁴⁷ Otherwise, "like the sentiments of an author, while in his own mind . . . they are alike the property of him, or of another."⁴⁸ The patent was invalid, according to the defendants, because the invention was an improvement and because the specification did not "correspond with it," since the patent was for "mere principles, which . . . cannot be the subject of a patent."⁴⁹

The plaintiffs countered that the patent was directed to "a new invented *method* of lessening the consumption of steam and fuel in fire engines," and that the specification "states both the principle of the invention, and also the mode in which it is to operate."⁵⁰ The "difference in the terms used in the patent and the specification," namely the "method" and "principle of the invention," as stated by the plaintiffs, "arises from the nature of the subject, but the real meaning of them is the same."⁵¹ In essence, then, the *method* was the application of principle of the invention. The plaintiffs argued that the patent directed to the method should be upheld, despite the fact that a right is given to the whole machine by employment of the method:

⁴⁵ See *id.*; see also WILLIAM ROSEN, *THE MOST POWERFUL IDEA IN THE WORLD* 104–06 (2010).

⁴⁶ The original patent was set to expire in 1783, but, by an Act of Parliament, the Fire-Engine Act of 1775, the patent was extended for twenty-five years. See *id.* at 162–63.

⁴⁷ *Boulton v. Bull*, 126 Eng. Rep. at 656.

⁴⁸ *Id.*

⁴⁹ *Id.* at 658. As stated by the defendants:

Upon the whole therefore of the case, it appears either that the patent is for an *entire* formed machine, when it ought to have been for an improvement only, and in which case the specification does not correspond with it, or it is for mere principles, which, according to the stat. 21 *Jac.* 1 c. 3, cannot be the subject of a patent.

Id.

⁵⁰ *Id.*

⁵¹ *Id.*

Where an improvement is made upon a machine already known, the patent ought not to be the machine itself, but for the method of improving it . . . [I]f from the nature of the thing a patent for the new method or improvement only should have the effect of giving a right to the whole machine, that is not of itself a ground on which the patent can be set aside.⁵²

Two of the four judges held the subject matter to be within the Statute of Monopolies and the specification to sufficiently describe the invention, despite the lack of description of any particular machinery for carrying it out.⁵³

Four years after *Boulton v. Bull*, however, in *Hornblower v. Boulton* the King's Bench did not have any difficulty in unanimously finding the improvement represented by that same patent to be eligible subject matter.⁵⁴ The questions previously addressed by the Court of Common Pleas were reflected in the defendants' four arguments on appeal, namely, first, that section 6 of the Statute of Monopolies provides for patentability of "a formed machine;" second, that Watt's improvement "could not be considered as a patent for such a machine;" third, that "the specification did not contain sufficient description of a machine;" and fourth, that Watt had taken a patent "for the whole, when it ought to have been for an addition only."⁵⁵ The arguments were addressed as two questions: whether Watt's improvement was a patent for mere principles and not for a new manufacture, and, if a manufacture, whether the specification provided an adequate description.⁵⁶

The court found in Watt's favor.⁵⁷ Lord Chief Justice Kenyon found that answer to be self-evident.⁵⁸ Justice Ashhurst agreed,

⁵² *Id.*

⁵³ *See id.* at 477–500.

⁵⁴ *Hornblower v. Boulton*, (1799) 101 Eng. Rep. 1285 (K.B.); 8 T.R. 95.

⁵⁵ *Id.* at 1287.

⁵⁶ *See id.* at 1288.

⁵⁷ *See id.* at 1288–92.

⁵⁸ *Id.* at 1288 (“[I]t evidently appears that the patentee claims a monopoly for an engine or machine, composed of material parts, which are to produce the effect

seeming to imply that adequate description of the nature of the invention was itself sufficient to secure the patent.⁵⁹ Justice Grose showed how a sufficiently detailed specification might, by enabling others to work the invention, replace the requirement that the patentee himself work the invention.⁶⁰ Likewise, Judge Lawrence relied on the specification to resolve the apparent discrepancy between principles and manufacture:

In order to see what the invention was, it is necessary to refer to the specification; that states what the invention is, and that the method consists in certain principles, as they are called, which are described in the specification. . . . Engine and method mean the same thing, and may be the subject of a patent. "Method," properly speaking, is only placing several things and performing several operations in the most convenient order; but it may signify a contrivance or device; so may an engine, and there I think it may answer the word "method." So "principle" may mean a mere elementary truth, but it may also mean constituent parts; and in effect the specification is this: "The contrivance by which I lessen the consumption of steam consists in the following principles, that is, constituent or elementary parts That is the description of the thing put into different language.

. . . If this be so, it only remains to be considered, whether or not, for the improvement of fire engines, Watt has, with sufficient accuracy, stated a definite alteration or addition which may be made in all fire

described; and that the mode of producing this is so described as to enable mechanics to produce it.").

⁵⁹ *Id.* ("[T]he inventor had by his specification particularly described the nature of his invention, and the manner in which it was to be performed; and having thus complied with the terms of his patent, I think he is, in point of law as well as justice, entitled to the benefit which the patent and the Act of Parliament intended to confer on him.")

⁶⁰ *Id.* at 1290 ("[T]he patent is not merely for principles, nor does the specification describe principles only. The patent states the principles on which the inventor proceeds, and shows in his specification the manufacture by means of which those principles are to take effect.").

engines, in such a way as to enable a workman to execute it? And it seems to me that he has.⁶¹

Regarding whether or not a patent could be granted for an addition to previously known matter, Justice Grose made short work of the contention that it could not:

If indeed a patent could not be granted for an addition, it would be depriving the public of one of the best benefits of the Statute of James. Lord Coke's opinion therefore seems to have been formed without due consideration; and modern experience shows that it is not well founded. . . . [T]he engines secured to the patentee are such as are improved in the manner stated in the specification, and not the original fire engines. . . .⁶²

Therefore, absolute novelty in application of principle on the one hand, and adequacy of specification on the other operated together in *Hornblower v. Boulton* to define an invention under the Statute of Monopolies, thereby providing alternatives to the previous requirements of importation and practice of the invention.

B. The Constitution and the First Patent Acts in the United States

In the United States, a similar progression of events was unfolding, albeit in microcosm. States had been granting exclusionary rights to inventors since before implementation of the Constitution in 1789.⁶³ Just as in England, protection originally had been granted to the first to import new technology, eventually shifting to "patents of invention."⁶⁴ Also as in England, the quid pro quo of such protection often included a requirement to fully describe and practice the invention.⁶⁵

⁶¹ *Id.* at 1291–92.

⁶² *Id.* at 1290–91.

⁶³ See Edward C. Walterscheid, *The Early Evolution of the U.S. Patent Law: Antecedents (5, Part II)*, 78 J. PAT. & TRADEMARK OFF. SOC'Y 665, 668 & n.120 (1996).

⁶⁴ See *id.* at 668.

⁶⁵ *Id.* at 670. Walterscheid quotes a patent granted by New York in 1780 to Henry Guest:

Provided nevertheless that the grant hereby made shall not take effect until the said Henry Guest shall have filed in the secretary's office in

Article I, Section 8, Clause 8, also known as “the intellectual property clause,” of the United States Constitution, authorizes Congress “[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”⁶⁶ The clause generally is understood to include two broad component parts. As articulated by the Judiciary Committee reports of the House of Representatives and the Senate prepared during enactment of the Patent Act of 1952, a “first provision is to promote the progress of science by securing for limited times to authors the exclusive right to their writings, the word ‘science’ in this connection having the meaning of knowledge in general.”⁶⁷ A second provision “is that Congress has the power to promote the progress of useful arts by securing for limited times to inventors the exclusive right to their discoveries.”⁶⁸ There has been much confusion and debate over the years about construction of the intellectual property clause, both as to whether “Progress of Science and useful Arts” are jointly objects for securing exclusive rights to both authors and inventors, and with respect to the meaning of the term “science.”⁶⁹ Walterscheid states that “[t]he fact that scientific discoveries frequently are patentable only adds to the confusion. Indeed, it may be for this reason that some commentators appear to view these terms as interchangeable in their discussions of the patent provision.”⁷⁰ Walterscheid states that the term “science” generally meant “knowledge” or “learning,”⁷¹ while the phrase “useful arts” meant “basically helpful or valuable trades.”⁷²

this State, a writing containing the names and description of the materials aforesaid, and the method and process of making such blubber and oyl, or a substitute of blubber and oyl; nor until the said Henry Guest shall have a manufactory erected for the purpose, and shall have made such blubber and oyl, of the materials aforesaid, within this State.

Id.

⁶⁶ U.S. CONST. art. I, § 8, cl. 8.

⁶⁷ H.R. REP. NO. 82-1923, at 4 (1952); S. REP. NO. 82-1979, at 3 (1952).

⁶⁸ H.R. REP. NO. 82-1923, at 4 (1952); S. REP. NO. 82-1979, at 3 (1952).

⁶⁹ See EDWARD C. WALTERSCHEID, *THE NATURE OF THE INTELLECTUAL PROPERTY CLAUSE: A STUDY IN HISTORICAL PERSPECTIVE* 120–21 (2002).

⁷⁰ *Id.* at 121.

⁷¹ See *id.* at 125.

⁷² See *id.* at 126.

It would appear, however, that there is at least some overlap in the meanings of the terms “science” and “useful arts” as those terms were understood at the time the Constitution was drafted. Mokyr, for example, points out that the concept of “usefulness” that developed during eighteenth century Britain “involved both practical uses (that is, technology) and a moral and intellectual improvement of humanity so that people would be taught more virtuous lives.”⁷³ According to Mokyr, the notion of “‘useful arts,’ what we call today science and technology,”⁷⁴ arose in conjunction with recognition of mutual reinforcement of useful knowledge and economic performance,⁷⁵ wherein under an “Enlightenment view . . . it was the role of the state to enhance prosperity and growth and to encourage the formation and dissemination of useful knowledge.”⁷⁶ Advancement of the “useful arts,” in effect, embodied the ideas of Francis Bacon, as stated by Mokyr, “to attain material progress through technological progress [by] application of inductive and experimental method to investigate nature, the creation of a universal natural history, and reorganization of science as a human activity.”⁷⁷ The three components of this “Baconian program” were “research into natural phenomenon,” a research agenda “directed to areas where there was a high chance of solving practical problems—in medicine, manufacturing, navigation, and so on,” and minimization of “access costs to this knowledge . . . not only by dissemination but also by organizing and classifying what was known.”⁷⁸ The distinction, therefore, between “science” and “useful arts” as those terms were employed in the Constitution, appears to be a distinction between knowledge—that is, knowledge based on natural phenomena—and its application. In other words, and as again expressed by Mokyr, it was the Enlightenment “idea of *useful knowledge* which gave people power over *nature* and not

⁷³ JOEL MOKYR, *THE ENLIGHTENED ECONOMY: AN ECONOMIC HISTORY OF BRITAIN 1700–1850*, 35 (2009).

⁷⁴ *Id.* at 40.

⁷⁵ *Id.* at 35.

⁷⁶ *Id.* at 26.

⁷⁷ *Id.* at 41.

⁷⁸ *Id.* at 40.

(just) over *other people*. It is this kind of power that . . . is at the very core of what increasingly mattered in this period.”⁷⁹

As we have seen, during the seventeenth and eighteenth centuries new application of principle became a basis for patentable distinction as a substitute for bare novelty.⁸⁰ Further, just as protection under section 6 of the Statute of Monopolies was limited to manufactures, and later to methods associated with manufactures, the type of principle—the new application of which would qualify for patent protection under the constitutional category of “useful arts”—generally was limited to that of a naturally-occurring power over nature, as opposed to knowledge which gave people power “(just) over other people.” The phrase “useful arts,” or “useful knowledge,” nevertheless, is very broad. Mokyr, for example, specifically applies the phrase “useful knowledge,” as that concept was understood, to applications of formal mathematics and demographic statistics to develop actuarial techniques supporting advancements in the insurance industry in the eighteenth century.⁸¹

Moreover, if, as Walterscheid argues, the term “science,” as that term was employed at the time the Constitution was drafted, is to be interpreted broadly as “knowledge,” and if the phrases “useful arts” and “useful knowledge” were considered equivalent during the same period, as referenced by Mokyr, then “knowledge” and “useful knowledge” appear to properly belong within the same clause, which not only includes securing to authors an exclusive right to their writings and to inventors an exclusive right to their discoveries, but also incorporates James Madison’s proposal, “to encourage by proper premiums and provisions the advancement of

⁷⁹ *Id.* at 35.

⁸⁰ *See supra* text accompanying notes 23–62.

⁸¹ *See* MOKYR, *supra* note 73, at 230.

The idea that useful knowledge of any kind should be brought to bear on the production of goods and services and that it should therefore be applied to the insurance industry is typical of the age of Enlightenment. Formal mathematics and demographics statistics were important components of the epistemic base that supported the correct actuarial techniques in this industry.

Id.

useful knowledge and discoveries.”⁸² In other words, the clause is open-ended, not only in the types of exclusive rights that can be granted by Congress, but also in the types of knowledge beyond “writings,” and the types of useful knowledge beyond “discoveries,” that can be rewarded. Under this view, the types of “useful knowledge” and “discoveries” potentially subject to exclusionary rights, therefore, is broad, excluding, as discussed above, only purely human interactions that only leverage power over others.⁸³

Madison referred to Article I, Section 8, Clause 8, also known as “the intellectual property” clause, in the Federalist papers:

The utility of this power will scarcely be questioned. The copyright of authors has been

⁸² WALTERSCHEID, *supra* note 69, at 116–17.

What is common to the balanced composition of the clause are the terms “promote,” “progress,” “securing,” and “limited times.” The usual interpretation is that Congress is given two separate powers involving the common use of these terms. In this view, it is given power (1) “to promote the progress of science . . . by securing for limited times to authors . . . the exclusive right to their . . . writings,” and (2) “to promote the progress of . . . useful arts by securing for limited times to . . . inventors the exclusive right to their . . . discoveries.”

. . . A careful comparison of the actual language of the clause with the proposals submitted by Madison and Pinckney suggests that the conventional wisdom is wrong, and that the clause is actually a consolidation and incorporation of three separate and distinct proposals presented by these gentlemen. . . . What is not generally recognized is that the clause incorporates a third proposal, namely, that by Madison to encourage by proper premiums and provisions the advancement of useful knowledge and discoveries.

Id.

⁸³ See *supra* text accompanying note 79. Interestingly, the Royal Society, which was founded in 1660 on the principles espoused by Francis Bacon, had as its stated purpose: “To improve the knowledge of natural things, and all useful Arts, Manufacturers, Mechanik practices, Engines and Inventions by Experiments (not meddling with Divinity, Metaphysics, Moralls, Politik, Grammar, Rhetoric or Logick).” HENRY GEORGE LYONS, THE ROYAL SOCIETY, 1660–1940: A HISTORY OF ITS ADMINISTRATION UNDER ITS CHARTERS 41 (1944). “Grammar” and “Rhetoric” were the seventeenth century equivalents of social science, which broadly embraces disciplines associated with society and human behavior, including, for example, economics, information science, management science, marketing and political economy. See, e.g., JOHN WILLIAM ADAMSON, PIONEERS OF MODERN EDUCATION 1600–1700, 65 (1921).

solemnly adjudged, in Great Britain, to be a right of the common law. The right to useful inventions seems with equal reason to belong to the inventors. The public good fully coincides in both cases with the claims of individuals. The States cannot make effectual provision for either of the cases, and most of them have anticipated the decision on this point, by laws passed at the instance of Congress.⁸⁴

Although the intellectual property clause makes reference only to “the exclusive right” to be secured by the authority of Congress, Madison’s reference to “the public good” coinciding with the claims of individuals can only be understood as the benefit to the public by introduction of writings and useful inventions and ultimate ownership by the public of them by their disclosure. Grant of a limited period of exclusivity to promote generation and introduction of knowledge and its application is consistent with Mokyr’s view of the “Baconian program” in Great Britain:

The Baconian program was built on two unshakeable axioms: that the expansion of useful knowledge would solve social and economic problems, and that the dissemination of existing knowledge to more and more people would lead to substantial efficiency gains. It was also understood how this was to be brought about. On its own, artisanal knowledge would be insufficient. Without the work of natural philosophers, who would infuse it with new knowledge and connect different industries, an artisanal economy would eventually revert to a technologically stationary state.⁸⁵

Mokyr, instead of partitioning knowledge and its application, as might be suggested by separately addressing advancement of “knowledge” and “useful knowledge,” emphasizes their “complementarity,” at least as they contributed to technological progress in Britain during this period:

⁸⁴ THE FEDERALIST NO. 43 (James Madison).

⁸⁵ MOKYR, *supra* note 73, at 61.

Rather than posing the question of whether it was theorists or practical people who brought about technological progress, we need to see the fundamental complementarity between them. It was precisely their presence together and their ability to interact and produce something larger that has the power to explain Britain's technological successes.⁸⁶

This does not mean that the framers of the United States Constitution intended that a period of exclusivity was to be granted to pure acquisition of knowledge; the clear language of the clause references "Authors and Inventors the exclusive Right to their *respective* Writings and Discoveries."⁸⁷ Here, the parallelism of the clause is spelled out; authors are to be granted exclusive rights for their writings, and inventors for their discoveries. However, the "Progress of Science and useful Arts" arguably was to be advanced by granting exclusive rights in both "Writings and Discoveries." With respect to inventors, then, the question becomes who qualifies as an "inventor" and what is a "discovery."

Shortly after the Constitution came into effect on March 4, 1789, a bill known as "H.R. 10" was introduced to "promote the Progress of Science and the useful Arts."⁸⁸ The bill provided for grant of letters patent to any person who has "invented or discovered any [new] art, manufacture, engine, machine, invention or device, or any improvement upon, or in some art, manufacture, engine, machine, invention or device, not before known or used."⁸⁹ There was no geographical limit to the phrase "not before known or used," and Walterscheid states that, consistent with *Liardet v. Johnson*,⁹⁰ where publication and "prior working" consequently became recognized as bars to patentability, "[t]he intent seems to

⁸⁶ *Id.*

⁸⁷ U.S. CONST. art. I, § 8, cl. 8 (emphasis added).

⁸⁸ See e.g., EDWARD C. WALTERSCHEID, TO PROMOTE THE PROGRESS OF USEFUL ARTS: AMERICAN PATENT LAW AND ADMINISTRATION, 1787–1836, 87 (1998).

⁸⁹ *Id.* at 92.

⁹⁰ *Liardet v. Johnson*, (1788) 1 Web. P.C. 53 (K.B.); 1 Carp. 35.

have been merely to have novelty treated the same in the United States as it was in Great Britain.”⁹¹

This is not to say, however, that patents of importation were to be excluded. To the contrary, the original section six of H.R. 41, the bill that, with amendment, would become the Patent Act of 1790, specifically provided for such protection.⁹² However, requirements to provide an enabling disclosure and to recognize publication removed the conventional geographic barriers associated with working the invention and prior knowledge.⁹³ Further, written description—both of the invention and as prior knowledge—inherently raised the question of the scope of protection to be afforded by exclusive rights, in that representations of the invention or the art could be much broader than what was actually practiced. Inventors logically would be interested in obtaining protection that was as broad as possible despite the fact that, in general, all aspects of any invention could separately be found in the prior art. Yet, protection could not be so broad as to hurt trade, the prohibition against which had been the central directive underlying grant of exclusive rights to promote importation since the early sixteenth century.⁹⁴

The word “principle,” in association with patentable subject matter, came into common use in the United States very early. Even prior to the Patent Act of 1790, a petition was filed by one John Churchman on April 15, 1789 for an exclusive right to a method for determining longitude.⁹⁵ The House Committee reported a petition stating that Churchman had “applied his

⁹¹ WALTERSCHEID, *supra* note 88, at 94.

⁹² Section six, as originally drafted, would be replaced before passage of the bill, but originally stated:

And it is hereby further enacted, that any person, who shall after the passing of this act, first import into the United States from any foreign country, any art, machine, engine, device or invention, or any improvement thereon, not before used or known in said states, such person, his executors, administrators and assigns, shall have the full benefit of this act, as if he were the original inventor or improver within said States.

H.R. 41, 1st Cong. (1790), *quoted in* WALTERSCHEID, *supra* note 88, at 452.

⁹³ See *supra* notes 89–91 and accompanying text.

⁹⁴ See *supra* text accompanying notes 23–25.

⁹⁵ See WALTERSCHEID, *supra* note 88, at 82.

principles to many instances in Cook's voyages," and that "he is also engaged in constructing tables for determining the longitude at sea upon magnetic principles."⁹⁶ The committee was "of opinion that such efforts deserve encouragement, and that a law should pass to secure to Mr. Churchman, for a term of years, the exclusive pecuniary emolument to be derived from the publication of these several inventions."⁹⁷

John Fitch also presented a petition for exclusive rights, on May 13, 1789, in view of his being "the original discoverer of the principle of applying the power of steam to the purposes of navigation."⁹⁸ The scope of protection would be to "preclude subsequent improves upon his principle from participating therein until the expiration of the term of his exclusive grants."⁹⁹ Fitch also distinguished between the "principle" of his invention and the "modes" of its application: as pointed out by Walterscheid, Fitch stated that his invention "consists in applying the force of Steam, and *not in which of these modes it is applied.*"¹⁰⁰

Similarly, James Rumsey commented in a letter to Jefferson on June 6, 1789:

Such machines as are already in use (and their principles not under any restrictions by patents) then Every person Improving on Such machines ought to have a grant for Such improvement and no more, but Where the principle itself is new I humbly Conceive that it ought to be Secured to the inventor for a Limited time¹⁰¹

Walterscheid observes that "Rumsey agreed with Fitch that a person who invents a new 'principle' should have a broad dominant patent."¹⁰²

⁹⁶ *Id.* at 83.

⁹⁷ *Id.*

⁹⁸ *Id.* at 85.

⁹⁹ *Id.*

¹⁰⁰ *Id.*

¹⁰¹ *Id.* at 106.

¹⁰² *Id.*

H.R. 10 specified that, in the event of a contest between inventors, a jury would determine priority of invention if “the inventions or discoveries aforesaid, claimed by two or more parties, shall appear to be substantially the same, both in principle and execution.”¹⁰³ Further, what is believed to be a typescript of the bill, discovered in 1955, states at section 5 that a contest over priority of invention shall be determined by justices who will “adjudge” whether they are the same, “both in principle and execution.”¹⁰⁴

H.R. 10 ultimately was replaced by H.R. 41. However, another bill, H.R. 44, modeled on H.R. 10¹⁰⁵ and directed to an invention to prevent counterfeiting, was considered separately by a committee that recommended H.R. 44 become law, citing the Act of British Parliament granting Bolton and Watt’s patent. The “Principle” of the invention at issue in the bill was of central concern:

It was on this Ground that the British Parliament passed an Act in 1786 securing to Bolton & Watt a new Invention to condense Steam for working Steam Engines, the *Principle* of which was to draw the Steam out of the Cylinder by an exhausted Receiver which could be done in so many different Forms that had they taken a Patent for their Form, others might be used not described in their Specification and they would be robbed of the *Principle* of their Invention, which was therefore granted by a Special Act of Parliament.¹⁰⁶

However, the Patent Act of 1790 as enacted did not refer to application of principle as a test for patentability. Rather, the “invented or discovered . . . useful art, manufacture, engine, machine or device” need only be “sufficiently useful and

¹⁰³ *Id.* at 89. The quoted language is by Fitch, who had apparently obtained a copy of H.R. 10; no copy of H.R. 10 is now known to survive. *Id.* at 88.

¹⁰⁴ *Id.* at 102.

¹⁰⁵ *See id.* at 117.

¹⁰⁶ *Id.* at 118–19. (emphasis added) (quoting PROCEEDINGS IN CONGRESS DURING THE YEARS 1789 AND 1790, RELATING TO THE FIRST PATENT AND COPYRIGHT LAWS, 22 J. PAT. OFF. SOC’Y, at 364–65 (1940). H.R. 44 was ultimately discarded in favor of H.R. 41, which addressed patents generally. *See id.* at 120.

important, to cause letters patent to be made out in the name of the United States.”¹⁰⁷

It became apparent shortly after enactment of the Patent Act of 1790 that the administrative burdens on the Secretary of State, the Secretary of War and the Attorney General, who made up the patent board,¹⁰⁸ were excessive. Jefferson, then Secretary of State, drafted a patent bill primarily intended to “reduce the ministerial requirements placed on the State Department and [Jefferson] in the issuance of patents.”¹⁰⁹ The most significant of the changes that carried over into later proposed bills and, ultimately, the Patent Act of 1793 was introduction of a registration system to replace that of examination under the Patent Act of 1790.¹¹⁰

Interestingly, Jefferson’s draft provided a defense to patent infringement where the invention “is so unimportant and obvious that it ought not to be the basis of an exclusive right.”¹¹¹ This provision was not carried over into later proposals, and obviousness did not become a component of statutory patent law in the United States until the Patent Act of 1952.¹¹² Jefferson’s draft also broadened the scope of patent-eligible subject matter to include any “composition of matter” and required a description of “the manner of using or process of compounding the same” along with “specimens of the ingredients, and of the composition of matter, sufficient in quantity for the purpose of experiment.”¹¹³ Jefferson’s draft bill, if it was introduced at all, was replaced by H.R. 166.¹¹⁴ In what appears to be an ode to importation, H.R. 166 provided “[t]hat the monies to be paid, as directed by this act, into the treasury, shall be appropriated to the expense of procuring and importing useful arts or machines from foreign countries.”¹¹⁵ Like Jefferson’s defense to patent infringement, this provision was not

¹⁰⁷ Patent Act of 1790, ch. 7, § 1, 1 Stat. 109 (repealed 1793).

¹⁰⁸ See Patent Act of 1790 § 1.

¹⁰⁹ WALTERSCHEID, *supra*, note 88, at 201.

¹¹⁰ See *id.*

¹¹¹ *Id.* at 204.

¹¹² See Patent Act of 1952, Pub. L. No. 82-593, § 103, 66 Stat. 792, 798 (current version at 35 U.S.C. § 103 (2006)).

¹¹³ See WALTERSCHEID, *supra* note 88, at 200.

¹¹⁴ See *id.* at 205.

¹¹⁵ *Id.* at 199.

included in what ultimately became the Patent Act of 1793. However, H.R. 166 further required that the inventor “fully explain the principle and the several modes, in which he has contemplated the application of that principle or character, by which it may be distinguished from other inventions.”¹¹⁶ This language, along with a proposal¹¹⁷ that the bill be amended to state that a “discovery” shall not consist of “changing the form or the proportions of any machine, or composition of matter, in any degree,” were adopted in the final bill that became the Patent Act of 1793.¹¹⁸

Although the Patent Act of 1790 provided no more of a test for patentability than that of being “sufficiently useful and important,” the Patent Act of 1793 did provide for patent protection to “any person, who shall have discovered an improvement in the principle of any machine, or in the process of any composition of matter.”¹¹⁹ The type of principle is not specified and, given the broad meaning of both the terms “science” and “useful arts” of Article 1, Section 8, Clause 8, the type of principle could be equally broad. However, as applied to patent protection, courts generally limited the scope of patent-eligibility to application of naturally-occurring principle. Other types of principles, such as those limited to power only over other people—as in, for example, morality, religion, and government—appear never to have been the subject of patent protection, at least as adjudicated in the United States.

Further, as stated above, the parallelism of the intellectual property clause provides Congress the authority to secure for “limited Times to . . . Inventors the exclusive Right to their . . . Discoveries.”¹²⁰ Broadly interpreting the terms “Science” and “useful Arts,” and linking promotion of both the progress of “Science” and “useful Arts” to securing for limited times to inventors an exclusive right, does not imply an authority to grant Congress the right to secure such protection to individuals the exclusive right to discoveries that are mere observations. The two

¹¹⁶ *Id.* at 207.

¹¹⁷ *See id.* at 222 n.96 (noting that the proposal may have been made by either Joseph Barnes or Thomas Jefferson).

¹¹⁸ *See* Patent Act of 1793, ch. 11, § 2, 1 Stat. 318, 321 (repealed 1836).

¹¹⁹ *Id.*

¹²⁰ U.S. CONST. art I, § 8, cl. 8.

terms, “inventors” and “discoveries,” were used in conjunction in the clause and, at that time, “discoveries,” in the context of inventorship implied some *useful* application of principle and its public disclosure, as opposed to mere observation.

Utility and public possession of a discovery were, in fact, part of the exchange for an exclusionary right, and these prerequisites in the United States were consistent with British common law. For example, as stated by Collier with respect to British common law:

A patent is an agreement between the King and the Subject, that if the latter will put the public in possession of a *useful* secret, he shall have the exclusive benefit of that secret for the first fourteen years. It is obvious, that if the public be already in possession of the discovery, the patentee can make no such return or compensation for the patent he obtains.¹²¹

Therefore, even without the restraint of construction of the intellectual property clause under the Constitution, consistency with the British model of patentability strongly implies that the grant of an exclusionary right based on a “secret” observation by an inventor was linked to subsequent public disclosure of that observation and its use by the inventor.

Godson went further and equated the word “inventor” with a “*discoverer, or he who first finds out a thing, of which a limited monopoly may lawfully be granted.*”¹²² He specifically stated that the application of a principle in the absence of its discovery was insufficient to make a patentee an “inventor.”¹²³ Godson also linked determination of “a true and first inventor” under the Statute of Monopolies to public disclosure, stating that publication by another would defeat entitlement to patent protection as a matter of

¹²¹ JOHN DYER COLLIER, AN ESSAY ON THE LAW OF PATENTS FOR NEW INVENTIONS 99 (London, A. Wilson, 2d ed. 1803).

¹²² RICHARD GODSON, A PRACTICAL TREATISE ON THE LAW OF PATENTS FOR INVENTIONS AND OF COPYRIGHT 26–27 (London, William Benning & Co. 1851).

¹²³ *Id.* at 29 (“If the principle of the invention be taken from a *scientific work* the patentee is not an *inventor.*”).

policy “to insure an early production of the efforts of genius.”¹²⁴ Conversely, discovery of “objects of patents . . . new in England” must also be published in order for an individual to assume the “character of an inventor,” regardless of whether the invention was imported:

Upon the whole, then, the character of an inventor may be obtained by a person in three ways, by bringing with him and publishing to his countrymen the productions of the genius of foreigners; by publishing what others as well as himself may have found out at home; or by publishing what he alone has discovered.¹²⁵

Therefore, at least in Great Britain, “discovery” was associated with application of a newly discovered principle and patent protection was contingent upon publication.¹²⁶ So, consistent with the intellectual property clause of the Constitution, which, as argued by Walterscheid, does not preclude protection for imports, “discovery,” in the context of inventorship in Great Britain, from which patent protection in the United States was derived, implied application of a newly discovered principle, and patent protection was granted both to encourage advancement of such new application, as well as to disseminate knowledge through its publication.

C. Application of the Patent Act of 1793

The interlocking nature of “inventorship,” “discovery” and “advancement of science and the useful arts” appears to have been carried over from England into U.S. jurisprudence. Justice Story, in his note, “On the Patent Laws,”¹²⁷ which appeared as an appendix to Justice Marshall’s opinion in *Evans v. Eaton*,¹²⁸

¹²⁴ *Id.* at 30 (“If two persons severally discover the same thing, the one who obtains a patent for it, before the other has made it public, will be adjudged to be ‘*the true and first inventor*’. . . . This rule is necessary to insure an early production of the efforts of genius.”).

¹²⁵ *Id.* at 32.

¹²⁶ *See id.*

¹²⁷ *Evans v. Eaton*, 16 U.S. (3 Wheat.) 454 app. at 13–29 (1818).

¹²⁸ 16 U.S. (3 Wheat.) 454 (1818).

quoted extensively the English *Boulton*¹²⁹ and *Hornblower*¹³⁰ cases, stating that they “contain more learning on the subject of patents than can be found in any other adjudications.”¹³¹ As discussed above, in *Hornblower*, the Justices ultimately agreed that, in essence, although a patent may not be obtained for “mere principles,” methods of application of those principles may qualify as “manufactures” under section 6 of the Statute of Monopolies if the patentee “specifies the particular parts requisite to produce the effect intended, and states the manner how they are to be applied.”¹³²

In the United States, the question of how broadly the statutory categories under the Patent Act of 1793¹³³ could be applied was not seriously tested; most cases instead focused on new application of principle as a threshold of patentable distinction over prior art or as a test of infringement. For example, Chief Justice Marshall delivered the opinion in *Evans v. Eaton*, the first Supreme Court case to test patentable distinction.¹³⁴ The patent at issue was directed to a flour mill known as a “hopper-boy.”¹³⁵ Oliver Evans, the owner of the patent, claimed as his invention “the application of those principles . . . during the process of the manufacture . . . to the improvement of the process of manufacturing flour.”¹³⁶ Elsewhere in the schedule, Evans strictly claimed the “peculiar properties or principles” possessed by his invention, namely “the spreading turning and gathering the meal at one operation, and the rising and lowering of its arms by its motion, to accommodate itself to any quantity of meal it has to operate on.”¹³⁷

¹²⁹ *Boulton v. Bull*, (1795) 126 Eng. Rep. 651 (C.P.); 2 H. Bl. 463.

¹³⁰ *Hornblower v. Boulton*, (1799) 101 Eng. Rep. 1285 (K.B.); 8 T.R. 95.

¹³¹ 16 U.S. (3 Wheat.) app. at 18.

¹³² 101 Eng. Rep. at 1290.

¹³³ See Patent Act of 1793, ch. 11, § 1, 1 Stat. 318, 319 (repealed 1836) (listing as categories “any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement on any art, machine, manufacture or composition of matter”).

¹³⁴ 16 U.S. (3 Wheat.) at 454.

¹³⁵ *Id.* at 455.

¹³⁶ *Id.* at 463 n.b.

¹³⁷ *Id.* at 468 n.b.

Justice Marshall reversed and annulled the lower court's judgment for the defendant.¹³⁸ Like the reasoning by the King's Bench in *Hornblower*, the Court considered the "application of . . . principles" to be what Evans claimed as his "invention or improvement in the art."¹³⁹ In return for the exclusionary rights Evans was to receive,¹⁴⁰ Marshall stated that Evans would have to enable others to understand the improvements he made.¹⁴¹ Therefore, despite language to the effect that Evans was claiming "principles," Justice Marshall construed the claim by Evans to extend only to the "application of these principles," and only insofar as they represented "improvements."¹⁴²

In 1822, the Supreme Court again considered Evans' patent.¹⁴³ This time, Justice Story, writing for the Court, invalidated the patent despite the fact that its specification sufficiently described the improved hopper-boy, as well as its manner of construction.¹⁴⁴ According to Story, Evans' claim to the "peculiar properties or principles which this machine possesses,"¹⁴⁵ without "any other qualification . . . is just such a claim as would be made by the plaintiff, if the whole machine was substantially in its structure and combination new."¹⁴⁶ According to Story, without distinguishing the improvement from what was known, Evans claimed more protection than the Patent Act permitted.¹⁴⁷ As stated by Story:

From this enumeration of the provisions of the act, it is clear that the party cannot entitle himself to a patent for more than his own invention; and if his patent includes things before known, or before in use, as his invention, he is not entitled to recover,

¹³⁸ *See id.* at 519.

¹³⁹ *Id.* at 515.

¹⁴⁰ *Id.* at 517.

¹⁴¹ *Id.* at 518 ("[I]t will be incumbent on him to show the extent of his improvement, so that a person understanding the subject may comprehend distinctly in what it consists.").

¹⁴² *Id.*

¹⁴³ *Evans v. Eaton*, 20 U.S. (7 Wheat.) 356 (1822).

¹⁴⁴ *Id.* at 428.

¹⁴⁵ *Id.*

¹⁴⁶ *Id.*

¹⁴⁷ *Id.* at 429. The Patent Act, as paraphrased by Story, "authorizes a patent to the inventor, for his invention or improvement in any new and useful art, machine, manufacture, or composition of matter not known or used before the application." *Id.*

for his patent is broader than his invention. If, therefore, the patent be for the whole of a machine, the party can maintain a title to it only by establishing that it is substantially new in its structure and mode of operation.¹⁴⁸

Story expanded on Marshall's requirement that the patentee "show the extent of his improvement, so that a person understanding the subject may comprehend distinctly in what it consists,"¹⁴⁹ stating that the specification has two objects.¹⁵⁰ The first object had an enabling function, to make known the manner of construction "so as to enable artisans to make and use it, and thus to give the public the full benefit of the discovery after the expiration of the patent."¹⁵¹ The other object had a notice function, "to put the public in possession of what the party claims as his own invention, so as to ascertain if he claim anything that is in common use, or is already known, and to guard against prejudice or injury from the use of an invention which the party may otherwise innocently suppose not to be patented."¹⁵² Since Evans' specification did not "describe what his own improvement is, and to limit his patent to such improvement,"¹⁵³ it was "defective for not specifying that improvement," according to Story.¹⁵⁴ Therefore, whereas Marshall upheld the patent as a new application of principle contingent upon enabling others with its knowledge,¹⁵⁵ Story invalidated the patent for having claimed, "without any other qualification,"¹⁵⁶ the "peculiar properties or principles which this machine possesses,"¹⁵⁷ thereby necessarily

¹⁴⁸ *Id.* at 430.

¹⁴⁹ *Evans v. Eaton*, 16 U.S. (3 Wheat.) 454, 518 (1818).

¹⁵⁰ *Evans*, 20 U.S. (7 Wheat.) at 433.

¹⁵¹ *Id.* at 433–34.

¹⁵² *Id.* at 434.

¹⁵³ *Id.* at 435.

¹⁵⁴ *Id.*

¹⁵⁵ *See Evans v. Eaton*, 16 U.S. (3 Wheat.) 454, 518 (1818).

¹⁵⁶ *Evans*, 20 U.S. (7 Wheat.) at 428.

¹⁵⁷ *Id.*

extending the exclusive right beyond his improvement to the “whole machine” so improved.¹⁵⁸

Carry-over from England continued in *Pennock v. Dialogue*,¹⁵⁹ where Justice Story drew from the English case *Wood v. Zimmer*¹⁶⁰ to state that use of the word “invention” in the “context” of *Wood* meant “not the abstract discovery, but the thing invented; not the new secret principle, but the manufacture resulting from it.”¹⁶¹ The “context” referred to by Story was a quotation from Lord Chief Justice Gibbs, who said, “[t]o entitle a man to a patent, the invention must be new to the world. The public sale of that which is afterwards made the subject of the patent, though sold by the inventor only, makes the patent void.”¹⁶² Story also reiterated that the “main object” of the Patent Act of 1793 “was ‘to promote the progress of science and useful arts’”; and this could be done best, by giving the public at large a right to make, construct, use, and vend the thing invented, at as early a period as possible; having a due regard to the rights of the inventor.”¹⁶³ A “reasonable reward to inventors” of an exclusive right to “stimulate the efforts of

¹⁵⁸ *See id.* (“From this manner of stating his invention, without any other qualification, it is apparent that it is just such a claim as would be made use of by the plaintiff, if the whole machine was substantially in its structure and combinations new.”).

¹⁵⁹ *Pennock v. Dialogue*, 27 U.S. (2 Pet.) 1 (1829).

¹⁶⁰ *Wood v. Zimmer*, (1815) 171 Eng. Rep. 161; 1 Holt. N.P. 58.

¹⁶¹ *Pennock*, 27 U.S. (2 Pet.) at 20.

¹⁶² *Id.* (quoting *Wood*, 171 Eng. Rep. at 162.). As discussed above, English common law under the Statute of Monopolies provided for exclusive rights for “the sole working or making of any manner of new manufactures within this realm.” 1624, 21 Jac. 1, c. 3, § 5. The Patent Act of 1793 provided no such geographical limitation. However, at least within the relevant territorial confines, Justice Story drew a parallel in *Pennock* between the sixth section of the Statute of Monopolies and the Patent Act of 1793 with respect to interpretation of the term “invention” and in the policy of barring patent protection subsequent to public use by the inventor. Story stated that “the words of our statute are not identical with those of the Statute of James, but it can scarcely admit of doubt, that they must have been within the contemplation of those by whom it was framed, as well as the construction which had been put upon them by Lord Coke.” *Pennock*, 27 U.S. (2 Pet.) at 20–21. Coke, in turn, in his commentary upon the sixth section of the Statute of Monopolies, stated that “if any other did use it at the making of the letters patent, or grant of the privilege, it is declared and enacted to be void by this act.” *Id.* at 20. According to Story, Coke’s “use here referred to has always been understood to be a public use, and not a private or surreptitious use in fraud of the inventor.” *Id.*

¹⁶³ *Pennock*, 27 U.S. (2 Pet.) at 19.

genius” was considered to be of secondary importance in Story’s view.¹⁶⁴

In *Whitney v. Emmet*,¹⁶⁵ Justice Baldwin, while riding circuit, upheld a patent¹⁶⁶ directed to a method for manufacturing glass knobs.¹⁶⁷ Like Justice Story, Justice Baldwin held that a new invention cannot consist of the “discovery of some new principle, theory, elementary truth, or an improvement upon it, abstracted from its application.”¹⁶⁸ Rather, the invention lies in the *application* of that discovery or principle.¹⁶⁹ Further, Justice Baldwin extended the scope of the patentable subject matter to a “method of doing a thing,” and, as did the King’s Bench in *Hornblower*, effectively equated methods with the means by which they are practiced.¹⁷⁰

Justice Story also equated method and means. In *Ames v. Howard*,¹⁷¹ Justice Story upheld the construction of a claim directed to a cylinder “for the purpose of making paper.”¹⁷² According to Story, “[i]t requires no commentary to establish, that the application of an old thing to a new use, without any other invention, is not a patentable contrivance,”¹⁷³ but that a patentee may claim “the construction and use of the peculiar cylinder above described, and the several parts thereof in combination for the purpose aforesaid,”¹⁷⁴ that is, for the purpose of making paper. As did Justice Baldwin in *Whitney*, therefore, Story linked the

¹⁶⁴ *See id.*

¹⁶⁵ *Whitney v. Emmet*, 29 F. Cas. 1074 (C.C.E.D. Pa. 1831) (No. 17,585).

¹⁶⁶ *See id.* at 1083.

¹⁶⁷ *See id.* at 1079.

¹⁶⁸ *Id.* at 1078.

¹⁶⁹ *Id.* (“[W]hen such discovery is applied to any practical purpose, in the new construction, operation or effects of machinery or composition of matter, producing a new substance, or an old one in a new way [I]t is a ‘discovery,’ ‘invention’ or ‘improvement’ within the acts of congress.”).

¹⁷⁰ *Id.* (“[A] patent for a mode or method detached from all physical application, would not refer to an engine or machine, but when referred to the mode of operation, so as to produce the effect, would be considered as for an engine or a machine.”).

¹⁷¹ *Ames v. Howard*, 1 F. Cas. 755 (C.C.D. Mass. 1833) (No. 326).

¹⁷² *See id.* at 757.

¹⁷³ *Id.*

¹⁷⁴ *Id.* at 756.

patentability of the method with that of the machinery by which the method is conducted.

D. Continuity Under the Patent Act of 1836

Even under a new patent act, U.S. courts continued to find that new application of a principle was a benchmark for qualification as statutory subject matter. In 1836, a new patent act was enacted in the United States;¹⁷⁵ among other things, it reinstated substantive examination of patent applications and eliminated the language in the Patent Act of 1793, stating “that simply changing the form or proportions of any machine, or composition of matter, in any degree, shall not be deemed a discovery.”¹⁷⁶ Nevertheless, new application of principle as a threshold for patent eligibility continued. For example, in *Blanchard v. Sprague*,¹⁷⁷ Justice Story upheld the subject patent because there was “described, not a mere function, but a machine of a particular structure, whose modes of operation are pointed out, to accomplish a particular purpose, function, or end.”¹⁷⁸ The fact that the specification linked the invention’s function to a “particular machine” justified a determination that the machine complied with the “liberal construction”¹⁷⁹ to which patents, in Story’s view, were clearly entitled.¹⁸⁰ Therefore, Justice Story, just as he had done in *Ames*, linked patentability of practice with the patentability of a particular machine as an expression of application of a principle.

Justice Story continued to demand particularity from patentees. In *Stone v. Sprague*,¹⁸¹ Justice Story held that a “patentee limits his invention to the specific machinery and mode . . . set forth, and

¹⁷⁵ Patent Act of 1836, ch. 357, 5 Stat. 117 (amended 1870, repealed 1952).

¹⁷⁶ Patent Act of 1793, ch. 11, § 2, 1 Stat. 318, 321 (repealed 1836).

¹⁷⁷ *Blanchard v. Sprague*, 3 F. Cas. 648 (C.C.D. Mass. 1839) (No. 1,518).

¹⁷⁸ *Id.* at 650.

¹⁷⁹ *See id.* (“Patents, then, are clearly entitled to a liberal construction, since they are not granted as restrictions upon the rights of the community, but are granted ‘to promote science and useful arts.’”).

¹⁸⁰ *Id.* (“[I]t is a particular machine, constituted in the way pointed out, for the accomplishment of a particular end or object. The patent is for a machine, and not for a principle or function detached from machinery.”).

¹⁸¹ *Stone v. Sprague*, 23 F. Cas. 161 (C.C.D.R.I.1840) (No. 13,487).

specifically described in the specification.”¹⁸² To do otherwise would be “an attempt to maintain a patent for an abstract principle, or for all possible and probable modes whatsoever . . . although they may be invented by others, and substantially differ from the mode described by the plaintiff in the specification.”¹⁸³

Similarly, in *Wyeth v. Stone*,¹⁸⁴ Justice Story again distinguished between attempts to patent a principle and its application. Story held, as “utterly unmaintainable in point of law,”¹⁸⁵ a claim “to cut ice of a uniform size, by means of an apparatus or by any other power than human.”¹⁸⁶ According to Story, such a claim was “broader than the actual invention of the patentee,” and therefore constituted a “claim for an art or principle in the abstract, and not for any particular method or machinery, by which ice is to be cut.”¹⁸⁷ “Upon the principles of the common law,” such a claim was “utterly void, and the patent is a nullity.”¹⁸⁸ Story further stated that, nevertheless, several embodiments of an invention could be embraced within the scope of a single patent on the basis that they shared a common application of principle.¹⁸⁹

In *Howe v. Abbott*,¹⁹⁰ Justice Story again appeared to link new application of principle to patentable invention. Here, he found that the application of an old process to the manufacture of something new is not patentable.¹⁹¹ To be entitled to a patent, there “must be some new process, or some new machinery used, to produce the result.”¹⁹² Likewise, according to Story, “[h]e, who produces an old result by a new mode or process, is entitled to a patent for that mode or process. But he cannot have a patent for a result merely, without using some new mode or process to produce

¹⁸² *Id.*

¹⁸³ *Id.* at 162.

¹⁸⁴ *Wyeth v. Stone*, 30 F. Cas. 723 (C.C.D. Mass. 1840) (No. 18,107).

¹⁸⁵ *Id.* at 727.

¹⁸⁶ *See id.*

¹⁸⁷ *See id.*

¹⁸⁸ *Id.*

¹⁸⁹ *Id.* at 729. (“[H]e might lawfully unite in one patent all the modes, in which he contemplated the application of his invention, and all the different sorts of machinery, or modifications of machinery, by which or to which it might be applied . . .”).

¹⁹⁰ *Howe v. Abbott*, 12 F. Cas. 656 (C.C.D. Mass. 1842) (No. 6,766).

¹⁹¹ *Id.* at 658.

¹⁹² *Id.*

it.”¹⁹³ Story thereby squarely placed methods within the scope of statutory subject matter and, interestingly, divorced the patentability of methods from a need to link them to novelty of machinery employed to conduct the method or to obtain the result produced.

Howe can be better understood when viewed in comparison with *Bean v. Smallwood*,¹⁹⁴ in which Story stated that “the thing itself which is to be patented must be new and not the mere application of it to a new purpose or object.”¹⁹⁵ Taken together, *Howe* and *Bean* can only be reconciled by understanding that although both a machine and a method of its operation or use may be an embodiment of principle, the principle need not be the same. Further, considering Story’s dicta in *Wyeth*—asserting that several modes sharing a common principle can be embraced within a single patent—both an apparatus and method of its use, if they indeed share a common application of principle, should be considered a single invention. This conclusion is consistent with Judge Lawrence’s opinion in *Hornblower*, whereby Watt’s application of principle as a method could be construed to be a manufacture within the meaning of the Statute of James.¹⁹⁶

In 1853, Justice McLean for the Supreme Court in *LeRoy v. Tatham*¹⁹⁷ distinguished between “principle” in the abstract and its application under patent law:

The word principle is used by elementary writers on patent subjects, and sometimes in adjudications of courts, with such a want of precision in its application, as to mislead. It is admitted, that a principle is not patentable. A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right. Nor can an exclusive right exist to a new power, should one

¹⁹³ *Id.*

¹⁹⁴ *Bean v. Smallwood*, 2 F. Cas. 1142 (C.C.D. Mass. 1843) (No. 1,173).

¹⁹⁵ *Id.* at 1143.

¹⁹⁶ *See* *Hornblower v. Boulton*, (1799) 101 Eng. Rep. 1285 (K.B.) 1291–92; 8 T.R. 105–07; *supra* note 61 and accompanying text.

¹⁹⁷ *LeRoy v. Tatham*, 55 U.S. (14 How.) 156 (1853).

be discovered in addition to those already known. . . .

In all such cases, the processes used to extract, modify, and concentrate *natural agencies*, constitute the invention. The elements of the power exist; the invention is not in discovering them, but in applying them to useful objects.¹⁹⁸

The language employed by Justice McLean implies that the types of principle—i.e., the type of “fundamental truth,” “original cause” or “motive”—are “natural agencies” that are discovered. Although not discussed by McLean, his characterization of agencies as “natural” can only mean that the patentability of their application stands in contrast to application of agencies that are not natural. Principles that are a product of mankind—such as government, religious tenets, morality, etiquette and custom—would not qualify, and it appears that courts generally relied on that assumption. Justice McLean, for example, drew from *Househill Company v. Nielson*,¹⁹⁹ which stated that a “patent will be good though the subject of the patent consists of the discovery of a great, general, and most comprehensible principle *in science or law of nature*, if that principle is by the specification applied to any special purpose, so as thereby to effectuate a practical result and benefit not previously attained.”²⁰⁰ Justice McLean appeared also to echo Justice Story’s prohibition in *Howe* against obtaining a “patent for a result merely,”²⁰¹ by stating that “[a] patent is not good for an effect, or the result of a certain process, as that would prohibit all other persons from making the same thing by any means whatsoever.”²⁰²

In *O’Reilly v. Morse*,²⁰³ the Supreme Court upheld seven of eight claims of Samuel F. B. Morse’s patent directed to his telegraph and its use, but denied granting Morse exclusivity to a

¹⁹⁸ *Id.* at 174–75 (emphasis added).

¹⁹⁹ *Househill Company v. Nielson*, (1843) 8 Eng. Rep. 616; 1 Web. P.C. 673.

²⁰⁰ *LeRoy*, 55 U.S. at 175 (emphasis added) (quoting *Househill*, 1 Web. P.C. at 683).

²⁰¹ *Howe v. Abbot*, 12 F. Cas. 656, 658 (C.C.D. Mass. 1842) (No. 6,766); *see also supra* text accompanying notes 171–74.

²⁰² *LeRoy*, 55 U.S. at 175.

²⁰³ *O’Reilly v. Morse*, 56 U.S. (15 How.) 62 (1854).

principle apart from its embodiment.²⁰⁴ The eighth claim expressly stated that Morse's invention was not limited to any "specific machinery, or parts of machinery, described in the foregoing specifications and claims."²⁰⁵ Instead, Morse was to be bound only by the "essence of my invention," which was stated to be "the use of the motive power of the electric or galvanic current, which I call electro-magnetism, however developed, for making or printing intelligible characters, letters, or signs, at any distances, being a new application of that power, of which I claim to be the first inventor or discoverer."²⁰⁶ Justice Taney, for the Court, stated that the terms of the claim were clear: "It is impossible to misunderstand the extent of this claim. He claims the exclusive right to every improvement where the motive power is the electric or galvanic current, and the result is the marking or printing intelligible characters, signs, or letters at a distance."²⁰⁷

The Court's denial of the eighth claim's validity appears to have been based on policy grounds, in that the patentee "shuts the door against inventions of other persons, [while] the patentee would be able to avail himself of new discoveries in the properties and powers of electro-magnetism which scientific men might bring to light."²⁰⁸ Therefore, the Court held that "the claim is too broad, and not warranted by law."²⁰⁹ The Court distinguished Morse's eighth claim from *Neilson v. Harford*.²¹⁰ There, the Court of Exchequer upheld a patent claim directed to a method for "throwing hot air into [a] furnace, instead of cold, and thereby

²⁰⁴ *See id.* at 113.

²⁰⁵ *Id.* at 112.

²⁰⁶ *See id.* Morse's eighth claim was as follows:

I do not propose to limit myself to the specific machinery, or parts of machinery, described in the foregoing specification and claims; the essence of my invention being the use of the motive power of the electric or galvanic current, which I call electro-magnetism, however developed for making or printing intelligible characters, letters, or signs, at any distances, being a new application of that power, of which I claim to be the first inventor or discoverer.

Id.

²⁰⁷ *Id.*

²⁰⁸ *See id.* at 113.

²⁰⁹ *Id.*

²¹⁰ *Neilson v. Harford*, (1841) 151 Eng. Rpt. 1266 (Exch. Div.); 8 M. & W. 806.

increasing the intensity of the heat”²¹¹ and to the efficiency of “fires, forges, and furnaces, where a blowing apparatus is required.”²¹² Despite the fact that Neilson claimed no particular mode of constructing the receptacle²¹³ to embody “the principle that hot air will promote the ignition of fuel better than cold,”²¹⁴ the court upheld Neilson’s patent because he “had invented a mechanical mode of applying [the principle] to furnaces; and that his invention consisted in interposing a heated receptacle, between the blower and the furnace, and by this means heating the air after it left the blower, and before it was thrown into the fire.”²¹⁵

Morse, on the other hand, claimed the exclusive use of communication at a distance by “electric or galvanic current,” regardless of the means.²¹⁶ This, in contrast to *Neilson*, went too far and represented to the Court an attempt to claim exclusive use of a principle disembodied from its application.²¹⁷ Public disclosure was also a factor underlying the policy denying protection to exclusive use of principle apart from any limitation

²¹¹ *O’Reilly* at 115 (citing *Nielson*, 151 Eng. Rpt. at 1266).

²¹² *Id.* at 114 (citing *Nielson*, 151 Eng. Rpt. at 1266).

²¹³ *Id.* at 115. As stated by the Court in *O’Reilly* with reference to *Neilson*:

We see nothing in this opinion differing in any degree from the familiar principles of law applicable to patent cases. Neilson claimed no particular mode of constructing the receptacle, or of heating it. He pointed out the manner in which it might be done, but admitted that it might also be done in a variety of ways; and at a higher or lower temperature; and that all of them would produce the effect in a greater or less degree, provided the air was heated by passing through a heated receptacle. And hence it seems that the court at first doubted, whether it was a patent for any thing more than the discovery that hot air would promote the ignition of fuel better than cold.

Id. at 115–16.

²¹⁴ *Id.* at 116.

²¹⁵ *See id.* As stated by the court:

But after much consideration, it was finally decided that this principle must be regarded as well known, and that the plaintiff had invented a mechanical mode of applying it to furnaces; and that his invention consisted in interposing a heated receptacle, between the blower and the furnace, and by this means heating the air after it left the blower, and before it was thrown into the fire.

Id.

²¹⁶ *See id.* at 112.

²¹⁷ *See id.* at 116.

on its embodiment.²¹⁸ The Court, therefore, refused Morse's claimed "exclusive right to use a manner and process which he has not described and indeed had not invented, and therefore could not describe when he obtained his patent."²¹⁹

The Supreme Court in *Burr v. Duryee*²²⁰ again limited protection and held that the reissue of a valid patent to broaden claims to cover all modes by which the object of the invention is to be achieved would constitute "an attempt to convert an improved machine into an abstraction, a principle or mode of operation, or a still more vague and indefinite entity often resorted to in argument, an '*idea*.'"²²¹ Similarly, notice appeared to be the basis for the Court's holding:

The great question of the case is, whether the Boyden machine infringes the patent originally granted to Wells for his invention; and if not, whether his assignees, by the use or abuse of the right to surrender and reissue their patent, can so expand it as to cover by ex post facto operation, all subsequent inventions.²²²

In sum, consistent with development of case law prior to the Patent Act of 1836, new application of principle or, more specifically, new *physical* application of *naturally-occurring* principle, continued to be the touchstone of statutory subject matter, despite removal of language explicitly barring patent protection where the invention represented "simply changing the form or proportions of any machine, or composition of matter, in any degree."²²³

²¹⁸ *Id.* at 113 ("And if he can secure the exclusive use by his present patent, he may vary it with a new discovery and development of science, and need place no description of the new manner, process, or machinery, upon the records of the patent office. And when the patent expires, the public must apply to him to learn what it is.").

²¹⁹ *Id.* at 113.

²²⁰ *Burr v. Duryee*, 68 U.S. 531 (1864).

²²¹ *Id.* at 577.

²²² *Id.* at 566.

²²³ See *supra* text accompanying notes 175–76.

II. THE FALL OF THE APPLICATION OF NATURALLY-OCCURRING PRINCIPLE AS A THRESHOLD FOR PATENT ELIGIBILITY

A. *Challenges Prior to the Patent Act of 1952*

Until the mid 1860s, the classification of subject matter within the statutory categories of the patent acts was not generally a point of controversy. Most inventions were directed to machines and methods of their use. Further, courts in the United States typically found that machines and methods of their use were equivalent when both embraced a common application of principle and, when they constituted different inventions, the courts required each to be a manifestation of some new application of principle.

Eventually, however, and inevitably, the variety of subject matter for which applicants sought protection would begin to test the limits of the statutory categories available for exclusionary protection. In 1876, for example, the Supreme Court decided *Cochrane v. Deener*,²²⁴ which would later figure prominently in qualification of statutory subject matter.²²⁵ In *Cochrane*, the Court held that a method for purifying the millings of flour practiced by the defendants infringed the plaintiff's patent because the only differences were, albeit improvements, "a mere matter of form" of the equipment employed to perform the method, despite the existence of a later patent of a third party from which the defendants had a license, covering machines that conduct their process.²²⁶ The Court stated that claimed processes can be practiced by different "instrumentalities" and still be patentable:

That a process may be patentable, irrespective of the particular form of the instrumentalities used, cannot be disputed. . . . A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject matter to be transformed and reduced to a different state or thing. If new and useful, it is just as patentable as is a piece of

²²⁴ *Cochrane v. Deener*, 94 U.S. 780 (1876).

²²⁵ *See Gottschalk v. Benson*, 409 U.S. 63, 69 (1972).

²²⁶ *Id.* at 786–87.

machinery. In the language of the patent law, it is an art. The machinery pointed out as suitable to perform the process may or may not be new or patentable; whilst the process itself may be altogether new, and produce an entirely new result. The process requires that certain things should be done with certain substances, and in certain order; but the tools to be used in doing this may be of secondary consequence.²²⁷

Note that the Court did *not* say that in order to qualify as a statutory process the claimed subject matter must employ a machine or transform material, but rather said only that machines and processes that *did* transform materials qualified as an “art,” and that the bases for patentability of a method and the apparatus for conducting that method can be distinct.

In *Baker v. Selden*,²²⁸ the Supreme Court distinguished between protections afforded by copyright and by patent. The Court found that the copyright in a book describing a method of bookkeeping—and including forms and blanks illustrating the system and showing how it is to be used and carried out in practice—did not protect the author against another’s use of the system or the forms employed to illustrate the system. The Court stated:

The description of the art in a book, though entitled to the benefit of copyright, lays no foundation for an exclusive claim to the art itself. The object of the one is explanation; the object of the other is use. The former may be secured by copyright. The latter can only be secured, if it can be secured at all, by letters-patent.²²⁹

²²⁷ *Id.* at 787–88.

²²⁸ *Baker v. Selden*, 101 U.S. 99 (1880).

²²⁹ *Id.* at 105.

The Court, however, did not opine upon whether the subject matter from the book was patentable,²³⁰ nor did it decide whether the forms themselves were patentable subject matter.²³¹

In *Munson v. City of New York*,²³² the Court addressed the patentability of a system of book-keeping.²³³ The Court found that “there was no patentable novelty in plaintiff’s scheme,”²³⁴ and, therefore, it could not “be held to involve any invention.”²³⁵ The Court made a point of not expressing any opinion as to whether the subject matter of the patent could be “considered as an ‘art, machine, manufacture, or composition of matter,’ within the meaning of the patent laws.”²³⁶ Rather, acting on the presumption that it did, it avoided the issue by invalidating the patent for lack of novelty over the prior art.²³⁷

A few years later, the Circuit Court for the Southern District of New York, in *United States Credit System v. American Credit Indemnity*,²³⁸ relied on *Baker* to hold that forms employed in an insurance practice were not “new to persons skilled in that art, and could not amount to any patentable invention or discovery.”²³⁹ The court also contrasted *Munson*, which “was for a contrivance to preserve paid coupons and bonds, and might be patentable as a machine or manufacture,”²⁴⁰ with the patent at issue, which was “for a method of transacting common business.”²⁴¹ Without further explanation, the court held that the method “does not seem to be patentable as an art.”²⁴²

²³⁰ *Id.* at 104. (“Whether the art might or might not have been patented, is a question which is not before us. It was not patented, and is open free to the use of the public.”).

²³¹ *Id.* (“And, of course, in using the art, the ruled lines and headings of accounts must necessarily be used as incident to it.”).

²³² *Munson v. City of New York*, 124 U.S. 601 (1888).

²³³ *Id.* at 604.

²³⁴ *Id.* at 604–05.

²³⁵ *Id.* at 605.

²³⁶ *Id.* at 604.

²³⁷ *Id.* at 604–05.

²³⁸ 53 F. 818 (C.C.S.D.N.Y. 1893).

²³⁹ *Id.* at 818–19.

²⁴⁰ *Id.* at 819.

²⁴¹ *Id.*

²⁴² *Id.*

Novelty was also implicated in other tests of statutory subject matter. For example, a process of preserving fruit by exposure to borax (sodium borate) was held to be unpatentable by the Supreme Court of the United States in *American Fruit Growers, Inc. v. Brogdex Co.*²⁴³ In deciding, the Court drew on a definition of “manufacture” as “the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery,” and “anything made for use from raw or prepared materials.”²⁴⁴ The Court disputed the lower court’s conclusion that the “product is a combination of the natural fruit and a boric compound . . . to render the fruit resistant to decay . . . and is thus an article of manufacture,”²⁴⁵ because there was “no change in the name, appearance or general character of the fruit. It remains a fresh orange fit only for the same beneficial uses as theretofore,” thereby disqualifying the claimed subject matter from qualification as a “manufacture” under the statute.²⁴⁶

In a case which later would be described as the origin of the “mental steps” doctrine,²⁴⁷ the Circuit Court of Appeals for the Ninth Circuit, in *Don Lee, Inc. v. Walker*,²⁴⁸ decided that “an improvement in the method of counterbalancing engine main shafts”²⁴⁹ was an attempt to monopolize a “formula for determining dynamic forces, and this although those forces were fully recognized and considered by engineers in published text-books long before the appellee applied for his patent.”²⁵⁰ This decision by the court closely paralleled earlier decisions that rationalized denial of patentability on the basis of lack of novelty where there was a previous understanding of the principle or its general application.

²⁴³ *American Fruit Growers, Inc. v. Brogdex Co.*, 283 U.S. 1, 11 (1931).

²⁴⁴ *Id.*

²⁴⁵ *Id.*

²⁴⁶ *Id.* at 12.

²⁴⁷ *In re Musgrave*, 431 F.2d 882, 889 (C.C.P.A. 1970) (describing *Don Lee, Inc. v. Walker* as the “genesis” of the mental step concept).

²⁴⁸ *Don Lee, Inc. v. Walker*, 61 F.2d 58 (9th Cir. 1932).

²⁴⁹ *Id.* at 58.

²⁵⁰ *Id.* at 62.

The Supreme Court weighed in with respect to the scope and validity of claims directed to application of an empirical formula in *MacKay Radio & Telegraph Co. v. Radio Corp. of America*.²⁵¹ As stated by the Court, if such a claim is to be considered valid, it would only be by limiting the claim to “structure conforming to the teachings” of the subject matter of the patent:

While a scientific truth, or the mathematical expression of it, is not patentable invention, a *novel* and useful structure created with the aid of knowledge of scientific truth may be. . . . We assume, without deciding the point, that this advance was invention even though it was achieved by the logical application of a known scientific law to a familiar type of antenna. But it is apparent that if this assumption is correct the invention was a narrow one . . . and is to be strictly construed with regard both to prior art and to alleged infringing devices.²⁵²

Again, qualification as statutory subject matter was linked to the novelty of claims that were viewed to embody physical application of scientific principle. Patent eligibility hung on evidence that the application of principle was novel, and not a preemption of the principle altogether.

The Supreme Court continued to emphasize the importance of novelty in the statutory subject matter context. In *Funk Bros. Seed Co. v. Kalo Inoculant Co.*,²⁵³ the Court held unpatentable, claims directed to combinations of strains of root nodule bacteria that did not mutually inhibit each other’s ability to fix nitrogen from air in specific leguminous plants, such as clover, alfalfa and soy beans.²⁵⁴ The claims were not limited to any particular combination of nitrogen-fixing bacterial strains, but rather claimed any combination of strains that were “unaffected by each other in respect to their ability to fix nitrogen in the leguminous plant for

²⁵¹ 306 U.S. 86 (1939).

²⁵² *Id.* at 94 (emphasis added).

²⁵³ 333 U.S. 127 (1948).

²⁵⁴ *See id.* at 132.

which they are specific.”²⁵⁵ Applying such combinations, farmers could avoid having to purchase strains of bacteria that were specific to crops they intended to plant. It had previously been thought that any combination of such inoculants would be mutually inhibiting.²⁵⁶

The Court held that, because the use of the bacterial strains in combination did not “improve in any way their natural functioning,” they “serve the ends of nature originally provided and act quite independently of any effort of the patentee.”²⁵⁷ Therefore, although the inventor, Bond, “made a new and different composition of non-inhibitive strains which contributed utility and economy to the manufacture and distribution of commercial inoculants . . . we think that that *aggregation* of species fell short of invention within the meaning of patent statutes.”²⁵⁸ In other words, despite the fact that Bond’s “*aggregation* of select strains of the several species into one product is an application of that newly-discovered natural principle [of lack of inhibition],” and despite the fact that “it may have been the product of skill,” the Court found that “it certainly was not the product of invention.”²⁵⁹ By disqualifying the claimed subject matter for lack of “invention,” the Court appears, again, to be basing a holding regarding statutory subject matter on novelty. Specifically, the Court held that Bond’s claim to any combination of non-inhibiting

²⁵⁵ *Id.* at 128 n.1.

²⁵⁶ *Id.* at 130 (“Hence it had been assumed that the different species were mutually inhibitive. Bond discovered that there are strains of each species of root-nodule bacteria which do not exert a mutually inhibitive effect on each other.”).

²⁵⁷ *Id.* at 131.

²⁵⁸ *Id.* at 130–31 (emphasis added).

²⁵⁹ *Id.* at 131–32 (emphasis added). The Court relied on *Cuno Eng’g Corp. v. Automatic Devices Corp.*, 314 U.S. 84 (1941), to state that “a product must be more than new and useful to be patented; it must satisfy the requirements of invention or discovery.” *Funk Bros.*, 33 U.S. at 131. The Court in *Cuno*, significantly, held that a “new device, however useful it may be, must reveal the flash of creative genius, not merely the skill of the calling.” *Cuno*, 314 U.S. at 91. This language in *Cuno* was severely criticized in later cases and, ultimately, qualified by the Supreme Court in *Graham v. John Deere Co.*, 383 U.S. 1, 15 n.7 (1965), as being merely “rhetorical embellishment of language going back to 1833.”

mixed inoculants was “no more than the discovery of some of the handiwork of nature and hence is not patentable.”²⁶⁰

B. Erecting the Crystal Palace of Patent Eligibility Tests

1. “Mental Steps,” “Technological Arts” and “Machine-or-Transformation” Tests

a) Mental Steps

The Patent Act of 1952²⁶¹ substituted the word “art” with “process” in order to avoid a conflict with the meaning of the same word in other parts of Title 35.²⁶² In 1951, just before the passage of the Patent Act of 1952, the United States Court of Customs and Patent Appeals (“CCPA”) was in “accord” in *In re Abrams*²⁶³ with three “suggested ‘rules of law’”²⁶⁴ for addressing mental steps in statutory subject matter. The rules were proposed by the appellant, whose patent application for a “Petroleum Prospecting Method” was rejected by the Board of Appeals in the United States Patent and Trademark Office (“USPTO”). The rules were:

1. If all the steps of a method claim are purely mental in character, the subject matter thereof is not patentable within the meaning of the patent statutes.

²⁶⁰ *Funk Bros.*, 333 U.S. at 131.

²⁶¹ Patent Act of 1952, Pub. L. No. 82-593, § 101, 66 Stat. 792, 797 (codified at 35 U.S.C. § 101 (2006)).

²⁶² As stated in the legislative history of the Patent Act of 1952:

Section 101 follows the wording of the existing statute as to the subject matter for patents, except that reference to plant patents has been omitted for incorporation in section 301 and the word ‘art’ has been replaced by ‘process,’ which is defined in section 100. The word ‘art’ in the corresponding section of the existing statute has a different meaning than the same word as used in other places in the statute; it has been interpreted by the courts as being practically synonymous with process or method. ‘Process’ has been used as its meaning is more readily grasped than ‘art’ as interpreted, and the definition in section 100(b) makes it clear that ‘process or method’ is meant.

S. REP. NO. 82-1979, at 2409–10 (1952).

²⁶³ *In re Abrams*, 188 F.2d 165 (C.C.P.A. 1951).

²⁶⁴ *Id.* at 167 (“From such examination of the decisions as we have been able to make, the suggested rules appear to accord with them . . .”).

2. If a method claim embodies both positive and physical steps as well as so-called mental steps, yet the alleged novelty or advance over the art resides in one or more of the so-called mental steps, then the claim is considered unpatentable for the same reason that it would be if all the steps were purely mental in character.

3. If a method claim embodies both positive and physical steps, as well as so-called mental steps, yet the novelty or advance over the art resides in one or more of the positive and physical steps and the so-called mental step or steps are incidental parts of the process which are essential to define, qualify or limit its scope, then the claim is patentable and not subject to the objection contained in 1 and 2 above.²⁶⁵

The court held that the “advance in the art” of the claimed six-step method of Abrams was that of “comparing data” and, therefore, the process fell into the second “rule,” as opposed to the third, as advocated by the appellants.²⁶⁶

In *In re Prater*,²⁶⁷ the CCPA addressed a case of first impression²⁶⁸ and affirmed a decision by the Board of Appeals rejecting method claims directed to “processing, or analysis, of conventionally obtained spectrographic data.”²⁶⁹ According to the court, “[w]hether or not a sequence of purely mental steps comes within the bounds of ‘process’ as used in 35 U.S.C. §§ 100 and 101 is, we feel, an issue which has never been squarely decided.”²⁷⁰ The *Prater* court, however, refrained from stating that patentable processes must have physical application, and attempted to explain Supreme Court precedent, namely *Cochrane*,²⁷¹ which the court

²⁶⁵ *Id.* at 166.

²⁶⁶ *Id.* at 170. (“[I]t seems to us that they are eliminated from the applicability of appellants proposed rule 3, and fall within No. 2.”).

²⁶⁷ *In re Prater*, 415 F.2d 1393 (C.C.P.A. 1969).

²⁶⁸ *Id.* at 1401.

²⁶⁹ *Id.* at 1395.

²⁷⁰ *Id.* at 1402 n.23.

²⁷¹ 94 U.S. 780, 788 (1877).

quoted, in part: “A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject matter to be transformed and reduced to a different state or thing.”²⁷² Specifically, the court in *Prater* disputed any categorical limitation by the Supreme Court in *Cochrane* on qualification of “processes” as statutory subject matter that limits the means by which they are carried out:

This passage [from *Cochrane*] has sometimes been misconstrued as a “rule” or “definition” requiring that all processes, to be patentable, must operate physically upon substances. Such a result misapprehends the nature of the passage quoted as dictum, in its context, and the question being discussed by the author of the opinion. To deduce such a rule from the statement would be contrary to its intent which was not to limit process patentability but to point out that a process is not limited to the means used in performing it.²⁷³

The Supreme Court, according to the court in *Prater*, did not preclude a sequence of purely mental steps from qualifying as patentable subject matter under 35 U.S.C. § 101.²⁷⁴ Earlier cases, such as *Abrams*,²⁷⁵ which denied patent eligibility, were distinguished as being confined to processes, or “the critical step thereof” that “required the use of the human mind—indeed, a purely mental process or step,” whereas the claimed method in *Prater* could be practiced either by mental steps or without human intervention.²⁷⁶ In other words, a method claim will not be barred from 35 U.S.C. § 101 protection under the “mental steps” doctrine

²⁷² *Prater*, 415 F.2d at 1393 (quoting *Cochrane*, 94 U.S. at 788).

²⁷³ *Id.* at 1403.

²⁷⁴ *Id.* at 1402 n.23 (“Whether or not a sequence of purely mental steps comes within the bounds of ‘process’ as used in 35 U.S.C. §§ 100 and 101 is, we feel, an issue which has never been squarely decided.”).

²⁷⁵ *In re Abrams*, 188 F.2d 165 (C.C.P.A. 1951).

²⁷⁶ *Prater*, 415 F.2d at 1402 (“But, as appellants point out, ‘Yuan’s disclosure was the use made of equations by pencil-and-paper with the mind of the operator at work to interpret the results.’ Again, as in *Abrams*, insofar as the disclosure was concerned, the process (or the critical step thereof) was one that required the use of the human mind—indeed, a purely mental process or step.”).

despite the fact that it consists of a sequence of purely mental steps, so long as the method does not exclude, and the specification supports, mechanical substitution of the entire method. The court summarized: “[I]t would appear that the disclosure of apparatus for performing the process wholly without human intervention merely shows that the disclosed process does not fall within the so-called ‘mental steps’ exclusion.”²⁷⁷

b) Technological Arts

Judge Rich for the CCPA, in *In re Musgrave*,²⁷⁸ reiterated *Prater*’s reasoning and more broadly stated that “novelty and advancement of an art are irrelevant to . . . whether the nature of a process is such that it is encompassed by the meaning of ‘process’ in 35 U.S.C. § 101.”²⁷⁹ The only requirement provided by Judge Rich for qualification as a “process” under 35 U.S.C. § 101 is that it be directed to the “technological arts”: “All that is necessary, in our view, to make a sequence of operational steps a statutory ‘process’ within 35 U.S.C. § 101 is that it be in the technological arts so as to be in consonance with the Constitutional purpose to promote the progress of ‘useful arts.’”²⁸⁰ However, Judge Rich did not specify what was meant by the term “technological arts.” Further, Judge Rich noted that *Don Lee*,²⁸¹ which was the genesis of the “mental steps” concept of patent law, provided only “an uncertain basis as precedent” for this holding.²⁸² Rich also stated

²⁷⁷ *Id.* at 1403.

²⁷⁸ *In re Musgrave*, 431 F.2d 882 (C.C.P.A 1970).

²⁷⁹ *Id.* at 889–90. The court referred to an article from the Journal of the Patent Office Society reciting “peculiarly human mental activities” that would exclude, at least in principle, assistance “by devices.” *See id.* at 890 n.4 (quoting Robert I. Coulter, *The Field of the Statutory Useful Arts*, 34 J. PAT. OFF. SOC’Y 417, 426 (1952)). Such activities included “aesthetic, emotional, imaginative, or a creative thought or reactions on the part of the practitioners (operators).” *Id.* (quoting Coulter, *supra*, at 426). Further, with respect to the technological “mental steps” cases, “the article stated that, ‘[n]one of the them involve human ‘value judgments’—that is, judgments on human conduct, ethics, morals, economics, politics, law, aesthetics, etc.’” *See id.* (quoting Coulter, *supra*, at 426).

²⁸⁰ *Musgrave*, 431 F.2d. at 893.

²⁸¹ *See Don Lee, Inc. v. Walker*, 61 F.2d 58 (9th Cir. 1932).

²⁸² *See Musgrave*, 431 F.2d at 889.

that the so-called “‘Rules’ of *Abrams* . . . have never enjoyed the approval of this court.”²⁸³

c) Machine-or-Transformation

A method for converting numerals from “binary-coded decimal numbers” to “pure binary numbers” was held by the Supreme Court in *Gottschalk v. Benson*²⁸⁴ to be unpatentable as an “algorithm”²⁸⁵ that “can be carried out in existing computers long in use, no new machinery being necessary [and] can also be performed without a computer.”²⁸⁶ The Court quoted *Cochrane*,²⁸⁷ stating that “a process may be patentable, irrespective of the particular form of the instrumentalities used,”²⁸⁸ but added that “[t]ransformation and reduction of an article ‘to a different state or a thing’ is the clue to the patentability of a process claim that does not include particular machines.”²⁸⁹ The Court refrained from holding that “a process patent must either be tied to a particular machine or apparatus or must operate to change articles or materials to a ‘different state or thing,’”²⁹⁰ and specifically denied they were precluding patent protection for any computer-servicing program.²⁹¹ However, with respect to the applicant’s method, the Court held that the “practical effect” would be to “patent an idea,” which “would wholly preempt the mathematical formula and . . . would be a patent on the algorithm itself.”²⁹²

²⁸³ *Id.*

²⁸⁴ *Gottschalk v. Benson*, 409 U.S. 63 (1972).

²⁸⁵ *Id.* at 65.

²⁸⁶ *Id.* at 67.

²⁸⁷ *Cochrane v. Deener*, 94 U.S. 780 (1877).

²⁸⁸ *Gottschalk*, 409 U.S. at 69 (quoting *Cochrane*, 94 U.S. at 787–88).

²⁸⁹ *Id.* at 70 (quoting *Cochrane*, 94 U.S. at 787–88).

²⁹⁰ *Id.* at 71. Justice Douglas, for the Court, stated:

It is argued that a patent process must either be tied to a particular machine or apparatus or must operate to change articles or materials to a “different state or thing.” We do not hold that no process patent could ever qualify if it did not meet the requirements of our prior precedents.

Id.

²⁹¹ *See id.* (“It is said that the decision precludes a patent for any program servicing a computer. We do not so hold.”).

²⁹² *Id.* at 71–72.

2. Algorithms, Abstract Ideas, Naturally-Occurring Phenomena and “Post-Solution Activity”

The CCPA developed the *Benson* holding into a two-step test in *In re Freeman*.²⁹³ There, the patent was directed to a system for printing mathematical formulae that positioned “mathematical symbols in an expression in accordance with their appearance, while maintaining the mathematical integrity of the expression.”²⁹⁴

The court reasoned:

Determination of whether a claim preempts nonstatutory subject matter as a whole, in the light of *Benson*, requires a two-step analysis. First, it must be determined whether the claim directly or indirectly recites an “algorithm” in the *Benson* sense of that term, for a claim which fails even to recite an algorithm clearly cannot wholly preempt an algorithm. Second, the claim must be further analyzed to ascertain whether in its entirety it wholly preempts that algorithm.²⁹⁵

Both apparatus and method claims of the patent were upheld as statutory subject matter under 35 U.S.C. § 101 because neither the “apparatus claims nor the . . . method claims recite or preempt a mathematical algorithm as forbidden by *Benson*.”²⁹⁶

Shortly thereafter, the Supreme Court again took up the issue of statutory subject matter in *Parker v. Flook*.²⁹⁷ Justice Stevens for the Court held that a method for updating alarm limits during catalytic conversion processes was not patentable under 35 U.S.C. § 101.²⁹⁸ Justice Stevens stated that “we assume the respondent’s formula is novel and useful and that he discovered it.”²⁹⁹ However, Justice Stevens warned that “post-solution activity,” such as computing an updated alarm limit, “no matter how conventional or obvious in itself, can transform an unpatentable

²⁹³ *In re Freeman*, 573 F.2d 1237 (C.C.P.A. 1978).

²⁹⁴ *Id.* at 1239.

²⁹⁵ *Id.* at 1245.

²⁹⁶ *Id.* at 1247.

²⁹⁷ *Parker v. Flook*, 437 U.S. 584 (1978).

²⁹⁸ *See id.* at 594–95.

²⁹⁹ *Id.* at 588.

principle into a patentable process [and, therefore] exalts form over substance.”³⁰⁰ The Court refuted the assumption that “if a process application implements a principle in some specific fashion, it automatically falls within the patentable subject matter of § 101.”³⁰¹ Instead, the Court stated that “[t]he rule that the discovery of a law of nature cannot be patented rests, not on the notion that natural phenomena are not processes, but rather on the more fundamental understanding that they are not the kind of ‘discoveries’ that the statute was enacted to protect.”³⁰² Otherwise, according to the Court, “determination of patentable subject matter [would] depend simply on the draftsman’s art and would ill serve the principles underlying the prohibition against patents for ‘ideas’ or phenomena of nature.”³⁰³

Further, the Court did not view its analysis to be one of dissection of claimed subject matter, whereby “if the only component found novel is outside the statutory classes of invention, the claim may be rejected under 35 U.S.C. § 101.”³⁰⁴ The claimed method would be unpatentable under section 101 “not because it contains a mathematical algorithm as one component, but because once that algorithm is assumed to be within the prior art, the application, considered as a whole, contains no patentable invention.”³⁰⁵ Nevertheless, “[e]ven though a phenomenon of nature or mathematical formula may be well known, an *inventive* application of the principle may be patented.”³⁰⁶ Therefore, qualification of statutory subject matter under 35 U.S.C. § 101, for the Court, depended upon “*inventive* application”³⁰⁷ of principle, and claimed subject matter might fail the test despite the fact that the novel application of a formula discovered by an applicant is useful. The Court stated: “Very simply, our holding today is that a

³⁰⁰ *Id.* at 590.

³⁰¹ *Id.* at 593.

³⁰² *Id.*

³⁰³ *Id.*

³⁰⁴ *Id.* at 594 (quoting *In re Chatfield*, 545 F.2d 152, 158 (C.C.P.A. 1976)).

³⁰⁵ *Id.*

³⁰⁶ *Id.* (emphasis added).

³⁰⁷ *Id.* (emphasis added).

claim for an improved method of calculation, even when tied to a specific end use, is unpatentable subject matter under § 101.”³⁰⁸

Three justices—including Chief Justice Burger—dissented from the majority opinion. Justice Stewart, for the dissent, stated that the majority confused issues of qualification as statutory subject matter patentability with issues of novelty and inventiveness under 35 U.S.C. §§ 102 and 103:

The Court today says it does not turn its back on well-settled precedents . . . but it strikes what seems to me an equally damaging blow at basic principles of patent law by importing into its inquiry under 35 U.S.C. § 101 the criteria of novelty and inventiveness. Section 101 is concerned only with subject-matter patentability. Whether a patent will actually *issue* depends upon the criteria of §§ 102 and 103, which include novelty and inventiveness, among many others.³⁰⁹

The CCPA in *In re Sarkar*³¹⁰ held that a method for “mathematically modeling an open channel, e.g., a natural stream or artificial waterway”³¹¹ was not a “process” within the meaning of 35 U.S.C. § 101 because an “algorithm” in the claim reduced the “invention as a whole” to a “mathematical exercise.”³¹² Physical steps of “gathering and substituting values” for the algorithm would, according to the court, cause “every mathematical equation, formula, or algorithm having any practical use . . . [to] be per se subject to patenting as a ‘process’ under §

³⁰⁸ *Id.* at 595 n.18.

³⁰⁹ *Id.* at 600 (Stewart, J., dissenting).

³¹⁰ *In re Sarkar*, 588 F.2d 1330 (C.C.P.A. 1978).

³¹¹ *Id.* at 1330.

³¹² See *id.* at 1336. The court stated:

Sarkar’s claimed invention as a whole consists of a mathematical exercise, wherein a new formula is provided, formula-dictated values are gathered and substituted for the variables in that formula, and the calculations required by the formula are made. Sarkar’s offer to disclose his process by patenting must, in the present state of the law, be declined.

Id.

101.”³¹³ For the court, “substitution of specific values” was inadequate to “convert disembodied ideas . . . into an embodiment of those ideas, or into an application of the formula.”³¹⁴

The CCPA affirmed a rejection by the Board of Appeals under 35 U.S.C. § 101 of claims directed to a “computer-implemented model of a sales organization” in *In re Maucorps*.³¹⁵ Applying *Freeman*’s two-step method of determining (1) “whether the claim directly or indirectly recites an ‘algorithm’ in the *Benson* sense of that term” and (2) “whether [the claim] in its entirety . . . wholly preempts that algorithm,”³¹⁶ the court held that the “claimed invention as a whole comprises each and every means for carrying out a solution technique for a set of equations wherein one number is computed from a set of numbers.”³¹⁷ Therefore, “appellant’s claims wholly preempt the recited algorithms.”³¹⁸ Whether the claim was directed to a method or an apparatus was considered immaterial by the court.³¹⁹

On the other hand, in *In re Sherwood*,³²⁰ the C.C.P.A. reversed a rejection by the Board of Appeals of another application directed to “geophysical prospecting.”³²¹ What the board viewed as “mathematically converting one set of numbers into a new set of numbers,”³²² the court found to be conversion of “*physical* apparitions, or particular patterns of magnetization on magnetic tape, i.e., the pattern of magnetization being a *physical* manifestation, or a *physical* line on a paper chart”³²³ from “amplitude-versus-time” seismic traces to “amplitude-versus-

³¹³ *Id.* at 1335.

³¹⁴ *Id.*

³¹⁵ *In re Maucorps*, 609 F.2d 481, 482 (C.C.P.A. 1979).

³¹⁶ *Id.* at 485 n.2 (quoting *In re Freeman*, 573 F.2d 1237, 1245 (C.C.P.A. 1978)).

³¹⁷ *Id.* at 486.

³¹⁸ *Id.*

³¹⁹ *See id.* at 485 (“Labels are not determinative in § 101 inquiries. ‘Benson applies equally whether an invention is claimed as an apparatus or process, because the form of the claim is often an exercise in drafting.’”) (quoting *In re Johnson*, 589 F.2d 1070, 1077 (C.C.P.A. 1978)).

³²⁰ *In re Sherwood*, 613 F.2d 809 (C.C.P.A. 1980).

³²¹ *Id.* at 811.

³²² *Id.* at 818.

³²³ *Id.* at 819 (emphasis added).

depth” traces.³²⁴ The court held that the claimed system converted “one physical thing into another physical thing just as any other electrical circuitry would do,”³²⁵ and, therefore, more than “mere methods (or means) for solving mathematical equations.”³²⁶

*In re Walter*³²⁷ was another case where the CCPA addressed the patentability of “seismic prospecting and surveying.”³²⁸ Judge Rich incorporated “scientific truth,” or “principle,” into the second step of the *Freeman* test, which hinged on preemption of a “mathematical algorithm” identified within claimed subject matter, thereby redefining that test in a manner that embraced both apparatus and process claims:

Once a mathematical algorithm has been found, the claim as a whole must be further analyzed. If it appears that the mathematical algorithm is implemented in a specific manner to define structural relationships between the physical elements of the claim (in apparatus claims) or to refine or limit claim steps (in process claims), the claim being otherwise statutory, the claim passes muster under § 101.³²⁹

The redefined second step of the *Freeman* test was contrasted with “post-solution activity” or recitation of “field of use,” which presumably would not limit apparatus or process elements by the manner in which a “mathematical algorithm” is implemented:

If, however, the mathematical algorithm is merely presented and solved by the claimed invention, as was the case in *Benson* and *Flook*, and is not applied in any manner to physical elements or process steps, no amount of *post-solution activity* will render the claim statutory; nor is it saved by a

³²⁴ *Id.*

³²⁵ *Id.*

³²⁶ *Id.*

³²⁷ *In re Walter*, 618 F.2d 758 (C.C.P.A. 1980).

³²⁸ *Id.* at 760.

³²⁹ *Id.* at 767.

preamble merely reciting the field of use of the mathematical algorithm.³³⁰

Consistent with Judge Rich's earlier pronouncements, a correct determination of statutory subject matter employing algorithms, mathematical formulas or scientific truth was not contingent on whether the subject matter, as claimed, was drafted as a process or apparatus, but rather it hinged on whether the claimed subject matter resulted in more than solution of a mathematical algorithm.

In a landmark decision by the Supreme Court, *Diamond v. Chakrabarty*,³³¹ the Court appeared to blend qualification as statutory subject matter with the other statutory requirements of novelty and utility. There, a "live, human-made micro-organism"³³² was held to be patentable subject matter under 35 U.S.C. § 101 as a "manufacture" or "composition of matter"³³³ under the terms of that statute.³³⁴ The Court explicitly rejected the argument that the 1930 Plant Patent Act³³⁵ and the 1970 Plant Variety Protection Act³³⁶ excluded protection for human-made microorganisms under 35 U.S.C. § 101.³³⁷ The Court also refuted the notion that qualification of micro-organisms as patentable subject matter under 35 U.S.C. § 101 would require express authorization from Congress.³³⁸ Neither was the Court swayed by the "gruesome parade of horrors" presented as a potential consequence of providing patent protection to man-made living organisms.³³⁹ Instead, the Court construed the 1952 Patent Act broadly, because "Congress plainly contemplated that the patent laws would be given wide scope,"³⁴⁰ in order to advance "Jefferson's philosophy that 'ingenuity should receive a liberal

³³⁰ *Id.* (emphasis added).

³³¹ *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).

³³² *Id.* at 305.

³³³ *See id.* at 312.

³³⁴ *See id.* at 318.

³³⁵ Plant Patent Act of 1930, Pub. L. No. 71-245, 46 Stat. 376 (repealed 1952).

³³⁶ Plant Variety Protection Act of 1970, Pub. L. No. 91-577, 84 Stat. 1542 (current version at 7 U.S.C. § 2402 (2006)).

³³⁷ *See Chakrabarty*, 447 U.S. at 311.

³³⁸ *Id.* at 315 ("Flook did not announce a new principle that inventions in areas not contemplated by Congress when the patent laws were enacted are unpatentable *per se.*").

³³⁹ *Id.* at 316.

³⁴⁰ *Id.* at 308.

encouragement.”³⁴¹ The Court invoked the legislative history of the 1952 Patent Act and P.J. Federico’s testimony: “[U]nder section 101 a person may have invented a machine or a manufacture, which may include anything under the sun that is made by man.”³⁴²

The Court went further, however, and appeared, at least, to blend qualification as statutory subject matter with other statutory requirements, namely, the novelty and utility requirements, which are separate from classification as a “process, machine, manufacture, or composition of matter” under 35 U.S.C. § 101. Specifically, the Court stated that “[h]is claim is not to a hitherto unknown natural phenomenon, but to a nonnaturally occurring manufacture or composition of matter—a product of human ingenuity ‘having a distinctive name, character [and] use.’”³⁴³ *Funk Bros.* was distinguished on the basis of “markedly different characteristics” of Chakrabarty’s micro-organism from that occurring in nature, further reinforcing the idea of patent eligibility under 35 U.S.C. § 101 as a function of novelty:

Here, by contrast, the patentee has produced a new bacterium with *markedly different characteristics* from any found in nature and one having potential for significant utility. His discovery is not nature’s handiwork, but his own; accordingly it is patentable subject matter under § 101.³⁴⁴

Next, the Supreme Court in *Diamond v. Diehr*³⁴⁵ addressed qualification under § 101 and seemed to import an enablement requirement into the section 101 inquiry. The patent at issue was directed at a method for operating a rubber-molding press that included repetitively calculating the cure time and opening the press at the time indicated by those calculations.³⁴⁶ The Court

³⁴¹ *Id.* at 308–09 (quoting 5 THE WRITINGS OF THOMAS JEFFERSON 76 (H. A. Washington ed., New York, Riker, Thorne & Co. 1854)).

³⁴² *Id.* at 309 n.6 (quoting *Hearings on H.R. 3760 Before Subcomm. No. 3 of the H. Comm. on the Judiciary*, 82d Cong. 37 (1951)).

³⁴³ *Id.* at 309–10 (quoting *Hartranft v. Wiegmann*, 121 U.S. 609, 615 (1887)).

³⁴⁴ *Id.* at 310 (emphasis added).

³⁴⁵ *Diamond v. Diehr*, 450 U.S. 175 (1981).

³⁴⁶ *See id.* at 178.

upheld a decision by the CCPA to reverse the rejection by the USPTO because “we do not view respondent’s claims as an attempt to patent a mathematical formula, but rather to be drawn to an industrial process for the molding of rubber products.”³⁴⁷

The Court believed that it was being consistent with its earlier holding in *Flook*, where calculation of an alarm limit during an unspecified chemical reaction was held not to be patentable subject matter, despite the fact that, as in the instant case, the claims in *Flook* did not “cover every conceivable application of the formula.”³⁴⁸ The distinction, according to the Court, was whether the claim relied on “insignificant post-solution activity . . . [to] transform an unpatentable principle into a patentable process.”³⁴⁹ The court further stated: “Similarly, a mathematical formula does not become patentable subject matter merely by including in the claim for the formula token post-solution activity such as the type claimed in *Flook*.”³⁵⁰ The Court did not provide much guidance in distinguishing between *Flook*’s “insignificant post-solution activity” and *Diehr*’s “industrial process” other than to point out that the claims at issue in *Flook* were not supported by an enabling written description, which is not a requirement of 35 U.S.C. § 101, but rather the first paragraph of 35 U.S.C. § 112.³⁵¹ In particular, the court stated that:

We were careful to note in *Flook* that the patent application did not purport to explain how the variables used in the formula were to be selected, nor did the application contain any disclosure relating to chemical processes at work or the means

³⁴⁷ *Id.* at 192–93.

³⁴⁸ *Id.* at 193 n.14; *see supra* text accompanying notes 297–309.

³⁴⁹ *Id.* at 191–92.

³⁵⁰ *Id.* at 193 n.14.

³⁵¹ *See* 35 U.S.C. § 112 (2006).

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Id.

of setting off an alarm or adjusting the alarm unit. All the application provided was a “formula for computing an updated alarm limit.”³⁵²

Therefore, like the *Flook* Court, the reasoning provided by the Court in *Diehr* is subject to the same type of criticism that was made by the dissent in *Flook*, namely that, by basing qualification of 35 U.S.C. § 101 on the presence or absence of “insignificant post-solution activity,” the Court is delivering a “damaging blow at basic principles of patent law by importing into its inquiry under 35 U.S.C. § 101” other statutory requirements.³⁵³ In *Flook*, it was novelty and obviousness.³⁵⁴ In *Diehr*, it was enablement. In addition, the Court in *Diehr* did not reduce the criteria for qualification under 35 U.S.C. § 101 to any general test, but instead relied upon simply considering the claimed subject matter “as a whole,” and reciting an example of a test that had been employed in the past, namely, that of “[t]ransforming and reduction of an article to a ‘different state or thing.’”³⁵⁵

The dissent in *Diehr* stated that the majority had failed to “recognize the critical difference between the ‘discovery’ requirement in § 101 and the ‘novelty’ requirement in § 102,”³⁵⁶ but, in making the distinction, the dissent actually appears to have made the same error, despite stating the contrary.³⁵⁷ Justice Stevens, for the dissent, stated that with respect to the claimed inventions of *Flook* and *Diehr*, the “post-solution activity is a significant part of the industrial process,”³⁵⁸ but that “in neither case should that activity have any *legal* significance because it

³⁵² *Diehr*, 450 U.S. at 193 n.14.

³⁵³ *Parker v. Flook*, 437 U.S. 584, 600 (Stewart, J., dissenting).

³⁵⁴ *See id.* Justice Stewart further stated that:

It may well be that under the criteria of §§ 102 and 103 no patent should issue on the process claimed in this case, because of anticipation, abandonment, obviousness, or for some other reason. But in my view the claimed process clearly meets the standards of subject matter patentability of § 101.

Id.

³⁵⁵ *Diehr*, 450 U.S. at 184 (quoting *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972)).

³⁵⁶ *Id.* at 211 (Stevens, J., dissenting).

³⁵⁷ *See id.* at 213 (“In the § 101 analysis, we must assume that the sequence of steps in this programming method is novel, unobvious and useful.”).

³⁵⁸ *Id.* at 215.

does not constitute a part of the *inventive concept* that the applicants claimed to have discovered.”³⁵⁹ The dissent’s analysis excluded what it believed to be non-statutory subject matter—namely, the computer program³⁶⁰—and looked to the remainder of the steps to decide the “threshold question of whether such a method is patentable subject matter.”³⁶¹ The dissent’s analysis of Diehr’s claimed method was squarely within the realm of 35 U.S.C. § 102:

Even the Court does not suggest that the computer program developed by Diehr and Lutton is a patentable discovery. Accordingly, *if we treat the program as though it were a familiar part of the prior art*—as well-established precedent requires—it is absolutely clear that their application contains no claim of patentable invention. Their application was therefore properly rejected under § 101 by the Patent Office and the Board of Appeals.³⁶²

Therefore, both the majority and the dissent in *Diehr* appear to have confused qualifications of subject matter as “any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof,” with other requirements under the Patent Act of 1952. The majority confused the question of statutory subject matter under 35 U.S.C. § 101 with the “enablement” requirement of 35 U.S.C. § 112, while the dissent, in criticizing the majority, also blended the requirements of 35 U.S.C. § 101 with the novelty requirement under 35 U.S.C. § 102.

Subsequent cases at the CCPA and, later, at the Court of Appeals for the Federal Circuit, continued to decide qualification under 35 U.S.C. § 101 by breaking claims down into their component parts and evaluating the nature of individual steps or components of claimed subject matter. Often, as in *Flook* and *Diehr*, analyses by courts hinged on issues provided for in other

³⁵⁹ *Id.* (emphasis added).

³⁶⁰ *See id.* at 216 (“In *Parker v. Flook*, we further held that such a computer program could not be transformed into a patentable process by the addition of postsolution activity that was not claimed to be novel.”).

³⁶¹ *Id.* at 213.

³⁶² *Id.* at 216 (emphasis added).

sections of the Patent Act, such as whether “post-solution” activity was insignificant, which would be better addressed under 35 U.S.C. § 103 as an issue of obviousness, and whether claimed subject matter was a “scientific truth” or “algorithm,” which is properly an issue of novelty. Further, there appeared to be no consistency from case to case as to whether any particular application of a law of nature, physical phenomena or abstract idea was sufficiently distinct from a prohibited preemption of all applications of principle.

For example, the CCPA in *In re Abele*³⁶³ affirmed a rejection by the USPTO of an independent claim directed to an “improvement in CAT scan imaging technique”³⁶⁴ as “no more than the calculation of a number and display of the result, albeit in a particular format,”³⁶⁵ while also upholding a dependent claim limiting the display of data to “X-ray attenuation data produced in a two dimensional field by a computed tomography scanner.”³⁶⁶ The “X-ray attenuation data” was viewed by the court as “an application of an algorithm to process steps which are themselves part of an overall process which is statutory.”³⁶⁷ The court came to the conclusion that the dependent claim was statutory by carving out the algorithm and assessing the remaining components of the claim.³⁶⁸

The court viewed *Walter* as requiring

no more than that the algorithm be “applied in any manner to physical elements or process steps,” provided that its application is circumscribed by more than a field of use limitation or non-essential post-solution activity. . . . This broad reading of

³⁶³ *In re Abele*, 684 F.2d 902 (C.C.P.A. 1982), *abrogated by In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008).

³⁶⁴ *Id.* at 904.

³⁶⁵ *Id.* at 909.

³⁶⁶ *Id.* at 908.

³⁶⁷ *Id.* at 908–09.

³⁶⁸ *Id.* at 908 (“Were we to view the claim absent the algorithm, the production, detection and display steps would still be present and would result in a conventional CAT-scan process.”).

Walter, we conclude, is in accord with the Supreme Court decisions.³⁶⁹

A direct comparison was made between the permissible dependent claim and the rubber-curing process claimed in *Diehr*, and the court found that “[t]he improvement in either case resides in the application of a mathematical formula within the context of a process which encompasses significantly more than the algorithm alone.”³⁷⁰

The two-dimensional presentation of X-ray attenuation data was enough of a physical application to distinguish it as patentable subject matter—in contrast to the method by which that data was generated. In other words, physical application of the principle represented by the algorithm resided in display of data generated by that algorithm.

A method of diagnosis was held unpatentable in *In re Grams*,³⁷¹ where the Federal Circuit upheld a rejection by the Board of Patent Appeals and Interferences of claims directed to a method of diagnosing an abnormal condition in an individual as a non-statutory algorithm, stating that the “presence of a physical step in the claim to derive data for the algorithm will not render the claim statutory.”³⁷² As further stated by the Court: “In all instances, this critical question must be answered: ‘What did applicants invent?’ . . . Though that analysis can be difficult, it is facilitated somewhat if, as here, the only physical step involves merely gathering data for the algorithm.”³⁷³ The court quoted *In re Sarkar*: “If the steps of gathering and substituting values were alone sufficient, every mathematical equation, formula, or algorithm having any practical use would be per se subject to patenting as a process under § 101.”³⁷⁴

³⁶⁹ *Id.* at 907 (quoting *In re Walter*, 618 F.2d 758, 767 (C.C.P.A. 1980)).

³⁷⁰ *Id.* at 909.

³⁷¹ *In re Grams*, 888 F.2d 835 (Fed. Cir. 1989).

³⁷² *Id.* at 840.

³⁷³ *Id.* at 839.

³⁷⁴ *Id.* (quoting *In re Sarkar*, 588 F.2d 1330 (C.C.P.A. 1978)).

On the other hand, in *Arrhythmia Research Technology, Inc. v. Corazonix Corp.*,³⁷⁵ which involved a method of diagnosis and associated apparatus employing electric cardiographic signals generated by a patient, Judge Newman, for the court, viewed “converting,” “applying,” “determining,” and “comparing” as “physical process steps that transform one physical, electrical signal into another” and, therefore, met the *Freeman-Walter-Abele* standard.³⁷⁶ *Grams* was considered distinct in that the subject claims in *Arrhythmia* were narrowly tailored to an “electrocardiograph analysis process,” whereas the claims in *Grams* “had application to ‘any complex system, whether it be electrical, mechanical, chemical or biological, or combinations thereof.’”³⁷⁷ The fact that the “physical process” of the claimed electrocardiographic method and apparatus only transformed “one physical, electrical signal into another”³⁷⁸ was sufficient to meet the requirements of section 101, despite the fact that the output of the apparatus and process was “simply a number.”³⁷⁹ The *Arrhythmia* court reasoned that “[t]he number obtained is not a mathematical abstraction; it is a measure in microvolts of a specified heart activity, an indicator of the risk of ventricular tachycardia. That the product is numerical is not a criterion of whether the claim is directed to statutory subject matter.”³⁸⁰

The claimed subject matter in *In re Alappat*³⁸¹ was directed to an apparatus, specifically, a “rasterizer” for smoothing a waveform display in a digital oscilloscope.³⁸² Judge Rich reversed a rejection by the Board of Patent Appeals and Interferences for lack of statutory subject matter under section 101,³⁸³ and held that the subject matter of the claimed apparatus, which was expressed in

³⁷⁵ *Arrhythmia Research Tech., Inc. v. Corazonix Corp.*, 958 F.2d 1053 (Fed. Cir. 1992).

³⁷⁶ *See id.* at 1059 (“The *Freeman-Walter-Abele* standard is met, for the steps of Simson’s claimed method comprise an otherwise statutory process whose mathematical procedures are applied to physical process steps.”).

³⁷⁷ *Id.* (quoting *Grams*, 888 F.2d at 840).

³⁷⁸ *Id.*

³⁷⁹ *Id.* at 1060.

³⁸⁰ *Id.*

³⁸¹ *In re Alappat*, 33 F.3d 1526 (Fed. Cir. 1994) (en banc).

³⁸² *Id.* at 1544.

³⁸³ *See id.* at 1545.

terms of “means-plus-function,”³⁸⁴ met the statutory requirements of 35 U.S.C. § 101 because it did not “‘wholly preempt’ the use of any apparatus employing the combination of mathematical calculations recited therein,”³⁸⁵ but rather was “limited to the use of a particularly claimed combination of elements performing the particularly claimed combination of calculations to transform, i.e., rasterize, digitized waveforms (data) into anti-aliased, pixel illumination data to produce a smooth waveform.”³⁸⁶ Thus, despite the fact that the claim “would read on a general purpose computer programmed to carry out the claimed invention,”³⁸⁷ according to Judge Rich, “a computer, like a rasterizer, is apparatus not mathematics.”³⁸⁸ The test for preemption for the *Alappat* court was whether there was a “useful, concrete and tangible result.”³⁸⁹

Judge Archer delivered an extended dissent in which he relayed an abbreviated history of the development of the section 101 requirements. Ultimately, however, Judge Archer concluded that the claimed rasterizer “is simply the mathematical conversion of data”³⁹⁰ that “is not even limited to the environment of an oscilloscope.”³⁹¹ Judge Archer stated that the attempt by the majority to find physical application of a principle masked the true nature of the invention: “[A]s a whole, there is no ‘application’ apart from the mathematical operation that is asserted to be the invention or discovery. What is going on here is a charade.”³⁹² Judge Archer stated, in short: “As the player piano playing new music is not the stuff of patent law, neither is the mathematics that is *Alappat*’s ‘rasterizer.’”³⁹³

³⁸⁴ *Id.* at 1542.

³⁸⁵ *Id.* at 1544.

³⁸⁶ *Id.*

³⁸⁷ *Id.* at 1545.

³⁸⁸ *Id.*

³⁸⁹ *Id.* at 1544 (“This is not a disembodied mathematical concept which may be characterized as an ‘abstract idea,’ but rather a specific machine to produce a useful, concrete, and tangible result.”).

³⁹⁰ *Id.* at 1564 (Archer, J., dissenting).

³⁹¹ *Id.*

³⁹² *Id.* at 1563–64.

³⁹³ *Id.* at 1568. Particularly striking, in view of his reasoning in *Alappat*, is the fact that the following year Judge Archer, in *In re Beauregard*, 53 F.3d 1583 (Fed. Cir. 1995),

C. *Crashing the Palace*

1. State Street Bank and Beyond

Shortly before retiring from the bench, Judge Rich decided to follow *Alappat* rather than the *Freeman-Walter-Abele* test. In *State Street Bank & Trust v. Signature Financial Group*,³⁹⁴ he reversed and remanded a summary judgment by the United States District Court for the District of Massachusetts that held invalid a patent entitled “Data Processing System for Hub and Spoke Financial Services Configuration” under 35 U.S.C. § 101. As stated by Judge Rich, the claimed system “facilitates a structure whereby mutual funds (Spokes) pool their assets in an investment portfolio (Hub) organized as a partnership . . . [which] provides the administrator of a mutual fund with the advantageous combination of economies of scale in administering investments coupled with the tax advantages of a partnership.”³⁹⁵ In holding that the patent claims were directed to statutory subject matter, Judge Rich cautioned against reading limitations into section 101, such as “mathematical algorithm”³⁹⁶ and “business method”³⁹⁷ exceptions where “the legislative history indicates that Congress clearly did not intend such limitations.”³⁹⁸ He dismissed the test developed under *Freeman-Walter-Abele* as having “little, if any, applicability to determining the presence of statutory subject matter” following the decisions in *Diehr* and *Chakrabarty*.³⁹⁹ Instead, Judge Rich relied on *Alappat*, which distinguished a non-statutory “disembodied mathematical concept which may be characterized as an ‘abstract idea,’”⁴⁰⁰ from a statutory “specific machine to

issued an order vacating a decision by the Board rejecting computer-product claims because the Commissioner of the U.S.P.T.O. conceded “that computer programs embodied in a tangible medium, such as floppy diskettes, are patentable subject matter under 35 U.S.C. § 101 and must be examined under 35 U.S.C. §§ 102 and 103.” *See id.* at 1584.

³⁹⁴ *State St. Bank & Trust v. Signature Fin. Grp.*, 149 F.3d 1368, 1370 (Fed. Cir. 1998), *cert. denied*, 525 U.S. 1093 (1999).

³⁹⁵ *Id.* at 1370.

³⁹⁶ *Id.* at 1372.

³⁹⁷ *Id.*

³⁹⁸ *Id.* at 1373.

³⁹⁹ *See id.* at 1374.

⁴⁰⁰ *See In re Alappat*, 33 F.3d 1526, 1544 (Fed. Cir. 1994) (en banc).

produce a useful, concrete and tangible result.”⁴⁰¹ For Judge Rich, the claimed system of managing mutual funds fell squarely within the latter category:

Today, we hold that the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces “a useful, concrete and tangible result”—a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities in subsequent trades.⁴⁰²

Exclusion from section 101 as a “business method” exception also was dismissed by Judge Rich as having “never been invoked by this court, or the CCPA, to deem an invention unpatentable.”⁴⁰³

As he had stated in several previous decisions, Judge Rich believed that enumeration of subject matter of a claim under any particular category within section 101 was not of great significance, “as long as it falls within at least one of the four enumerated categories of patentable subject matter.”⁴⁰⁴ For Judge Rich, then, “[u]npatentable mathematical algorithms are identifiable by showing they are merely abstract ideas constituting disembodied concepts or truths that are not ‘useful.’ From a practical standpoint, this means that to be patentable an algorithm must be applied in a ‘useful’ way.”⁴⁰⁵

Judge Rich did not explain, however, how the “final share of price momentarily fixed for recording and reporting purposes” constituted “concrete,” “tangible” or “useful” results, nor did he provide any limitation on patentable subject matter other than the broad categories listed in section 101. Under Judge Rich’s interpretation, which essentially disregards all judicial

⁴⁰¹ *See id.*

⁴⁰² *State St. Bank*, 149 F.3d at 1373 (quoting *Alappat*, 33 F.3d at 1544).

⁴⁰³ *Id.* at 1375.

⁴⁰⁴ *Id.* at 1372.

⁴⁰⁵ *Id.* at 1373.

interpretation of statutes governing the scope of statutory subject matter since the Patent Act of 1793 other than the prohibition against grant of exclusive rights to naturally occurring principles per se, the breadth of potentially patentable subject matter is almost boundless. For example, without being tethered by some physical application of naturally occurring principle, to grant exclusive rights to “anything under the sun that is made by man”⁴⁰⁶ explodes all previous categorizations—such as printed matter, mental steps, or anything else that might be viewed as man’s handiwork—so long as it could be considered “useful” in some sense.⁴⁰⁷ Examples of such areas might well include not only so-called “methods of doing business,” but other fields not previously viewed as within the scope of patent protection: forms of government, religion, morality, ethics, art, and so on. In sum, any form of human expression or control could be classified as a machine or process under 35 U.S.C. § 101. After *State Street Bank*, decisions regarding the scope of statutory eligibility became more frequent and increasingly erratic.

Justice Breyer, for example, along with Justices Stevens and Souter, in dissent from dismissal of a writ of certiorari of an appeal from the Federal Circuit in *Laboratory Corp. of America v. Metabolite Laboratories, Inc.*,⁴⁰⁸ stated that a claimed method for detecting a deficiency of cobalamin or folate in warm-blooded animals fell outside of § 101 because, by requiring that one practicing a method need only “(1) obtain test results and (2) think about them,”⁴⁰⁹ the claim constituted an “improper effort to obtain patent protection for a law of nature.”⁴¹⁰ Justice Breyer did not consider the “useful, concrete and tangible result” test of *State Street* to be controlling, both because it had never been invoked by the Supreme Court and because “if taken literally, the statement

⁴⁰⁶ See S. REP. NO. 82-1979, at 2399 (1952); see also *Diamond v. Chakrabarty*, 447 U.S. 303, 309 n.6 (1981) (quoting *Hearings on H.R. 3760 Before Subcomm. No. 3 of the H. Comm. on the Judiciary*, 82d Cong. 37 (1951)).

⁴⁰⁷ See *supra* text accompanying note 73–83 (regarding notions of “usefulness” as understood at the time the Constitution was written).

⁴⁰⁸ *Lab. Corp. of America v. Metabolite Labs., Inc.*, 548 U.S. 124 (2006).

⁴⁰⁹ *Id.* at 136 (Breyer, J., dissenting).

⁴¹⁰ *Id.* at 131.

would cover instances where this Court has held the contrary,”⁴¹¹ such as the “use of electromagnetic current for transmitting messages over long distances” in *Morse*,⁴¹² “triggering alarm limits in connection with catalytic conversion” in *Flook*,⁴¹³ and transforming, “for computer-programming purposes, decimal figures into binary figures” in *Gottschalk v. Benson*,⁴¹⁴ despite their apparent utility.⁴¹⁵

The Federal Circuit in *In re Petrus A.C.M. Nuijten*⁴¹⁶ held that a claim to a “signal” for embedding “watermarks” into electronic files such as digital audio files was not statutory subject matter under 35 U.S.C. § 101 because it did not fall within any of the four enumerated statutory categories listed—i.e., “process, machine, manufacture, or composition of matter.”⁴¹⁷ In essence, the court held that signals are not “an act or series of acts” and, therefore, not a “process”⁴¹⁸ and not a “composition of matter” because a “signal [comprises] a fluctuation in electrical potential or in electromagnetic fields” and, therefore, “is not a ‘chemical union’ nor a gas, fluid, powder, or solid.”⁴¹⁹ Further, although signals are physical, they are “transitory embodiments”⁴²⁰ and, consequently, not a “machine”⁴²¹ or a “manufacture”⁴²² under 35 U.S.C. § 101.

⁴¹¹ *Id.* at 136.

⁴¹² *See supra* text accompanying notes 203–19.

⁴¹³ *See supra* text accompanying notes 297–308.

⁴¹⁴ *See supra* text accompanying notes 284–92.

⁴¹⁵ *See Lab Corp.*, 548 U.S. at 136–37.

⁴¹⁶ *In re Petrus A.C.M. Nuijten*, 500 F.3d 1346 (Fed. Cir. 2007).

⁴¹⁷ *See id.* at 1357.

⁴¹⁸ *See id.* at 1355.

⁴¹⁹ *See id.* at 1357.

⁴²⁰ *See id.* at 1353.

⁴²¹ *See id.* at 1355.

The Supreme Court has defined the term ‘machine’ as a ‘concrete thing, consisting of parts, or of certain devices and combination of devices.’ *Burr v. Duryee*, 68 U.S. (1 Wall.) 531, 570 (1863). . . . A transitory signal made of electrical or electromagnetic variances is not made of ‘parts’ or ‘devices’ in any mechanical sense. While such a signal is physical and real, it does not possess concrete structure in the sense implied by these definitions.

Id.

⁴²² *See id.* at 1356 (“These definitions address ‘articles’ of ‘manufacture’ as being tangible articles or commodities. A transient electric or electromagnetic transmission does not fit within that definition.”).

Acting en banc in *In re Comisky*,⁴²³ the Federal Circuit held as ineligible for patent protection claims directed to a method and system for mandatory arbitration involving legal documents if they “depend entirely on the use of mental processes.”⁴²⁴ The court reasoned that “it is established that the application of human intelligence to the solution of practical problems is not in and of itself patentable.”⁴²⁵ Claims that recited “under the broadest reasonable interpretation . . . use of a machine”—such as a “registration module,” “arbitration module,” an “arbitration resolution module,” or access to “the Internet, intranet, World Wide Web, software applications, telephone, television, cable video [or radio], magnetic, electronic communication, or other communication means”—were remanded to the Patent Office for consideration under 35 U.S.C. § 101.⁴²⁶

The Federal Circuit in *Prometheus Laboratories, Inc. v. Mayo Collaborative Services (Prometheus I)*⁴²⁷ upheld as statutory subject matter methods of optimizing “therapeutic efficacy for treatment of an immune-mediated gastrointestinal disorder.”⁴²⁸ At issue in *Prometheus* were claimed diagnostic tests for determining whether subsequent administration of either of two drugs—namely, 6-mercaptopurine (6-MP) or a prodrug for 6-MP, azathiopurine—employed to treat inflammatory bowel diseases such as Crohn’s Disease and ulcerative colitis should be increased or decreased.⁴²⁹ Independent claims included the method steps of administering a drug providing 6-thioguanine to a subject having immune-mediated gastrointestinal disorder, followed by determining the level of 6-thioguanine or 6-MP, both of which were metabolites of the therapeutic drugs, to determine if subsequent doses of those drugs should be increased or decreased.⁴³⁰ One independent claim included only the step of

⁴²³ *In re Comisky*, 554 F.3d 967 (Fed. Cir. 2009) (en banc).

⁴²⁴ *See id.* at 980.

⁴²⁵ *Id.*

⁴²⁶ *See id.* at 981.

⁴²⁷ *Prometheus Labs., Inc. v. Mayo Collaborative Servs.(Prometheus I)* 581 F.3d 1336 (Fed. Cir. 2009), *vacated*, 130 S. Ct. 3543 (2010).

⁴²⁸ *Id.* at 1340.

⁴²⁹ *See id.* at 1339.

⁴³⁰ *See id.*

determining the level of metabolites in a subject to which the drug had been administered.⁴³¹ Since the drugs and their utility were known, the claimed novelty lay in the criteria provided in the claim for determining whether subsequent doses should be increased or decreased.⁴³²

Referring to its own decision in *Bilski*,⁴³³ as well as the Supreme Court decision in *Diehr*, the Federal Circuit in *Prometheus I* stated on appeal:

[I]t has . . . been established that “while a claim drawn to a fundamental principle”—i.e., a law of nature, natural phenomenon, or abstract idea—“is unpatentable, ‘an *application* of law or mathematical formula to a known structure or process may well be deserving of patent prosecution.’”⁴³⁴

The Court further stated that the “key issue for patentability, then, at least on the present facts, is whether a claim is drawn to a fundamental principle or an application of a fundamental principle.”⁴³⁵ The “machine-or-transformation” test articulated in *Bilski* “must be central to the purpose of the claimed process”⁴³⁶ as opposed to “insignificant extra-solution activity” or a “data-gathering step.”⁴³⁷

The court found transformation to inhere in the administration of the drugs to the patient according to the method of the claim⁴³⁸ and, independently, in the “determining step.”⁴³⁹ According to the court, “[s]ome form of manipulation, such as the high pressure liquid chromatography method specified in several of the asserted

⁴³¹ See U.S. Patent No. 6,355,623 col.23 l.41 (filed Apr. 8, 1999); see also *Prometheus Labs., Inc. v. Mayo Collaborative Servs. (Prometheus II)*, 628 F.3d 1347, 1350–51 (Fed. Cir. 2010), *rev'd*, 132 S. Ct. 1289 (2012).

⁴³² See *Prometheus I*, 581 F.3d at 1340.

⁴³³ *In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008), *aff'd*, *Bilski v. Kappos*, 130 S. Ct. 3218 (2010).

⁴³⁴ *Prometheus I*, 581 F.3d at 1342 (quoting *Bilski*, 545 F.3d at 953).

⁴³⁵ *Id.*

⁴³⁶ *Id.* at 1342–43 (quoting *Bilski*, 545 F.3d at 961–62).

⁴³⁷ *Id.* (quoting *Bilski*, 545 F.3d at 961–63).

⁴³⁸ See *id.* at 1346.

⁴³⁹ *Id.* at 1347.

dependent claims or other modification of the substances to be measured, is necessary to extract the metabolites from a bodily sample and determine their concentration.”⁴⁴⁰ The administration and determination step was found to be “central to the claims rather than merely insignificant extra-solution activity.”⁴⁴¹

The court distinguished Prometheus’ claimed therapeutic methods from those at issue in *In re Grams*⁴⁴² on the basis that the clinical tests conducted in *Grams* were not “transformative.”⁴⁴³ According to the Court in *Prometheus I*, *Grams* held unpatentable claims that included “(1) performing a clinical test on individuals and (2) based on the data from that test, determining if an abnormality existed and determining possible causes of any abnormality by using an algorithm.”⁴⁴⁴ The *Grams* process “was merely an algorithm combined with a data gathering step.”⁴⁴⁵ The Federal Circuit agreed with the district court that the final step in each of Prometheus’ claimed methods were mental steps and “thus not patent eligible per se,”⁴⁴⁶ but stated that the “addition of the mental steps to the claimed methods does not remove the prior two steps” from the realm of statutory subject matter.⁴⁴⁷ Applying the question posed by the *Grams* court—“what did the applicant invent?”⁴⁴⁸—to the facts in *Prometheus I*, the Federal Circuit stated that “the answer is a series of transformative steps that optimizes efficacy and reduces toxicity of a method of treatment for particular diseases using particular drugs.”⁴⁴⁹ The court was careful to assert, however, that “it is improper to consider whether

⁴⁴⁰ *Id.*

⁴⁴¹ *Id.* (“Mayo is correct that not all of the asserted claims contain the administering step. That omission, which occurs in claims 46 and 53 of the ’623 patent, does not diminish the patentability of the claimed methods because the determining step, which is present in each of the asserted claims is also transformative and central to the claimed methods.”).

⁴⁴² *In re Grams*, 888 F.2d 835 (Fed. Cir. 1989); *see supra* text accompanying notes 371–74.

⁴⁴³ *See Prometheus I*, 581 F.3d at 1347.

⁴⁴⁴ *Id.* at 1348.

⁴⁴⁵ *Id.* (quoting *Grams*, 888 F.2d at 840).

⁴⁴⁶ *See id.*

⁴⁴⁷ *See id.*

⁴⁴⁸ *Id.* at 1349 (quoting *Grams*, 888 F.2d at 839).

⁴⁴⁹ *Id.* at 1349.

a claimed element or step in a process is novel or non-obvious, since such considerations are separate requirements set forth in 35 U.S.C. §§ 102 and 103, respectively.”⁴⁵⁰

2. *Bilski v. Kappos*: “Restoring . . . [an] . . . Historical State of Rest”⁴⁵¹

In *Bilski v. Kappos*,⁴⁵² the Supreme Court upheld decisions of the United States Patent and Trademark Office⁴⁵³ and United States Court of Appeals for the Federal Circuit⁴⁵⁴ that the claimed subject matter of U.S. Patent Application No. 08/833,892, entitled “Energy Risk Management Method,” filed April 10, 1997, was not eligible for protection under 35 U.S.C. § 101.⁴⁵⁵ The application included eleven claims directed to a “method for managing the consumption of risk costs of a commodity sold by a commodity provider at a fixed price.”⁴⁵⁶

⁴⁵⁰ *Id.* at 1343.

⁴⁵¹ *Bilski v. Kappos*, 130 S. Ct. 3218, 3235 (2010) (Stevens, J., concurring) (“[T]he opinion for the Court explains—correctly—that the Court is merely restoring the law to its historical state of rest.”) (citing *Bilski*, 130 S. Ct. at 3227).

⁴⁵² *Id.* at 3218.

⁴⁵³ *Ex parte Bilski*, No. 2002-2257, 2006 WL 5738364 (B.P.A.I. Sept. 26, 2006).

⁴⁵⁴ *In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008).

⁴⁵⁵ *Bilski v. Kappos*, 130 S. Ct. 3213, 3231 (2010).

⁴⁵⁶ Claim 1 is representative and reads:

1. A method for managing the consumption risk costs of a commodity sold by a commodity provider at a fixed price comprising the steps of:

(a) initiating a series of transactions between said commodity provider and consumers of said commodity wherein said consumers purchase said commodity at a fixed rate based upon historical averages, said fixed rate corresponding to a risk position of said consumer;

(b) identifying market participants for said commodity having a counter-risk position to said consumers; and

(c) initiating a series of transactions between said commodity provider and said market participants at a second fixed rate such that said series of market participant transactions balances the risk position of said series of consumer transactions.

Petition for a Writ of Certiorari at 7, *Bilski v. Kappos*, 130 S. Ct. 3218 (2010) (No. 08-964). Claim 4, the only other independent claim, applied the same concept more specifically to a “method for managing weather related energy price risk costs by an energy provider at a fixed price,” and applies a specific mathematic formula. *See id.* at 7–8.

The questions presented on appeal to the Supreme Court were: (1) “[w]hether the Federal Circuit erred by holding that a ‘process’ must be tied to a particular machine or apparatus, or transform a particular article into a different state or thing (‘machine-or-transformation’ test), to be eligible for patenting under 35 U.S.C. § 101;” and (2) “[w]hether the Federal Circuit’s ‘machine-or-transformation’ test for patent eligibility . . . contradicts the clear Congressional intent that patents protect ‘method[s] of doing or conducting business.’”⁴⁵⁷

With respect to the first question, the Court held that the Federal Circuit did err by holding that a “process” must be tied to a particular machine or apparatus, or transform a particular article into a different state or thing to be eligible for patenting under 35 U.S.C. § 101.⁴⁵⁸ Without directly answering the second question presented on appeal, the Court further stated that, “[i]n the course of applying a machine-or-transformation test to emerging technologies, courts may pose questions of such intricacy and refinement that they risk obscuring the larger object of securing patents for valuable inventions without transgressing the public domain.”⁴⁵⁹ Moreover, the Court did not preclude application of the machine-or-transformation test to any statutory category of subject matter under 35 U.S.C. § 101, but did state that articulation in 35 U.S.C. § 273(a)(3) of a “method of doing or conducting

⁴⁵⁷ The complete questions as they appear in the Petition for a Writ of Certiorari are as follows:

Whether the Federal Circuit erred by holding that a “process” must be tied to a particular machine or apparatus, or transform a particular article into a different state or thing (“machine-or-transformation” test), to be eligible for patenting under 35 U.S.C. § 101, despite this Court’s precedent declining to limit the broad statutory grant of patent eligibility for “any” new and useful process beyond excluding patents for “laws of nature, physical phenomena, and abstract ideas.”

Whether the Federal Circuit’s “machine-or-transformation” test for patent eligibility, which effectively forecloses meaningful patent protection to many business methods, contradicts the clear Congressional intent that patents protect “method(s) of doing or conducting business.”

Id. at i (citing 35 U.S.C. § 273 (2006)).

⁴⁵⁸ *Bilski*, 130 S. Ct. at 3227 (“The machine-or-transformation test is not the sole test for deciding whether an invention is a patent-eligible ‘process.’”).

⁴⁵⁹ *Id.*

business,”⁴⁶⁰ means that, “at least in some circumstances,”⁴⁶¹ business methods are eligible for patenting under 35 U.S.C. § 101, although “it does not suggest broad patentability of such claimed inventions.”⁴⁶²

Relying on the Supreme Court precedent⁴⁶³ excepting “laws of nature, physical phenomena, and abstract ideas”⁴⁶⁴ from patent eligibility under 35 U.S.C. § 101, the Court held that the “concept of hedging described in claim 1 and reduced to a mathematical formula in claim 4, is an unpatentable abstract idea”⁴⁶⁵ and, therefore, ineligible under 35 U.S.C. § 101.⁴⁶⁶ According to the Court, “[a]llowing petitioner to patent risk hedging would preempt use of this approach in all fields, and would effectively grant a monopoly over an abstract idea.”⁴⁶⁷ Having excluded the Federal Circuit’s use of the “machine-or-transformation” test as the sole criteria for patent eligibility, the Court nevertheless was careful to state that “nothing in today’s opinion should be read as endorsing interpretations of § 101 that the Court of Appeals for the Federal Circuit has used in the past,”⁴⁶⁸ and that the Court “by no means foreclose[s] the Federal Circuit’s development of other limiting criteria that further the purposes of the Patent Act and are not inconsistent with its text.”⁴⁶⁹

Justice Stevens, in his last opinion before retiring from the bench, concurred in the result, but was sharply critical of the reasoning employed by the majority. For him, the Court’s opinion was “less than pellucid in more than one respect, and, if misunderstood, could result in confusion or upset settled areas of the law.”⁴⁷⁰ Specifically, Justice Stevens disagreed with the

⁴⁶⁰ See 35 U.S.C. § 273(a)(3) (“[T]he term ‘method’ means a method of doing or conducting business.”).

⁴⁶¹ *Bilski*, 130 S. Ct. at 3228.

⁴⁶² *Id.* at 3229.

⁴⁶³ *See id.*

⁴⁶⁴ *Id.* at 3225.

⁴⁶⁵ *Id.* at 3231.

⁴⁶⁶ *See id.* (“In light of these precedents, it is clear that petitioner’s application is not a patentable ‘process.’”).

⁴⁶⁷ *Id.*

⁴⁶⁸ *Id.*

⁴⁶⁹ *Id.*

⁴⁷⁰ *See id.* at 3234 (Stevens, J., concurring).

Court's reliance on 35 U.S.C. § 100(b) for a definition of "process,"⁴⁷¹ which he characterized as "somewhat circular."⁴⁷² A logical consequence of the Court's reliance on the statutory definition, in Justice Stevens' thinking, would be to consider patentable "any series of steps or any way to do any thing," which the 1952 Patent Act was "neither intended nor understood to encompass."⁴⁷³ Prohibiting abstract ideas, laws of nature "and the like,"⁴⁷⁴ was not, for Justice Stevens, an adequate bulwark against many processes that would be eligible for patent prosecution, such as a "process for training a dog, a series of dance steps, a method of shooting a basketball, maybe even words, stories or songs, framed as the steps of typing letters or uttering sounds."⁴⁷⁵

Justice Stevens further criticized the majority for imputing from the definition of process that the American Inventors Protection Act "acknowledges that there may be business method patents."⁴⁷⁶ Rather, Stevens asserted that the "1999 Act was passed to limit the impact of the Federal Circuit's then-recent statements on the 1952 Act,"⁴⁷⁷ referring to Judge Rich's comments, in dicta, in *State Street Bank*.⁴⁷⁸ The paradoxical effect of the majority's reasoning, according to Stevens, is that, "[i]f, tomorrow, Congress were to conclude that patents on business methods are *so important* that the special infringement defense in § 273 ought to be abolished . . . [this would] strengthen the case *against* such patents because there would no longer be a § 273 that 'acknowledges . . . business method patents.'⁴⁷⁹ With respect to the "sole issue presented to us,"⁴⁸⁰ Justice Stevens stated that, in

⁴⁷¹ See 35 U.S.C. § 100 ("When used in this title unless the context otherwise indicates . . . [t]he term 'process' means process, art, or method, and includes a new use of a known process, machine, manufacturer, composition of matter, or material").

⁴⁷² See *Bilski*, 130 S. Ct. at 3237 (Stevens, J., concurring).

⁴⁷³ *Id.*

⁴⁷⁴ *Id.* at 3238 n.5 (Stevens, J., concurring).

⁴⁷⁵ *Id.* at 3238. (Stevens, J., concurring).

⁴⁷⁶ *Id.* at 3251 (Stevens, J., concurring) (quoting majority opinion).

⁴⁷⁷ *Id.*

⁴⁷⁸ *State St. Bank & Trust Co., v. Signature Fin. Grp.* 149 F.3d 1368, 1375 (Fed. Cir. 1999) ("The business method exception has never been invoked by this court, or the C.C.P.A., to deem an invention unpatentable.").

⁴⁷⁹ *Bilski*, 130 S. Ct at 3252 (Stevens, J., concurring).

⁴⁸⁰ *Id.* at 3235.

striking down the machine-or-transformation test as the sole criterion for patent eligibility, “the Court is merely restoring the law to its historical state of rest,”⁴⁸¹ and “that the machine-or-transformation test remains an important test for patentability.”⁴⁸²

Justice Stevens also was critical of the Court’s failure to provide “a satisfying account of what constitutes an unpatentable abstract idea”⁴⁸³ and, as a consequence, despite a “correct outcome,”⁴⁸⁴ concluded that the “court’s musings on this issue stand for very little.”⁴⁸⁵ He stated that, in view of the history of the development of British and American patent law, and the “constitutionally mandated purpose and function of the patent laws,”⁴⁸⁶ despite the fact that business methods might be “useful for encouraging innovation and disclosure, it would still be questionable whether they would, on balance, facilitate or impede the progress of American business.”⁴⁸⁷ Acknowledging that methods of doing business are ineligible for patent protection under section 101 would, according to Justice Stevens, “be a far more sensible and restrained way to resolve”⁴⁸⁸ the issues presented in *Bilski*. Justice Stevens concluded by stating that, “while I confirm the judgment, I strongly disagree with the court’s disposition of this case.”⁴⁸⁹ Justices Breyer and Scalia concurred with Justice Stevens’ opinion “in full” in a separate opinion.⁴⁹⁰

3. The “Historical State of Rest” Since *Bilski*

Cases decided since the Supreme Court’s decision in *Bilski* seem minimally affected by the outcome in *Bilski*. The first such case, *Prometheus Laboratories, Inc. v. Mayo Collaborative*

⁴⁸¹ *Id.*

⁴⁸² *Id.*

⁴⁸³ *Id.* at 3236

⁴⁸⁴ *Id.*

⁴⁸⁵ *See id.*

⁴⁸⁶ *Id.* at 3252.

⁴⁸⁷ *Id.* at 3255.

⁴⁸⁸ *Id.* at 3257.

⁴⁸⁹ *Id.*

⁴⁹⁰ *Id.* at 3257–58 (Breyer, J., concurring) (“This Court has never before held that so-called ‘business methods’ are patentable, and, in my view, the test, history, and purpose of the Patent Act make clear that they are not. I would therefore decide this case on that ground, and I join Justice Stevens’ opinion in full.”).

Servives (Prometheus II),⁴⁹¹ was decided by the Federal Circuit on remand from the Supreme Court for consideration in light of *Bilski*. As discussed above,⁴⁹² prior to remand, the Federal Circuit in *Prometheus I* had applied the “machine-or-transformation test,” which was considered at the time to be the “definitive test”⁴⁹³ for determining whether a process is patentable subject matter under 35 U.S.C. § 101, and held that both the “administering”⁴⁹⁴ and “determining”⁴⁹⁵ steps in the claimed diagnostic method of *Prometheus* were transformative. As a consequence, the Federal Circuit reversed⁴⁹⁶ the district court’s decision, which held the claims to be invalid under 35 U.S.C. § 101 as wholly preempting use of the “natural phenomena” of “correlations between, on the one hand, thiopurine drug metabolite levels and, on the other hand, efficacy and toxicity.”⁴⁹⁷

On remand, the Federal Circuit in *Prometheus II* acknowledged the Supreme Court’s refusal in *Bilski* to adopt the “machine-or-transformation test” as the sole test for determining patent eligibility and quoted the Court’s assertion that “while a law of nature, natural phenomenon, or abstract idea cannot be patented, ‘an *application* of a law of nature or mathematical formula to a

⁴⁹¹ *Prometheus II*, 628 F.3d 1347 (Fed. Cir. 2010).

⁴⁹² See *supra* text accompanying notes 433–50.

⁴⁹³ See *Prometheus I*, 581 F.3d 1336, 1342 (Fed. Cir. 2009), *vacated*, 130 S. Ct. 3543 (2010). The court stated:

The key issue for patentability, then, at least on the present facts, is whether a claim is drawn to a fundamental principle or an application of a fundamental principle. Although this inquiring is hardly straightforward, following the Supreme Court, we articulated in *Bilski* a “definitive test” for determining whether a process is patent-eligible under § 101: “A claimed process is surely patent eligible under § 101 if: (1) it is tied to a particular machine or apparatus, or (2) it transforms a particular article into a different state or thing.”

Id. (quoting *In re Bilski*, 545 F.3d 943, 954 (Fed. Cir. 2008)).

⁴⁹⁴ See *Prometheus I*, 581 F.3d at 1346 (quoting *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972)) (“The administering step, therefore, is not merely data-gathering but a significant transformative element of *Prometheus*’s claimed methods of treatment that is ‘sufficiently definite to confine the patent monopoly.’”).

⁴⁹⁵ See *id.* at 1347 (“The determining step, by working a chemical and physical transformation on physical substances, likewise sufficiently confines the patent monopoly, as required by *Bilski*.”).

⁴⁹⁶ *Prometheus II*, 628 F.3d at 1350.

⁴⁹⁷ *Prometheus I*, 581 F.3d at 1341.

known structure or process may well be deserving of patent protection.”⁴⁹⁸ The Federal Circuit also highlighted the Supreme Court’s statement in *Diehr* that it is “inappropriate to dissect the claims into old and new elements and then to ignore the presence of the old elements in the analysis,”⁴⁹⁹ while concluding that “[n]onetheless, a scientific principle cannot be made patentable by limiting its use to a particular technological environment or by adding insignificant post-solution activity.”⁵⁰⁰

Applying these principles to the claimed methods of “optimizing therapeutic efficacy,” the court stated that “Prometheus’ asserted method claims recite a patent-eligible application of naturally occurring correlations between metabolite levels and efficacy or toxicity,”⁵⁰¹ because “the steps involve a particular application of the natural correlations: the treatment of a specific disease by administering specific drugs and measuring specific metabolites.”⁵⁰² According to the court, “[t]he inventive nature of the claimed methods stems not from preemption of all use of these natural processes, but from the application of a natural phenomenon in a series of steps comprising particular methods of treatment.”⁵⁰³ Again applying the machine-or-transformation test, the court stated that the “asserted claims are in effect claims to methods of treatment, which are always transformative when one of a defined group of drugs is administered to the body to eliminate the effects of an undesired condition.”⁵⁰⁴ The court then found that both the administering and determining steps included transformations, specifically metabolization of the administered drugs after administration and “manipulation, such as the high pressure liquid chromatography method specified in several of the asserted dependent claims or some other modification of the substances to be measured,”⁵⁰⁵ that were required to determine

⁴⁹⁸ *Prometheus II*, 628 F.3d at 1354 (quoting *Bilski v. Kappos*, 130 S. Ct. 3218, 3230 (2010)).

⁴⁹⁹ *Diamond v. Diehr*, 450 U.S. 175, 188 (1981).

⁵⁰⁰ *Prometheus II*, 628 F.3d at 1354.

⁵⁰¹ *Id.* at 1355.

⁵⁰² *Id.*

⁵⁰³ *Id.*

⁵⁰⁴ *Id.* at 1356.

⁵⁰⁵ *Id.* at 1357.

levels of the metabolites formed. In both cases, according to the court, the transformations were “central to the purpose of the claims,”⁵⁰⁶ as prescribed by *Bilski*. As before, the court contrasted the claimed subject matter with that of *Grams* in that the methods of *Prometheus* were more than “‘merely’ data-gathering steps” associated with “‘insignificant extra-solution activity.’”⁵⁰⁷

In other words, in order to find statutory subject matter in *Prometheus*’ claims, the court was forced to distinguish *Grams*’ “data-gathering steps” from *Prometheus*’ “purpose of treating disease” and “purpose of assessing the drug’s dosage during the course of treatment.”⁵⁰⁸ However, characterizing claimed subject matter as patent eligible or not on the basis of the purpose associated with the claimed invention reduces any such analysis to a matter of semantics; any act, such as collection of data, can arbitrarily be ascribed to a higher purpose.

Viewed from the standpoint of physical application of naturally-occurring principle, on the other hand, the subject matter of both *Prometheus* and *Grams* would meet the statutory criteria of eligibility under 35 U.S.C. § 101, but neither might pass the requirement of novelty under 35 U.S.C. § 102, regardless of whether the testing and determination steps could be held to be part of *Prometheus*’ “treatment protocol”⁵⁰⁹ or “‘merely an algorithm combined with a data-gathering step,’” as ascribed to *Grams*.⁵¹⁰ Diagnostic testing, such as was claimed as application of principle in both *Prometheus*⁵¹¹ and *Grams*,⁵¹² would have to include some physical application of principle in order to qualify as statutory subject matter, and that physical application would have to be new in order to meet the novelty requirement.

More generally, diagnostic testing is based on some discovered correlation between a test result and a physiological condition, and the value of the test is in the ability to isolate a subpopulation

⁵⁰⁶ *Id.*

⁵⁰⁷ *See id.* at 1358.

⁵⁰⁸ *Id.* at 1357.

⁵⁰⁹ *Id.*

⁵¹⁰ *Id.* at 1358.

⁵¹¹ *See, e.g., Prometheus II*, 628 F.3d 1347, 1350 (Fed. Cir. 2010).

⁵¹² *See In re Grams*, 888 F.2d 835, 836 (Fed. Cir. 1989).

likely to have the physiological condition identified by the claimed diagnostic method. Diagnostic methods, therefore, quite clearly qualify as statutory subject matter under 35 U.S.C. § 101 and, further, will at least meet the statutory requirement of novelty if the claimed method includes a novel physical step. For example, the claimed diagnostic testing in *Metabolite*, discussed above,⁵¹³ included a physical manifestation of naturally-occurring principle, namely, that of testing for an amount of total homocysteine.⁵¹⁴ The novelty associated with this claimed method was the selection of a subpopulation on whom the test was to be conducted. The new application of the principle was testing of a subpopulation of individuals for whom elevated levels of total homocysteine could generally be correlated with a deficiency of cobalamin or folate, as discussed by the inventors.⁵¹⁵ Conversely, the mere act of drawing new conclusions from available information would not represent a physical application of naturally-occurring principle, even if new, nor would new conclusions drawn from ubiquitous testing constitute a novel method, even if the testing done was, in fact, a physical application of naturally-occurring principle, as in *Grams*, or even *Prometheus*.

The Federal Circuit took a comparatively broad view of statutory qualification of claimed subject matter in *Research Corp. Technologies v. Microsoft Corp.*⁵¹⁶ The claims of the patent at issue were directed to methods and machines for imaging that utilized half-toning masks “designed to produce visually pleasing dot profiles when thresholded at a number of levels and a comparator responsive to [a] computer readable memory device.”⁵¹⁷ The court reversed the district court’s holding that the claims were invalid under 35 U.S.C. § 101 and appeared to accept the Supreme Court’s invitation in *Bilski* to develop “other limiting criteria that further the purposes of the Patent Act and are not inconsistent with its text”⁵¹⁸ to determine the eligibility of claimed

⁵¹³ See *supra* text accompanying notes 408–15.

⁵¹⁴ See *Lab. Corp. of America v. Metabolite Labs., Inc.* 548 U.S. 124, 125 (2006) (Breyer, J., dissenting).

⁵¹⁵ See *id.* at 128.

⁵¹⁶ *Research Corp. Techs. v. Microsoft Corp.*, 627 F.3d 859 (Fed. Cir. 2010).

⁵¹⁷ *Id.* at 866.

⁵¹⁸ *Bilski v. Kappos*, 130 S.Ct. 3218, 3231 (2010).

subject matter under 35 U.S.C. § 101. Considering the three exceptions to eligibility—laws of nature, physical phenomena and abstract principle—neither the inventors nor the court understood the claimed process or machine for half-tone imaging to preempt either laws of nature or physical phenomena.⁵¹⁹

As to whether the claimed subject matter amounted to nothing more than an abstract idea, the court stated that it would “not presume to define ‘abstract’ beyond the recognition that this disqualifying characteristic should exhibit itself so manifestly as to override the broad statutory categories of eligible subject matter and the statutory context that directs primary attention on the patentability criteria of the rest of the Patent Act.”⁵²⁰ The court viewed the claimed pixel-by-pixel comparison of a digital image against a blue noise mask of the invention to be “functional and palpable applications in the field of computer technology”⁵²¹ that “are not likely to be so abstract that they would override the statutory language and framework of the Patent Act.”⁵²²

As in *Prometheus II*, where the court held that the claimed process was “not ‘merely’ data-gathering steps or ‘insignificant extra-solution activity,’ [but rather] part of treatment regimes for various diseases using thiopurine drugs,”⁵²³ the court relied on *Diehr* to resolve the issue of eligibility by selectively characterizing the claimed invention: “Borrowing from the reasoning of the Supreme Court in *Diehr*, this court observes that the patentees here ‘do not seek to patent a mathematical formula. Instead, they seek patent protection for a process of’ halftoning in computer applications.”⁵²⁴ Correctly, the Federal Circuit also indicated that, despite qualifying under 35 U.S.C. § 101, the claimed subject matter might not meet the requirements of other

⁵¹⁹ See *Research Corp.*, 627 F.3d at 869 (“Accordingly, this court reverses the district court’s summary judgment that the ’310 and ’228 patents do not claim patent-eligible inventions.”).

⁵²⁰ *Id.* at 868.

⁵²¹ *Id.*

⁵²² *Id.* at 869.

⁵²³ *Prometheus II*, 628 F.3d 1347, 1358 (Fed. Cir. 2010).

⁵²⁴ *Research Corp.*, 627 F.3d at 869 (quoting *Diamond v. Diehr*, 450 U.S. 175, 187 (1981)).

sections of the patent statute.⁵²⁵ Here, the court stated that although a claimed process may “pass the coarse eligibility filter,” it might still be indefinite or lack an enabling description under 35 U.S.C. § 112.⁵²⁶

The central issue in all questions of patent eligibility is how to discern impermissible claims to laws of nature, physical phenomena and abstract ideas from eligible subject matter, since almost any claimed subject matter can be characterized as eligible or not, depending upon the limits of the context applied by the court. For example, in *Research Corp. Technologies*, the claimed invention did nothing more than manipulate data to present an improved image, similar to the “rasterizer” for smoothing a wave form displayed on an oscilloscope in *Alappat*,⁵²⁷ and therefore appeared to reflect the “charade” complained of by Judge Archer in his dissenting opinion in that case.⁵²⁸ Despite the court’s acknowledgment that “[s]ection 101 does not permit a court to reject subject matter categorically because it finds that a claim is not worthy of a patent,”⁵²⁹ by linking “*specific* applications or improvements to technologies in the marketplace”⁵³⁰ to newly-derived judicial tests, such as whether claims are “likely to be so abstract that they override the statutory language and framework of the Patent Act” (as was done by the court in *Research Corp. Technologies*),⁵³¹ doctrinal analysis of patent eligibility is brought just that much closer to the dangers of unpredictability that attend broad contextual characterizations.

In another example, the Federal Circuit affirmed a determination of invalidity of claims directed to a “method and system for detecting fraud in a credit card transaction between [a] consumer and a merchant over the Internet” in *CyberSource Corp. v. Retail Decisions, Inc.*,⁵³² because “one could mentally perform

⁵²⁵ *See id.*

⁵²⁶ *See id.*

⁵²⁷ *In re Alappat*, 33 F.3d 1526 (Fed. Cir. 1994).

⁵²⁸ *See id.* at 1564 (Archer, J., dissenting).

⁵²⁹ *Research Corp.*, 627 F.3d at 868.

⁵³⁰ *Id.* at 869 (emphasis added).

⁵³¹ *Id.*

⁵³² *See CyberSource Corp. v. Retail Decisions Inc.*, 654 F.3d 1366, 1376 (Fed. Cir. 2011).

the fraud detection method.”⁵³³ With respect to the “so-called ‘Beauregard claim’” format of a “computer readable medium containing program instructions,” the court stated that CyberSource had not “met its burden to demonstrate that [the claim] is ‘truly drawn to a *specific*’ computer readable medium, rather than to the underlying method of credit card fraud detection.”⁵³⁴ The court did not elaborate on how CyberSource could establish that the claimed subject matter is “‘truly drawn to a *specific*’ computer readable medium,” other than to say that “mere manipulation or reorganization of data . . . does not satisfy the transformation prong”⁵³⁵ and “merely claiming a software implementation of a purely mental process that could otherwise be performed without the use of a computer does not satisfy the machine prong of the machine-or-transformation test.”⁵³⁶

Indeed, despite the Supreme Court’s confirmation in *Bilski* that “an application of a law of nature or mathematical formula to a known structure or process may well be deserving of patent protection,”⁵³⁷ it becomes impossible for courts to identify which applications are not “made patentable by limiting its use to a particular technological environment or by adding insignificant post-solution activity,”⁵³⁸ as the *Prometheus II* court stated, and those that are “not so manifestly abstract as to override the statutory language of § 101” as in *Research Corp. Technologies*.⁵³⁹ Moreover, if courts remain without a clear understanding of the types of principles historically embraced by the statutory applications of “art” or “process,” “machine, manufacture, or composition of matter, or any new or useful improvement thereof,” the “wide scope,” contemplated by Congress—and recited in

⁵³³ *Id.*

⁵³⁴ *Id.* at 1374–75 (emphasis added).

⁵³⁵ *Id.* at 1375.

⁵³⁶ *Id.*

⁵³⁷ *Bilski v. Kappos*, 130 S.Ct. 3218, 3230 (2010) (quoting *Diamond v. Diehr*, 450 U.S. 175, 187 (1981)).

⁵³⁸ *Prometheus II*, 628 F.3d 1358, 1354 (Fed. Cir. 2010) (citing *Diehr*, 450 U.S. at 191–92).

⁵³⁹ *Research Corp. Techs. v. Microsoft Corp.*, 627 F.3d 859, 869 (Fed. Cir. 2010).

*Chakrabarty*⁵⁴⁰—is likely to be tested by claims to subject matter that are unrelated to any naturally-occurring principle, such as purely human conceptions including financial systems, forms of government, religion and other systems that give “people power . . . (just) over the people.”⁵⁴¹

In *Ass’n for Molecular Pathology v. United States Patent & Trademark Office*,⁵⁴² Judge Robert W. Sweet granted summary judgment invalidating fifteen claims of seven patents⁵⁴³—all directed to human breast cancer susceptibility genes 1 and 2 (BRCA 1 and BRCA 2), fragments and mutated forms of those genes, and to methods for their identification and use.⁵⁴⁴ In essence, Judge Sweet held that isolated nucleic acids are unpatentable as products of nature, which are prohibited as outside the scope of 35 U.S.C. § 101.⁵⁴⁵

On appeal,⁵⁴⁶ the Federal Circuit reversed the district court decision with respect to all of the claims directed to “isolated” DNA and all but one of the claims directed to methods of use of

⁵⁴⁰ See *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (“Congress plainly contemplated that the patent laws would be given wide scope.”).

⁵⁴¹ See *supra* note 79 and accompanying text.

⁵⁴² *Ass’n for Molecular Pathology v. U.S. Patent & Trademark Office*, 702 F. Supp. 2d 181 (S.D.N.Y. 2010), *rev’d*, 653 F.3d 1329 (Fed. Cir. 2011).

⁵⁴³ See *id.* at 185–86.

⁵⁴⁴ See *id.* at 184–85.

⁵⁴⁵ See *id.* at 185. The court stated:

The resolution of these motions is based upon long recognized principles of molecular biology and genetics: DNA represents the physical embodiment of biological information, distinct in its essential characteristics from any other chemical found in nature. It is concluded that DNA’s existence in an “isolated” form alters neither this fundamental quality of DNA as it exists in the body nor the information it encodes. Therefore, the patents at issue directed to “isolated DNA” containing sequences found in nature are unsustainable as a matter of law and are deemed unpatentable subject matter under 35 U.S.C. § 101.

Similarly, because the claimed comparisons of DNA sequences are abstract mental processes, they also constitute unpatentable subject matter under § 101.

Id.

⁵⁴⁶ *Ass’n for Molecular Pathology v. U.S. Patent & Trademark Office*, 653 F.3d 1329 (Fed. Cir. 2011).

DNA.⁵⁴⁷ With respect to the eligibility of isolated DNA molecules, the court dismissed a “magic microscope”⁵⁴⁸ test proposed by the defendant USPTO, stating that “because such a microscope could focus in on the claimed isolated *BRCA1* or *BRCA2* sequences as they exist in the human body, the claims covering those sequences are not patent eligible.”⁵⁴⁹ In contrast, because the same “imaginary microscope could not focus *in vivo* on a cDNA sequence, which is engineered by man to splice together non-contiguous coding sequences (i.e., exons), claims covering cDNAs are patent eligible.”⁵⁵⁰ For the Federal Circuit, both isolated DNAs and cDNAs are “markedly different—have a distinctive chemical identity and nature—from molecules that exist in nature,”⁵⁵¹ as required by the Supreme Court in *Chakrabarty*.⁵⁵² Like cDNAs, “human intervention in cleaving or synthesizing a portion of a native chromosomal DNA imparts on that isolated DNA a distinctive chemical identity from that possessed by native DNA.”⁵⁵³

The court distinguished the “markedly different characteristics” of *Chakrabarty* from the “magic microscope” test by linking patent eligibility to “reducing a portion of nature to concrete form” which “may have an entirely different utility”:

Because isolated DNAs, not just cDNAs, have a markedly different chemical structure compared to native DNAs, we reject the government’s proposed “magic microscope” test, as it misunderstands the

⁵⁴⁷ *See id.* at 1334.

⁵⁴⁸ *Id.* at 1350.

⁵⁴⁹ *Id.*

⁵⁵⁰ *Id.*

⁵⁵¹ *Id.* at 1351.

⁵⁵² *See supra* text accompanying notes 331–44.

⁵⁵³ *Ass’n for Molecular Pathology*, 653 F.3d at 1352. The court dismissed the analogy made by the district court between “isolation” and “purification.” As stated by the court:

[I]solated DNA is not purified DNA. Purification makes pure what was the same material, but was previously impure. Although isolated DNA must be removed from its native cellular and chromosomal environment, it has also been manipulated chemically so as to produce a molecule that is markedly different from that which exists in the body.

Id.

difference between science and invention and fails to take into account the existence of molecules as separate chemical entities. . . . It is the difference between knowledge of nature and reducing a portion of nature to concrete form, the latter activity being what the patent laws seek to encourage and protect. The government's microscope could focus in on a claimed portion of any complex molecule, rendering that claimed portion patent ineligible, even though that portion never exists as a separate molecule in the body or anywhere else in nature, and *may* have an entirely different utility. That would discourage innovation.⁵⁵⁴

By using the word "may," the court also partitioned patent eligibility from the statutory requirement that patentable subject matter must be useful. In other words, the requirement of "markedly different characteristics" that must be possessed by patent eligible subject matter does not mandate that patent eligible subject matter, in fact, *be* useful, but rather, only that it has the *potential to be* useful in ways other than are possible by the form of that subject matter as it exists in nature.

To make matters worse, the court in *Molecular Pathology* seemed to have failed to distinguish *patentable* from *patent eligible* subject matter. Subject matter may be patent eligible and, at the same time, not be patentable, although it exhibits "markedly different characteristics relative to its native counterpart, because it may not, in fact, be "useful" under 35 U.S.C. § 101. Subject matter also may be patent eligible and yet not be patentable because it may not meet the requirement of non-obviousness under 35 U.S.C. § 103. The *Molecular Pathology* court, however, seemed to miss its own point by stating, in response to an analogy by the dissent to "snapping a leaf from a tree,"⁵⁵⁵ that "no one

⁵⁵⁴ *Id.* at 1353 (emphasis added).

⁵⁵⁵ *Id.* at 1377 (Bryson, J., concurring in part and dissenting in part). Judge Bryson stated:

In that respect, extracting a gene is akin to snapping a leaf from a tree. Like a gene, a leaf has a natural starting and stopping point. It buds during spring from the same place that it breaks off and falls

could contemplate that snapping a leaf from a tree would be worthy of a patent, whereas isolating genes to provide useful diagnostic tools and medicines is surely what the patent laws are intended to encourage and protect.”⁵⁵⁶ Ignoring the fact that isolated leaves are clearly not novel, there is no reason to believe that those leaves may not have utilities entirely different than those available while they are still attached. The same may be said for isolated chemical elements, diamonds and kidneys, which also were mentioned by the court as not necessarily being “sufficiently distinctive to make the composition markedly different from the one that exists in nature.”⁵⁵⁷ The court here confused patent eligibility with statutory utility by making patent eligibility at least potentially contingent upon a demonstration of distinct utility:

[W]e cannot tell on this record whether the changes are sufficiently distinctive to make the composition markedly different from the one that exists in nature. In contrast, a portion of a native DNA molecule—an isolated DNA—has a markedly different chemical nature from the native DNA. It is, therefore, *patentable* subject matter.⁵⁵⁸

Again, the proper issue is not whether the subject matter is “patentable,” but rather whether it is “patent eligible.”

The method claims at issue in *Molecular Pathology* were divided by the majority into those directed to “comparing” or “analyzing” sequences,⁵⁵⁹ and those directed to “screening potential cancer therapeutics.”⁵⁶⁰ The court held that claims directed to “comparing” or “analyzing” gene sequences were not patent eligible under 35 U.S.C. § 101 “because they claim only

during autumn. Yet prematurely plucking the leaf would not turn it into a human-made invention.

Id.

⁵⁵⁶ *Id.* at 1354 (majority opinion).

⁵⁵⁷ *Id.* (“Elemental lithium is the same element whether it is in the earth or isolated; the diamond is the same lattice of carbon molecules, just with the earth removed; the kidney is the same kidney; the leaf the same leaf.”).

⁵⁵⁸ *Id.* (emphasis added).

⁵⁵⁹ *Id.* at 1355.

⁵⁶⁰ *Id.* at 1357.

abstract mental processes,”⁵⁶¹ and refused to impute to the claims “transformative steps,” such as “extracting DNA from a human sample” or “sequencing the *BRCA* DNA molecule.”⁵⁶² In contrast to Prometheus’ claimed methods, the court held that Myriad’s method claims did not include a “‘determining’ step [that] was both transformative and central to the purpose of the claims.”⁵⁶³ Instead, the “comparison between the two sequences” of Myriad’s claims “can be accomplished by mere inspection alone.”⁵⁶⁴

Myriad’s other method claims, directed to “screening potential cancer therapies,” were held, on the other hand, to be patent eligible because the claims included “the steps of (1) ‘growing’ host cells transformed with an altered *BRCA1* gene in the presence or absence of a potential cancer therapeutic, (2) ‘determining’ the growth rate of the host cells with or without the potential therapeutic, and (3) ‘comparing’ the growth rate of the host cells.”⁵⁶⁵ All of these steps were considered to be “central to the purpose of the claimed process.”⁵⁶⁶ The court concluded that the screening methods of Myriad did not “cover all cells, all compounds, or all methods of determining the therapeutic effect of a compound,”⁵⁶⁷ and therefore were “not so ‘manifestly abstract’ as to claim only a scientific principle, and not a patent eligible process.”⁵⁶⁸

As with the court’s earlier analysis, it is not clear why physical manipulation cannot be imputed to “comparing” or “analyzing” method steps, but can be considered inherent in the “determining” method steps of *Prometheus* and in the “screening” claims of *Myriad*. Further, the court did not explain how to distinguish permissible narrow application of scientific principle from impermissible “post-solution activity.”

⁵⁶¹ *Id.* at 1355.

⁵⁶² *See id.* at 1356.

⁵⁶³ *Id.* at 1357.

⁵⁶⁴ *Id.*

⁵⁶⁵ *Id.*

⁵⁶⁶ *See id.*

⁵⁶⁷ *Id.* at 1358.

⁵⁶⁸ *Id.*

Judge Moore concurred in part and wrote separately, distinguishing isolated nucleic acids from genomic DNA on the basis of the “flexible test” applied by the Supreme Court in *Funk Bros.* and *Chakrabarty*, whereby “an invention which ‘serve[s] the ends nature originally provided’ is likely unpatentable subject matter, but an invention that is an ‘enlargement of the range of . . . utility’ as compared to nature may be patentable.”⁵⁶⁹ Judge Moore viewed “short isolated sequences” as having “a variety of applications and uses in isolation that are new and distinct as compared to the sequence as it occurs in nature.”⁵⁷⁰ Judge Moore believes, “[b]ecause the different chemical structure of the isolated DNA, which is a product of the intervention of man, leads to a different and beneficial utility . . . isolated DNA fragments are patentable subject matter.”⁵⁷¹ “Longer strands” represented to Judge Moore a “much closer case,”⁵⁷² which depended upon “how much weight is allocated to the different structure as compared to the similarity of the function to nature” of those longer sequences.⁵⁷³ The judge viewed cDNA molecules as having “markedly different characteristics” than genomic DNA and naturally occurring RNA, by virtue of lack of introns and substitution of thiamine for uracil and deoxyribose for ribose, respectively.⁵⁷⁴ As a result, “cDNA sequences thus have a

⁵⁶⁹ *Id.* at 1359–60 (Moore, J., concurring in part) (quoting *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 131 (1948)).

⁵⁷⁰ *See id.* at 1365.

⁵⁷¹ *Id.*

⁵⁷² *Id.* at 1366.

⁵⁷³ *See id.*

⁵⁷⁴ *Id.* at 1364. As stated by Judge Moore:

The cDNA claims present the easiest analysis. Although the plaintiffs (now plaintiff) in the suit argue, and the district court held, that cDNA falls within the “laws of nature” exception to section 101 patentability, I cannot reconcile this argument with the fact that the claimed cDNA sequences do not exist in nature. Moreover, since cDNA has all of the introns removed, and only contains the coding nucleotides, it can be used to express a protein in a cell which does not normally produce it. Of course, the claimed isolated cDNA is inspired by nature—after all, naturally occurring RNA is the template upon which cDNA is constructed. Because it is used as a template, however, cDNA has a complementary sequence of nucleotides, and therefore has a completely different nucleotide sequence than the

distinctive name, character, and use, with markedly different chemical characteristics from either the naturally occurring RNA or any continuous DNA sequence found on the chromosome.”⁵⁷⁵

Judge Bryson, in a separate opinion, agreed that claims to BRCA cDNA are patent eligible, but he dissented from the portion of the majority’s opinion that isolated segments of DNA are statutory subject matter. Like the “magic microscope” analogy, Judge Bryson found that there was “no magic to a chemical bond that requires us to recognize a new product when a chemical bond is created or broken, but not when other atomic or molecular forces are altered,” such as when ionic bonds are broken to derive lithium from its salt.⁵⁷⁶ As stated by Judge Bryson:

The majority characterizes the question in this case as turning on the breaking of covalent bonds linking the BRCA genes to the rest of the DNA in chromosomes 13 and 17, but its analysis appears to place patentable weight on the breaking of other chemical bonds, such as the hydrogen bonds that are broken when separating DNA from histones or—in an example unrelated to this case, the ionic bonds that are broken when lithium is derived from a salt. It is difficult to see why differences between types of chemical bonds should matter for patentability purposes, and I see little support for such a distinction in the governing precedents.⁵⁷⁷

Even so, Judge Bryson relied on utility to assess the statutory eligibility of both cDNA and isolated nucleic acids, finding that “cDNA has a utility not present in naturally occurring BRCA DNA and mRNA because cDNA can be attached to a promoter and inserted into a non-human cell to drive protein expression,”⁵⁷⁸

RNA. Moreover, DNA has a different chemical structure than RNA, including a different base (T instead of U, respectively) and sugar units (deoxyribose instead of ribose, respectively).

Id.

⁵⁷⁵ *Id.*

⁵⁷⁶ *Id.* at 1375 (Bryson, J., concurring in part, dissenting in part).

⁵⁷⁷ *Id.* at 1375 n.3.

⁵⁷⁸ *Id.* at 1379.

rendering it patent eligible, whereas “Myriad has failed to credibly identify new uses for the isolated BRCA genes as probes or primers.”⁵⁷⁹ Judge Bryson framed *Chakrabarty* as focusing “on two things: (1) the similarity in structure between what is claimed and what is found in nature and (2) the similarity in utility between what is claimed and what is found in nature.”⁵⁸⁰ For Judge Bryson, the test of “similarity in structure” could be analogized to “extracting a slab of marble from the earth [that] does not give rise to protectable intellectual property rights, but ‘extracting’ a piece of sculpture from that slab or marble [that] does.”⁵⁸¹ Judge Bryson explicitly linked the test for similarity in structure to that of utility:

One could say, for example, that a baseball bat is “extracted” or “isolated” from an ash tree, but in that case the process of “extracting” the baseball bat necessarily changes the nature, form, and use of the ash tree and thus results in a manmade manufacture, not a naturally occurring product. In that setting, a man has defined the parts that are to be retained and the parts that are to be discarded. The result of the process of selection is a product with a function that is entirely different from that of the raw material from which it was obtained.⁵⁸²

Judge Bryson also linked statutory eligibility to claim breadth, stating that “Myriad could easily have claimed more narrowly to achieve the utility it attaches to segments of cDNA. . . . [It] could have claimed the tagged segments to achieve probe functionality.”⁵⁸³ However, the judge did not articulate how so modifying the claims would have escaped the charge of “mere post-solution activity.” Further, Judge Bryson’s objection to the claims appears to be based, at least in part, on policy, in that “[b]road claims to genetic material present a significant obstacle to

⁵⁷⁹ *Id.* at 1378.

⁵⁸⁰ *Id.*

⁵⁸¹ *Id.* at 1377 n.4.

⁵⁸² *Id.* at 1377.

⁵⁸³ *Id.* at 1379.

the next generation of innovation in genetic medicine—multiplex tests and whole-genome sequencing.”⁵⁸⁴

The court could have reconciled the majority opinion with both Moore’s and Bryson’s separate opinions by acknowledging that all of the sequences claimed by Myriad—being “isolated” and, therefore, not naturally occurring—were new physical applications of naturally occurring principles. Judges Lourie, Moore and Bryson might have disagreed with respect to whether the subject matter of individual claims was ultimately patentable, but all could have agreed—and did, in essence, agree—that the subject matter of Myriad’s nucleic acid claims, whether of cDNA, or “shorter” or “longer” sequences, as well as the methods that employed them, were novel and represented a physical application of naturally-occurring principle which, therefore, constituted at least one of a “process, machine, manufacture, or composition of the matter, or any new and useful improvement thereof.” Any question of whether the claimed nucleic acid sequences or the methods that employed them were judicially-recognized exceptions to statutory subject matter as being, for example, naturally-occurring phenomena, could easily have been resolved by simply recognizing that the claimed sequences did not occur in nature. The question of utility could have been addressed separately, and could even have been further parsed into a separate question of nonobviousness.

In *Classen Immunotherapies, Inc. v. Biogen IDEC*,⁵⁸⁵ the Federal Circuit on remand from the Supreme Court in view of *Bilski* upheld the claims of two patents directed to screening a plurality of immunization schedules and then immunizing subjects in accordance with the immunization schedule “identified as [being] a lower risk” than the others,⁵⁸⁶ while striking down as patent-ineligible the claims of a third patent which included immunizing a group according to a schedule and then comparing the results of that immunization with those of a control group.⁵⁸⁷ Writing for the court, Judge Newman stated that while the “claims

⁵⁸⁴ See *id.* at 1379–80.

⁵⁸⁵ *Classen Immunotherapies, Inc. v. Biogen IDEC*, 659 F.3d 1057 (Fed. Cir. 2011).

⁵⁸⁶ See *id.* at 1059–60.

⁵⁸⁷ See *id.* at 1067–68.

of the '139 and '739 Patents are directed to a method of lowering the risk of chronic immune mediated disorder, including the physical step of immunization on the determined schedule,"⁵⁸⁸ the claims of the '283 Patent simply "states the idea of collecting and comparing known information."⁵⁸⁹ The court stated: "The distinction between a concrete, physical step of a process claim, as compared with data gathering or insignificant extra-solution activity, warrants specific consideration in the context of evolving technologies, for 'Congress took [a] permissive approach to patent eligibility to ensure that "ingenuity would receive a liberal encouragement."⁵⁹⁰

In essence, however, the majority, by characterizing one set of claims as including a "concrete, physical step of a process claim,"⁵⁹¹ and steps of the other set of claims as "data gathering or insignificant extra-solution activity,"⁵⁹² denied any significance relevant to patent-eligibility of the immunization step of the '283 Patent, leaving only the "comparing" step. The court, therefore, imposed a novelty analysis on both sets of claims in that the claimed method of the '283 Patent would be known, but for the "comparing" step, while the claimed subject matter of the '139 and '739 Patents would be novel by having tailored the scope of immunization in view of the "comparing" step that preceded it. The court, in fact, reduced the claimed method of the '283 Patent to that "of reading the literature,"⁵⁹³ and distinguished its holding in *Prometheus II* by asserting that, whereas "the claims in *Prometheus* are for a method of controlling individualized dosages of a specific drug by measuring its metabolic products in the blood of individual patients . . . the *Classen* patents operate on published information to determine general immunization schedules."⁵⁹⁴ Specifically, the court partitioned the two sets of claims in *Classen*

⁵⁸⁸ *Id.* at 1066.

⁵⁸⁹ *Id.* at 1067.

⁵⁹⁰ *Id.* (citing *Bilski v. Kappos*, 130 S. Ct. 3218, 3225 (2010) (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980) (quoting 5 THE WRITINGS OF THOMAS JEFFERSON 76 (H. A. Washington ed., New York, Riker, Thorne & Co. 1854)))).

⁵⁹¹ *Id.*

⁵⁹² *Id.*

⁵⁹³ *Id.* at 1068 n.2.

⁵⁹⁴ *Id.*

on the basis of whether the claims included “transformative steps,” reasoning that “[t]he principles applied in *Prometheus* support the patent eligibility of the *Classen* claims that include such transformative steps, but are not relevant to claims that require no more than referring to known information but do not include immunization in light of that information.”⁵⁹⁵ The court neglected to mention that not all of the claims of *Prometheus* included any “administration” step.⁵⁹⁶

Judge Moore dissented from the *Classen* majority opinion in that she saw “no distinction between the ’283 claims and the ’139 and ’739 claims,”⁵⁹⁷ noting that “[t]he ’283 patent claim clearly and unequivocally requires the physical act of immunization and it is unfair of the majority to analyze the claim for § 101 purposes as though it did not have that step.”⁵⁹⁸ Although recognizing that both sets of claims include a positive “immunizing” step, Judge Moore stated that both sets of claims were of “staggering breadth”⁵⁹⁹ that presented inherent “preemption issues”⁶⁰⁰ because the “claims cover any kind of comparison between any two schedules, using any drugs in comparing the incidence of any chronic immune disease.”⁶⁰¹ Therefore, in the name of “striking the balance between protecting inventors and not granting monopolies over procedures that others would discover by independent, creative application of general principles,”⁶⁰² Judge Moore considered the immunization step of the ’283 Patent to be “nothing more than a data gathering step necessary to explore the effects of different immunization schedules,”⁶⁰³ and that of the ’739 Patent to be mere “post-solution activity.”⁶⁰⁴ Invoking *Flook*,

⁵⁹⁵ *Id.*

⁵⁹⁶ *See supra* notes 427–32 and accompanying text.

⁵⁹⁷ *Classen*, 659 F.3d at 1076 (Moore, J., dissenting).

⁵⁹⁸ *Id.* at 1077 n.1.

⁵⁹⁹ *Id.* at 1076.

⁶⁰⁰ *Id.*

⁶⁰¹ *Id.* at 1078.

⁶⁰² *Id.* at 1080 (Moore, J., dissenting) (quoting *Bilski v. Kappos*, 130 S. Ct. 3218, 3228 (2010)).

⁶⁰³ *Id.* at 1079 (Moore, J., dissenting).

⁶⁰⁴ *Id.* (Moore, J., dissenting).

Judge Moore determined that neither sets of claims were the “kind of ‘discoveries’ that the statute was enacted to protect.”⁶⁰⁵

Despite being a dissenting opinion, Judge Moore’s reasoning closely paralleled Judge Newman’s majority opinion. Specifically, both judges discounted the significance of positively claiming “immunizing” as a distinct step of the claimed methods by relegating that step to “data gathering” or “post-solution activity.”⁶⁰⁶ Also, both Judge Newman and Judge Moore inserted other statutory requirements as part of their analysis. As discussed above, Judge Newman, in effect, distinguished the two sets of claims on the basis of novelty, where comparison of known immunization schedules lacked novelty, while immunization in view of such comparison possessed novelty. Judge Moore, on the other hand, based her analysis on overbreadth, which typically is part of an enablement analysis under the first paragraph of 35 U.S.C. § 112. Both analyses, however, as in previous cases, discussed above, could have been made considerably easier by recognizing that any claim that positively asserts a physical method step—in this case that of “immunizing”—constitutes a process under 35 U.S.C. § 101 and, therefore, constitutes patent eligible subject matter. There is no need to go any further with respect to patent eligibility.

Once the determination has been made that both sets of claims represent a physical application of naturally-occurring principle, subsequent analysis of novelty and enablement would have led Judges Newman and Moore to their respective conclusions, and may even have compelled them to come to the same conclusion—namely, that the claims of the ’283 Patent were not novel because the method of conducting the immunizing step prior to any comparison was known, and that subsequent comparison did not yield any benefit absent immunizing a population on the basis of that comparison, as specified in the claims of the ’139 and ’739 Patents. Similarly, Judges Newman and Moore, by acknowledging that the claims of the ’139 and ’739 Patents constituted patent eligible subject matter, may have disagreed with respect to whether

⁶⁰⁵ See *id.* at 1080 (quoting *Parker v. Flook*, 437 U.S. 584, 593 (1978)).

⁶⁰⁶ See *id.* at 1079–80; see also *supra* note 585–95 and accompanying text.

the subject matter of the claims was impermissibly broad, but they would do so on the basis of accepted principles of enablement under 35 U.S.C. § 112 rather than try to apply those principles to an analysis of patent-eligibility under 35 U.S.C. § 101.

In another case that tested the limits of patent eligibility, *Ultramercial v. Hulu*,⁶⁰⁷ the Federal Circuit reversed a lower court's dismissal of claims as being impermissibly abstract.⁶⁰⁸ The claims were directed to a method for distributing copyrighted products over the Internet by providing copyrighted material to consumers in exchange for viewing advertisements.⁶⁰⁹ The Federal Circuit reaffirmed determinations of subject matter eligibility as a "threshold check,"⁶¹⁰ prerequisite to assessment under 35 U.S.C. §§ 102, 103 and 112, and recognized that, while it is understood that "laws of nature and physical phenomena cannot be invented," the issue of "[a]bstractness . . . has presented a different set of interpretive problems, particularly for the section 101 'process' category."⁶¹¹ The court characterized the claimed invention as a "method for monetizing and distributing copyrighted products over the Internet"⁶¹² that extended beyond the "mere idea that advertising can be used as a form of currency."⁶¹³ Rather, the court held that the claimed subject matter constituted a "practical application of this idea"⁶¹⁴ that consisted of several steps, many of which would likely "require intricate and complex computer programming."⁶¹⁵ The degree of "programming complexity required before a computer-implemented method can be patent eligible"⁶¹⁶ was not defined, nor would the court hold that "use of

⁶⁰⁷ *Ultramercial v. Hulu*, 657 F.3d 1323 (Fed. Cir. 2011).

⁶⁰⁸ *See id.* at 1330.

⁶⁰⁹ *Id.* at 1324.

⁶¹⁰ *Id.* at 1326 ("More importantly, as § 101 itself expresses, subject matter eligibility is merely a threshold check; claim patentability ultimately depends on the 'conditions and requirement of this title.'").

⁶¹¹ *Id.*

⁶¹² *See id.* at 1327.

⁶¹³ *See id.* at 1328.

⁶¹⁴ *Id.*

⁶¹⁵ *Id.*

⁶¹⁶ *Id.*

an Internet website to practice such a method is either necessary or sufficient in every case to satisfy section 101.”⁶¹⁷

Rather, the *Ultramercial* court held that they “simply find the claims here to be patent-eligible, in part because of these factors.”⁶¹⁸ In contrast to *CyberSource*, where the court held that CyberSource had not “met its burden to demonstrate that [the claim] is ‘truly drawn to a specific’ computer readable medium,”⁶¹⁹ the court in *Ultramercial* held that the claims were directed to a “particular method for collecting revenue from the distribution of media products over the Internet.”⁶²⁰ Specifically, the court stated that, “[u]nlike the claims in *CyberSource*, the claims here require, among other things, controlled interaction with a consumer via an Internet website, something far removed from *purely* mental steps.”⁶²¹ As a consequence, quoting *Research Corp.*, the court held that Ultramercial’s claimed invention was “not ‘so manifestly abstract as to override the statutory extra interest in section 101.’”⁶²²

Again, selectively characterizing a claimed invention and placing it on a scale of “abstractness”—as was done by the court in *Ultramercial*—limits the precedential value of any jurisprudence assessing patent eligibility. If the criteria for satisfaction of 35 U.S.C. § 101 is reliance on whether any claimed invention is “so manifestly abstract”⁶²³ as to “override the statutory language and framework of the patent act,”⁶²⁴ then it should be expected that litigation in this area of the law will increase along with calls for a bright line test.

Physical application of naturally-occurring principle as a test for patent eligibility has been before us all along, and failure to

⁶¹⁷ *Id.*

⁶¹⁸ *Id.*

⁶¹⁹ *CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1374–75 (Fed. Cir. 2011) (quoting *In re Abele*, 684 F.2d 902, 909 (C.C.P.A. 1982), *abrogated by In re Bilski*, 545 F.3d 943 (Fed. Cir. 2008)).

⁶²⁰ *Ultramercial*, 657 F.3d at 1329.

⁶²¹ *Id.* at 1330.

⁶²² *Id.* (quoting *Research Corp. Techs. v. Microsoft Corp.*, 627 F.3d 859, 869 (Fed. Cir. 2010)).

⁶²³ *Id.*

⁶²⁴ *Id.* at 1328 (quoting *Research Corp.*, 627 F.3d at 869).

recognize and strictly apply it is causing confusion that ultimately will lead to erosion of patent protection as a driving force in economic development. In *Ultramercial*, the exchange of copyrighted material for advertisement employing computer software as “currency” clearly lacks physical application of any naturally-occurring principal. The claimed method is, instead, purely a function of social leverage, such as the claimed method of hedging that was repudiated by the Supreme Court in *Bilski*.⁶²⁵ No amount of “intricate and complex computer programming,” or “practical application of this idea,”⁶²⁶ can change the fact that the claimed subject matter in *Ultramercial* required no physical steps and involved no application of naturally-occurring principal.

Even if, as a hypothetical, the claimed subject matter of *Ultramercial* did specify some physical application of naturally-occurring principal, such as making keystrokes, the claimed subject matter would meet the statutory requirement of a process under 35 U.S.C. § 101. That same subject matter may or may not meet the other requirements of the Patent Act of 1952, but would have to do so within the realm of criteria set forth with respect to those keystrokes, and not with respect to motivation for making those keystrokes that are outside the scope of patent eligibility. Although such easy assessments may be subject to the criticism that statutory eligibility might simply be a matter of claim-drafting skill, an increased focus on physical application of naturally-occurring principal would easily separate patent eligible subject matter from that which is not, and would allow assessment of patentability under other sections of the statute.

For example, in the case of *Ultramercial*, although application of keystrokes as method steps would cause the claim to meet the requirements of section 101, the claimed method would not meet the requirements of section 102 unless the sequence of keystrokes was novel and, even if the sequence of keystrokes was novel, it would be obvious under 35 U.S.C. § 103 because the *only* basis for nonobviousness of that sequence would be predicated on the patent ineligible subject matter of exchange of copyrighted material for

⁶²⁵ See *supra* text accompanying notes 451–90.

⁶²⁶ *Id.*

advertisement. The historical alternative is to consider any such steps included in the claim to be considered mere post-solution activity, which would be disqualified from consideration of the claimed invention as a whole under 35 U.S.C. § 101.

However, partitioning the analysis as proposed clearly distinguishes the tests for *patent eligibility* from *patentability*. Regardless of which approach is applied, a decision must be made as to the scope of *patent eligible* subject matter. As can be seen, decisions made in the absence of consideration as to whether the principle of an invention is an application of a naturally-occurring principle or one of human social origin—such as finance, government or religion—and in the absence of considerations as to whether that claimed invention is a physical application of that principle, leads to an inextricable difficulties in the predictability of the outcome of any question regarding *eligibility* for patent protection.

III. *MAYO V. PROMETHEUS*: BEYOND THE ZERO

In *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*,⁶²⁷ Justice Breyer for the Supreme Court reversed the decision made by the Federal Circuit on remand. In a 9-0 decision, the Court recognized that “laws of nature, natural phenomena, and abstract ideas” are not patentable,⁶²⁸ but that “to transform an unpatentable law of nature into a patent-eligible *application* of such a law, one must do more than simply state the law of nature while adding the words ‘apply it.’”⁶²⁹ Rather, relying on *Flook*, the Court stated that its precedents “insist that a process that focuses upon the use of a natural law also contain other elements or a combination of elements, sometimes referred to as an ‘inventive concept,’ sufficient to ensure that the patent and practice amounts to significantly more than a patent upon the natural law itself.”⁶³⁰ As discussed above, the Court in *Flook* relied upon lack of “inventive application of principle” to deny patent eligibility to

⁶²⁷ *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289 (2012).

⁶²⁸ *See id.* at 1292.

⁶²⁹ *See id.* at 1294.

⁶³⁰ *Id.* (quoting *Parker v. Flook*, 437 U.S. 584, 594 (1978)).

Flook's method for calculating an alarm limit.⁶³¹ Specifically, as stated by the Court in *Flook*:

Respondent's process is unpatentable under § 101, not because it contains a mathematical algorithm as one component, but because once that algorithm is assumed to be within the prior art, that the application, considered as a whole, contains no patentable invention. Even though a phenomenon of nature or mathematical formula may be well-known, an inventive application of the principle may be patented. Conversely, the discovery of such a phenomenon cannot support a patent unless there is some other inventive concept in its application.⁶³²

According to the Court in *Mayo*, the question of patent eligibility did not hinge upon the "machine-or-transformation test," despite the fact that it is an "important and useful clue," that the Federal Circuit believed "led to the 'clear and compelling conclusion . . . that the . . . claims . . . do not encompass laws of nature or preempt natural correlations.'"⁶³³ Instead, the Court held that the question was whether "the patent claims add *enough* to their statements of the correlations to allow the processes they describe to qualify as patent eligible processes that *apply* natural laws."⁶³⁴

The Court then addressed the "administering" step, "determining" step and "wherein" step of *Prometheus*' claims and found that each of them, individually, was a conventional method step which, even in combination, "adds nothing to the laws of nature that is not already present when the steps are considered separately."⁶³⁵ Rather, according to the Court, "the three steps simply tell doctors to gather data from which they may draw an inference in light of the correlations."⁶³⁶ The Court compared

⁶³¹ See *supra* text accompanying note 297–308.

⁶³² *Flook*, 437 U.S. at 594.

⁶³³ See *Mayo*, 132 S. Ct. at 1296 (quoting *Prometheus II*, 628 F.3d 1347, 1355 (Fed. Cir. 2010)).

⁶³⁴ *Id.* at 1297.

⁶³⁵ *Id.* at 1298.

⁶³⁶ *Id.*

Prometheus' method with those in *Diehr* and *Flook*, stating that those cases were the "most directly on point,"⁶³⁷ albeit having opposite conclusions. In particular, the Court held that, whereas in *Diehr* the "steps of the process integrated the equation into the process as a whole"⁶³⁸ and thereby "transformed the process into an inventive application of the formula,"⁶³⁹ the process in *Flook* "did not 'explain how the variables used in the formula were to be selected, nor did the [claim] contain any disclosure relating to chemical processes at work or the means of setting off an alarm or adjusting the alarm limit,'"⁶⁴⁰ and, therefore, "the other steps in the process did not limit the claim to a particular application."⁶⁴¹ As a result, "there was no 'inventive concept' in the claimed application of the formula."⁶⁴² The Court held that the "claim before us presents a case for patentability that is weaker than the (patent eligible) claim in *Diehr* and no stronger than the (unpatentable) claim in *Flook*"⁶⁴³ because the "instructions" of the claim "add nothing specific to the laws of nature other than what is well-understood, routine, conventional activity, previously engaged in by those in the field."⁶⁴⁴

The *Mayo* Court also offered other, older cases to support its conclusions. For example, *Neilson v. Harford*, an eighteenth-century English case⁶⁴⁵ which was directed to introduction of heated air to a furnace,⁶⁴⁶ was considered by the *Mayo* Court to have been held patentable because the claimed process "included not only a law of nature but also several unconventional steps (such as inserting the receptacle, applying heat to the receptacle externally, and blowing the air to into the furnace)"⁶⁴⁷ and, thus,

⁶³⁷ *Id.*

⁶³⁸ *Id.*

⁶³⁹ *Id.* at 1299.

⁶⁴⁰ *Id.* (quoting *Diamond v. Diehr*, 450 U.S. 175, 193 (1981)).

⁶⁴¹ *Id.*

⁶⁴² *Id.* (quoting *Parker v. Flook*, 437 U.S. 584, 594 (1978)).

⁶⁴³ *Id.*

⁶⁴⁴ *Id.*

⁶⁴⁵ See *supra* notes 210–15 and accompanying text.

⁶⁴⁶ See *Mayo*, 132 S. Ct. at 1300 (quoting *Neilson v. Harford*, (1841) 151 Eng. Rpt. 1266 (Exch. Div.); 8 M. & W. 806).

⁶⁴⁷ *Id.*

“explained how the principal could be implemented in an inventive way.”⁶⁴⁸

By way of contrast, the Court recalled how the patent application in *Bilski* claimed “an unpatentable abstract idea,”⁶⁴⁹ namely the “concept of hedging”⁶⁵⁰ that, like *Flook*, could not be saved by limiting that idea to “one field of use or adding token postsolution components.”⁶⁵¹ The Court also linked “post solution activity” to preemption through *Benson* by stating that, because the mathematical formula in *Benson* “‘had no substantial practical application except in connection with the digital computer’ . . . the claim (like the claims before us [in *Prometheus*]) was overly broad; it did not differ significantly from a claim that just said ‘apply the algorithm.’”⁶⁵² The underlying problem for the Court was the same as that stated in *Morse*: what if a future inventor were to “discover a mode of writing or printing at a distance . . . [that] if it is covered by this patent the inventor could not use it, nor the public have the benefit of it without the permission of this patentee[?]”⁶⁵³ According to the *Mayo* Court, these concerns were also reflected in the decisions to deny patent eligibility under 35 U.S.C. § 101 in *Benson*, *Bilski* and *Flook*. As summarized by the Court:

[E]ven though rewarding with patents those who discover new laws of nature and the like might well encourage their discovery, those laws and principles, considered generally, are “the basic tools of scientific and technological work.” And so there is a danger that the grant of patents that tie up their use will inhibit future innovation premised upon them, a danger that becomes acute when a patented process amounts to no more than an instruction to “apply the natural law,” or otherwise forecloses

⁶⁴⁸ *Id.*

⁶⁴⁹ *Id.* (quoting *Bilski v. Kappos*, 130 S. Ct. 3218, 3222 (2010)).

⁶⁵⁰ *Id.* (quoting *Bilski*, 130 S. Ct. at 3222).

⁶⁵¹ *Id.* at 1301 (quoting *Bilski*, 130 S. Ct. at 3231).

⁶⁵² *Id.* (quoting *Gottschalk v. Benson*, 409 U.S. 63, 71 (1972)).

⁶⁵³ *Id.* (quoting *O’Reilly v. Morse*, 56 U.S. (15 How.) 62, 113 (1853)).

more future invention than the underlying discovery could reasonably justify.⁶⁵⁴

As applied to Prometheus' claimed subject matter, the Court stated that "[w]e need not, and do not, now decide whether were the steps at issue here *less conventional*, these features of the claim would prove sufficient to invalidate them."⁶⁵⁵

The Court recognized that, "in evaluating the significance of additional steps, the § 101 patent-eligibility inquiry and, say, the § 102 novelty inquiry might sometimes overlap," however,

§§ 102 and 103 say nothing about treating laws of nature as if they were part of the prior art when applying those sections . . . [and] studiously ignoring *all* laws of nature when evaluating patents under §§ 102 and 103 would 'make all inventions unpatentable because all inventions can be reduced to underlying principles of nature which, once known, make their implementation obvious.'⁶⁵⁶

These considerations led the Court "to decline the Government's invitation to substitute §§ 102, 103, and 112 inquiries for the better established inquiry under section 101."⁶⁵⁷ In essence, the Court was attempting to "balance"⁶⁵⁸ the effects of patent protection, which it considered to be "a two-edged sword,"⁶⁵⁹ whereby "[o]n the one hand, the promise of exclusive rights provides monetary incentives that lead to creation, invention, and discovery. On the other hand, that very exclusivity can impede the flow of information that might permit, indeed spur, invention"⁶⁶⁰

The Supreme Court's insistence on including an "inventive concept" or "inventive application" of a law of nature as a criterion for assessing patent eligibility stems from dual concerns that "[i]ntuitively, one would suppose that a newly discovered law of

⁶⁵⁴ *Id.* (quoting *Gottschalk*, 409 U.S. at 67 (1972)).

⁶⁵⁵ *Id.* at 1302.

⁶⁵⁶ *Id.* at 1304 (quoting *Diamond v. Diehr*, 450 U.S. 175, 189 (1981)).

⁶⁵⁷ *Id.*

⁶⁵⁸ *Id.* at 1305.

⁶⁵⁹ *Id.*

⁶⁶⁰ *Id.*

nature is novel,”⁶⁶¹ and that, because “§§ 102 and 103 say nothing about treating laws of nature as if they were part of the prior art when applying those subsections,”⁶⁶² the consequence of failing to require an “inventive concept” as part of the threshold for patent eligibility of § 101 “would make the ‘law of nature’ exception to § 101 patentability a dead letter.”⁶⁶³ Therefore, according to the Court, “to shift the patent-eligibility inquiry entirely to these later sections risks creating significantly greater legal uncertainty, while assuming that those sections can do work they are not equipped to do.”⁶⁶⁴

However, mandating that a claimed combination of elements embody an “inventive concept,” threatens to collapse the requirements for *patentability* under 35 U.S.C. §§ 102, 103 and 112 into that of *patent eligibility* by failing to provide any basis for distinguishing between them. Alternatively, the failure to acknowledge that the criteria for novelty, nonobviousness and enablement are inherent in assessments of “inventive conception” hopelessly mires patent eligibility under 35 U.S.C. § 101 in a sliding scale of policy considerations and arbitrary judgments. The Supreme Court in *Mayo* expressly articulated the relative nature of patent eligibility:

But the *underlying functional concern* here is a *relative* one: how much future innovation is foreclosed relative to the contribution of the inventor. A patent upon a narrow law of nature may not inhibit future research as seriously as would a patent upon Einstein’s law of relativity, but the creative value of the discovery is also considerably smaller. And, as we have previously pointed out, even a narrow law of nature (such as the one before us) can inhibit future research.⁶⁶⁵

In view of such language by the Supreme Court, it is understandable that practitioners and theoreticians would advocate

⁶⁶¹ *Id.* at 1304.

⁶⁶² *Id.*

⁶⁶³ *Id.* at 1303.

⁶⁶⁴ *Id.* at 1304.

⁶⁶⁵ *Id.* at 1303 (emphasis added).

that 35 U.S.C. § 101 not be addressed as a “threshold” consideration preliminary to standards under §§ 102, 103 and 112, but, rather, to address 35 U.S.C. § 101 as necessary only after addressing those other considerations.⁶⁶⁶

The Supreme Court’s decision in *Mayo v. Prometheus* marks the demise of any boundary to what may be considered statutory subject matter, so long as the claimed subject matter can be “characterized,” to use the Supreme Court’s term,⁶⁶⁷ in a manner that appears not to embrace a scope so large as to “inhibit future research.”⁶⁶⁸ One consequence of applying only a vague standard of “inventive conception” and “inventive application” to patent eligibility, as the Court in *Mayo* has done, is to free patentable subject matter from physical application of laws of nature, physical phenomena and abstract ideas. This is contrary to historical notions of patent eligibility. Ironically, failure to limit patent eligibility to physical applications of naturally-occurring phenomena and abstract principles obscures the “bright-line prohibition against patenting laws of nature, mathematical formulas and the like” noted by the Court,⁶⁶⁹ and inevitability will result in the descent of our patent regime.

CONCLUSION

Although the patent system in the United States has evolved considerably since the Patent Act of 1790, and although it has always been distinct from the English patent custom from which it was derived, there are certain fundamental principles that remain manifest, albeit sometimes rather cryptically, in our current jurisprudence. One of these is the criterion of subject matter eligibility for patent protection. The term “useful art” in Article 1, Section 8, Clause 8 of the Constitution, under the meaning of that

⁶⁶⁶ See, e.g., *supra* note 17.

⁶⁶⁷ 132 S. Ct. at 1299. In distinguishing *Flook* from *Diehr*, the Court stated: “The Court, as in *Diehr*, pointed out that the basic mathematical equation, like a law of nature, was not patentable. But it *characterized* the claimed process as doing nothing other than ‘provid[ing] a[n unpatentable] formula for computing an updated alarm limit.’” *Id.* (emphasis added) (quoting *Parker v. Flook*, 437 U.S. 584, 586 (1978)).

⁶⁶⁸ *Id.* at 1303.

⁶⁶⁹ *Id.*

term at the time of the Constitutional Convention in 1787, has been understood to be limited to physical applications of naturally-occurring principle. Exceptions to statutory classes of patent eligible subject matter had their basis in lack of novelty, and barred patent protection for subject matter that would preempt, without limit, exclusive rights to laws of nature, physical phenomena and abstract ideas.

Advancements in technology have clearly eclipsed the imaginations of the Founders as undoubtedly they presumed it would. However, the space they created within the Constitution “by securing for limited times to . . . inventors the exclusive right to their . . . discoveries,”⁶⁷⁰ as applied by the various patent acts dating from 1790, and as interpreted by the courts, has until recently exhibited remarkable consistency in mandating an underlying physical manifestation of naturally-occurring principle. Many tests have evolved over the last two hundred years to attempt to adapt this broad concept to new technologies for which patent protection is sought. However, if these tests obscure a fundamental requirement of some sort of physical application of naturally-occurring principle by employing some undefined terminology or open policy, such as “inventive concept,” “inventive application,” or by requiring elements that are “less than conventional,” as in *Mayo v. Prometheus*, the resulting unpredictability will undermine the patent system as we know it and may, ultimately, lead to diminished reliance on patents as a means for advancement of our societal economic development.

⁶⁷⁰ U.S. CONST. art. I, § 8, cl. 8.