

*Shaking the Foundations of Patentable Subject Matter*  
Joshua D. Sarnoff<sup>a</sup>

Now I think these methods may be said to be new manufactures, in one of the common acceptations of the word, as we speak of the manufactory of glass, or any other thing of that kind.... [The patent] must then be for the method; and I would say ... it must be for the method detached from all physical existence whatever. And I think we should well consider what we do in this case, that we may not shake the foundation upon which these patents stand.

Boulton v. Bull, 2 H. Bl. 463, 494 (1795) (Opinion of Lord Eyre, C.J.).

But then it was said, that though an idea or a principle alone would not support the patent, yet that an idea reduced into practice, or a practical application of the principle was a good foundation for a patent, and was the present case.... The method and the mode of doing a thing are the same: and I think it impossible to support a patent for a method only, without having carried it into effect and produced some new substance.... [A] principle reduced into practice.... can only mean a practice founded on principle, and that practice is the thing done or made, or in other words the manufacture which is invented.

Boulton v. Bull, 2 H. Bl. 463, 486 (1795) (Opinion of Buller, J.).

The relevant principle of law “[e]xclude[s] from ... patent protection ... laws of nature, natural phenomena, and abstract ideas.” This principle finds its roots in both English and American law.... [T]he reason for the exclusion is that sometimes *too much* patent protection can impede rather than “promote the Progress of Science and useful Arts,” the constitutional objective of patent and copyright protection.

Laboratory Corp. of America Holdings v. Metabolite Laboratories, Inc., 126 S.Ct. 2921, 2922 (2006) (Breyer, J. dissenting from dismissal of certiorari as improvidently granted) (quoting *Diamond v. Diehr*, 450 U.S. 175, 185 (1981), and U.S. Const. Art. I, § 8, cl.8)) (emphasis in original).

The notion that post-solution activity, no matter how conventional or obvious in itself, can transform an unpatentable principle into a patentable process exalts form over substance.... Respondent's process is unpatentable under § 101, not

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<sup>a</sup> Practitioner-in-Residence and Assistant Director, Glushko-Samuelson Intellectual Property Law Clinic, Washington College of Law (WCL), American University. The author filed amicus briefs in the Supreme Court in *Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc.*, No. 04-607, and in *KSR Intern. Co. v. Teleflex, Inc.*, No. 04-1350, from which some of the present discussion is drawn. I thank Craig Barnes, James Bessen, Oren Bracha, Lewis Hyde, Paul Israel, Peter Jaszi, Christine Macleod, Michael Madison, Rob Merges, Adam Mossoff, Samuel Oddi, Malla Pollack, Richard Stern, Lawrence Stratton, Michael Steinberg and Edward Walterscheid for their terrific work and helpful suggestions, and Susan Alimenti, Elliot Cook, Aaron Enatsky, and librarian Adeen Postar for exceptional research assistance. I wish to thank them and my colleagues at WCL for support, my parents and parents-in-law for investing substantial intellectual capital, and my wife Belle Belew for spending it freely with me. This paper was prepared for the Oracle International Corp.-George Washington University Law School 2006 Symposium *What's Ahead on Highway 101*. The material forms the basis for a forthcoming book *Patents and Morality: Religion, Science, Nature, and the Law*, forthcoming 2008, Edward Elgar Publishing, reprinted with permission.

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....* [T]he discovery of such a phenomenon cannot support a patent *unless there is some other inventive concept in its application.*

Parker v. Flook, 437 U.S. 584, 590, 593-94 (1978) (emphasis added).

“How are you going to make it move? It doesn’t have a –” “Be very quiet,” advised the duke, “for it goes without saying.”

NORTON JUSTER, THE PHANTOM TOLLBOOTH 79 (Bullseye 1996) (1961).

## Introduction

This article describes the history and character of the exclusions from patentable subject matter for “laws of nature, natural phenomena, and abstract ideas”<sup>1</sup> (or science, nature, and ideas), which include “mathematical ‘algorithm[s],’”<sup>2</sup> “products of nature,”<sup>3</sup> and “mental processes.”<sup>4</sup> As recently suggested in *Laboratory Corporation of America Holdings, Inc. v. Metabolite Laboratories, Inc.*,<sup>5</sup> the “promote the Progress” language in the preamble of Article I, Section 8, Clause 8 of the U.S. Constitution<sup>6</sup> restricts legislative power to grant patents on science, nature, and ideas. Such patents would exceed the scope of human invention involved in the discovery, and thus would impose excessive restrictions on sequential invention and would thereby impede the progress of both science and technology. In contrast, this article suggests that the “useful Arts” and “Discoveries” of “Inventors” language of the Clause reflects fundamental moral objections to subjecting science, nature, and ideas to private property rights. The Clause (and subsequent implementing legislation, but not recent judicial interpretations) historically limited patentable subject matter to things that could properly be called human inventions.<sup>7</sup> By restricting patentable subject matter to newly created physical objects and technological (rather than scientific) processes, Congress avoided the hubris of treating science, nature, and ideas as human creations and the concerns animating the Justices that doing so might impose excessive burdens on the scientific enterprise or be bad for society.

The history remains relevant to important contemporary disputes regarding what kinds of discoveries of science and technological inventions are patentable. The history also sheds light on the current guidance being provided by the U.S. Patent and Trademark Office (PTO) regarding the types of inventions that are patentable,<sup>8</sup> based on

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<sup>1</sup> *Diamond v. Diehr*, 450 U.S. 175, 185 (1981).

<sup>2</sup> *Gottschalk v. Benson*, 409 U.S. 63, 65 (1972).

<sup>3</sup> *Diamond v. Chakrabarty*, 447 U.S. 303, 313 (1980) (as distinguished from “human-made inventions”).

<sup>4</sup> *Gottschalk*, 409 U.S. at 67.

<sup>5</sup> 126 S.Ct. 2921, 2922 (2006) (Breyer, J., dissenting from dismissal of certiorari as improvidently granted).

<sup>6</sup> U.S. CONST., Art. I, § 8, cl. 8. The Clause is also sometimes referred to as the Copyright and Patent Clause, the “Science and useful Arts” Clause, and the “Authors” and “Inventors” Clause. *Id.*

<sup>7</sup> See 35 U.S.C. § 101 (2000).

<sup>8</sup> See Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility, 1300 Off. Gazette (U.S. Pat. & Trademark Off.) 142 (Nov. 22, 2005) [hereinafter *PTO Interim Utility Guidelines*].

interpretation of cases decided by the U.S. Court of Appeals for the Federal Circuit (Federal Circuit) that processes are patentable when they produce a “useful, concrete and tangible result.”<sup>9</sup>

Part I of the Article traces the legal doctrinal history of these exceptions, from roughly 1623 through 1841 in England and from the colonial period through the present in the United States. This doctrinal history reveals the *stated* origins for the exclusions for science, nature, and ideas. In England, patents could not be granted for new discoveries of scientific principles, because such principles were not considered “manufactures” (*i.e.*, technology) within the meaning of the Statute of Monopolies.<sup>10</sup> The exclusions for science, nature, and ideas were carried across the Atlantic Ocean, as the American Colonies and later the States created patents, by special legislative enactments adopted for a variety of economic reasons, mostly along the lines of the English system of royal patent grants.<sup>11</sup> The U.S. Constitution vested in the new Congress the power to grant exclusive rights to “Inventors” for their “Discoveries” in order to “promote the Progress of Science and useful Arts,”<sup>12</sup> with the term “useful Arts” then understood to mean technology.<sup>13</sup> Congress initially adopted patent laws that were “founded on the principles and usages which have grown out of the English statute.”<sup>14</sup> Congress initially delegated its discretionary authority to issue or to deny patents to a Patent Board,<sup>15</sup> which

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<sup>9</sup> *Id.* at Annex II, § B.ii. (quoting *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1373-74 (Fed. Cir. 1998), and citing *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352, 1358 (Fed. Cir. 1999)). See *State Street Bank & Trust*, 149 F.3d at 1370-77 (upholding patent for data processing system used for financial services and repudiating the “business methods” exception to patentability); *AT&T Corp.*, 172 F.3d at 1355-61 (upholding patent for process of data transformation used for telephone billing). I focus on the Federal Circuit because of the significant changes to patent granting practices in light of these two cases, although under the leadership of Judge Giles Rich the Court of Claims and Patent Appeals had begun the “assault on the citadel” of exclusions from patentable subject matter in regard to computer-related and biotechnological inventions. A. Samuel Oddi, *Assault on the Citadel: Judge Rich and Computer Related Inventions*, 39 HOUS. L. REV. 1033, 1040 (2002). See *id.* at 1041-97.

<sup>10</sup> See Statute of Monopolies, 1623, 21 Jac. 1, c. 3, § 6. Cf. Robert G. Sterne & Lawrence B. Bugaisky, *The Expansion of Statutory Subject Matter Under the 1952 Patent Act*, 37 AKRON L. REV. 217, 225 (2004) (arguing that there is an overlap between what should be patentable and what is, and that “previously unencountered ethical, moral, economic and public policy issues ... are *analytically unrelated to a construction of the Patent Act* but tend to ‘muddy’ the analysis.”) (emphasis added).

<sup>11</sup> See Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents* (pt. 1), 77 J. PAT. & TRADEMARK OFF. SOC’Y 771 (1995) [hereinafter Walterscheid, *Antecedents 5 Part I*], Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents* (pt. 2), 77 J. PAT. & TRADEMARK OFF. SOC’Y 771 (1995) [hereinafter Walterscheid, *Antecedents 5 Part II*]; BRUCE W. BUGBEE, GENESIS OF AMERICAN PATENT AND COPYRIGHT LAW 57-124 (Public Affairs 1967); Oren Bracha, *The Commodification of Patents 1600-1836: How Patents Became Rights and Why We Should Care* 35-40 (May 2005) (unpublished draft), available at <http://www.obracha.net/patent-com.pdf>.

<sup>12</sup> U.S. CONST. art. I, § 8, cl. 8.

<sup>13</sup> See Malla Pollack, *The Multiple Unconstitutionality of Business Method Patents: Common Sense, Congressional Consideration, and Constitutional History*, 28 RUTGERS COMP. & TECH. L.J. 61, 86-108 (2002) (discussing historical evidence that “useful Arts” was understood at the time of the Constitution as “mechanical arts” or “technological arts”). Cf. *id.* at 82-84 (discussing ambiguities regarding whether “Inventors” was meant to be limited to original discoverers or included importers of new technologies).

<sup>14</sup> *Evans v. Eaton*, 16 U.S. (3 Wheat.) 454, 519 (1818) (Story, J., app. Note II, *On the Patent Laws*).

<sup>15</sup> See Patent Act of April 10, 1790, ch. 7, 1 Stat. 109, 110, § 1 (1790) (“if they shall deem it sufficiently useful and important”); *Grant v. Raymond*, 31 U.S. 218, 228, 241 (1832) (argument by defendant noting that this discretionary power of the 1790 Act was repealed by the 1793 Act).

sought to develop rules regarding the nature of patentable inventions.<sup>16</sup> Congress withdrew that discretionary authority in the 1793 Act when it adopted a registration system (although Congress restored the authority in the 1836 Act when it reinstated substantive examination).<sup>17</sup> The judiciary then took up the task of specifying the nature of patentable inventions contemplated by the statute and authorized by the Constitution.<sup>18</sup> Cases during the middle of the 19<sup>th</sup> Century in the United States thus held that patents could not be granted for discoveries of science, nature, and ideas, and did so by reference to earlier English cases.<sup>19</sup> Further, these cases relied on earlier English cases to treat newly discovered scientific principles as prior art public knowledge, free for all to use, when evaluating the nature of and creative contribution made by any patented invention.<sup>20</sup>

The actual grounds for these exclusions from patentable subject matter, however, were not clearly articulated in the U.S. case law. The English cases (focusing on the meaning of “manufactures”) and the 19<sup>th</sup> Century American cases articulated two concerns with patents for new discoveries of nature, science, and ideas.<sup>21</sup> First, newly discovered scientific principles reflect operations that lack physical embodiment and are

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<sup>16</sup> Letter of Thomas Jefferson to Isaac MacPherson (Aug. 13, 1813), *reprinted in* THOMAS JEFFERSON, THE PORTABLE THOMAS JEFFERSON 531-32 (Merrill D. Peterson ed., Penguin Books 1977) [hereinafter Jefferson, MacPherson Letter].

<sup>17</sup> *See* Patent Act of July 4, 1836, ch. 357, 5 Stat. 117, 121, § 7 (1836) (“if the Commissioner shall deem it to be sufficiently useful and important, it shall be his duty to issue a patent therefor.”); *Grant*, 31 U.S. at 241 (holding under the Patent Act of 1793, as amended by the Patent Act of 1800, that “[i]f the prerequisites of the law be complied with, [the secretary of state, as a ministerial officer] can exercise no judgment on the question whether the patent shall be issued.”).

<sup>18</sup> This inquiry can have two dimensions – the types of subjects that can qualify as inventions and the degree of creativity required to qualify as patentable inventions. These dimensions are not wholly unrelated, but also are not identical. Highly creative discoveries may not be considered inventions; minimally creative discoveries relating to excluded subjects also may not qualify as inventions. *See, e.g.,* *Diamond v. Diehr*, 450 U.S. 175, 191-92 (1981) (“insignificant post-solution activity will not transform an unpatentable principle into a patentable process”).

<sup>19</sup> *See, e.g.,* *O’Reilly v. Morse*, 56 U.S. (15 How.) 62, 116 (1854); *Le Roy v. Tatham*, 55 U.S. (14 How.) 156, 175 (1853).

<sup>20</sup> *See O’Reilly*, 56 U.S. (15 How.) at 115. *See also* *Funk Bros. Seed Co. v. Kalo Co.*, 333 U.S. 127, 130 (1948).

<sup>21</sup> The Statute of Monopolies and 19<sup>th</sup> Century U.S. cases also expressed a third concern, that the uses to which the inventions would be put were not contrary to various public policies. Specifically, the Statute of Monopolies contained numerous public policy exceptions to the grant of patents, and the statutory term “useful” in the U.S. Patent Act was recognized to impose an additional patentability requirement, *i.e.*, that the invention had been developed to the point of understanding and the application disclosed an understanding of the practical benefits to be derived from using the invention, and that such uses were not contrary to public policy. *See* 21 Jac. 1, c. 3, § 6 (1623); Patent Act of Feb. 21, 1793, ch. 11, 1 Stat. 318, §1 (1793) (“new and useful art ...”); *Evans*, 16 U.S. (3 Wheat.) at 519 (useful means “applied to a beneficial use in society, in contradistinction to ... injurious to the morals, health or good order... or frivolous or insignificant”) (citations omitted). *See also* *Lowell v. Lewis*, 15 F. Cas. 1018, 1019 (No. 8568) (C.C.D. Mass. 1817) (Story, J.) (same). In the 20<sup>th</sup> Century, the Supreme Court extended 19<sup>th</sup> Century concerns regarding abstract and overbroad claims, construing “useful” to impose a greater level of identified utility than use in research, to avoid interfering with the development of science and technology. *See* *Brenner v. Manson*, 383 U.S. 519, 534 (1966) (“Such a patent may confer power to block off whole areas of scientific development”). Although I hope to return to the question of requirements for developed utility in a separate article, I do not generally address it here (except in footnotes 48, 71 *infra*).

not tied to particular machines to accomplish functional results, *i.e.*, they are not tangible and thus are not technological inventions. Until the middle of the 19<sup>th</sup> Century, method (or process) claims ambiguously had been understood as limited to physical structural inventions or to the mechanical means used to accomplish the claimed functional result.<sup>22</sup> It was not until 1842 in England and 1853 in the United States that methods distinct from specified physical embodiments were finally and clearly determined to be patentable (and even afterwards patents were not permitted to claim processes that achieved disembodied results or that merely applied newly-discovered naturally occurring phenomena to achieve physical results).<sup>23</sup> Second, and correspondingly, scientific principles were not patentable because they are abstract and thus do not have specified concrete embodiments. Science, nature, and ideas are not limited to particular physical entities upon or through which they operate. Thus, patents on such principles would apply beyond the scope of any actual technological invention and thereby interfere with the sequential development of both science and technology.<sup>24</sup>

Over the course of the late 19<sup>th</sup> and early 20<sup>th</sup> Centuries, the boundary between unpatentable scientific discoveries and patentable technological inventions shifted.<sup>25</sup> In particular, the line between science and useful arts – and between natural and synthetic objects – began to blur,<sup>26</sup> and patent law thus expanded to protect less technological discoveries within a wider range of human activity.<sup>27</sup> Nevertheless, throughout the 20<sup>th</sup> Century the earlier prohibition on patenting science, nature, and ideas remained.

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<sup>22</sup> See, e.g., *Evans*, 16 U.S. (3 Wheat.) at 519 (citing *Boulton v. Bull*, 2 H. Bl. 463, 492 (1797) (Opinion of Lord Eyre, C.J.)); *O'Reilly*, 56 U.S. (15 How.) at 116; *Wyeth v. Stone*, 30 F. Cas. 723, 727 (C.C.D. Mass. 1840) (No. 18,107).

<sup>23</sup> See *Crane v. Price*, 1 W.P.C. 377 (1842); *Corning v. Burden*, 56 U.S. (15 How.) 252, 268 (1854); *Cochrane v. Deener*, 94 U.S. (4 Otto) 780, 787 (1877) (permitting patents on processes distinct from the physical equipment used to perform them but limited to operations performed with “certain substances”); *Dolbear v. American Bell Telephone Co.*, 126 U.S. 1, 534-35 (1888) (noting that Bell had not claimed electricity in its natural state but rather in a “specified condition” that Bell was first to create, and that even if the patent granted the right to all structures that would accomplish this purpose “that does not make his claim one for the use of electricity distinct from the particular process”). See also HAROLD I. DUTTON, *THE PATENT SYSTEM AND INVENTIVE ACTIVITY DURING THE INDUSTRIAL REVOLUTION 1750-1852* 75 (Manchester 1984) (citing WILLIAM HINDMARCH, *LAW AND PRACTICE OF LETTERS PATENTS FOR INVENTION* 84 (1848)).

<sup>24</sup> See, e.g., *O'Reilly*, 56 U.S. (15 How.) at 113; *Evans*, 16 U.S. (3 Wheat.) at 519 (citing *King v. Else*, 11 East 109, note.); *Wyeth*, 30 F. Cas. at 727; *Rex v. Wheeler*, 2 B. & Ald. 345, 354 (1819) (Abbot, C.J.). See also DUTTON, *supra* note 18, at 73 (discussing the fear of Chief Judge Abbot “that patenting a principle would give inventors the sole rights to all future improvements.”).

<sup>25</sup> Compare, e.g., *O'Reilly*, 56 U.S. (15 How.) at 113, with *Dolbear*, 126 U.S. at 534-35.

<sup>26</sup> See, e.g., *Badische Anilin & Soda Fabric v. Kalle & Co.*, 104 F. 802, 803-13 (2d Cir. 1900). See also *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980).

<sup>27</sup> See, e.g., John R. Thomas, *The Patenting of the Liberal Professions*, 40 B.C. L. REV. 1139, 1146-47, 1163-67 (1999) (discussing printed matter and business method limits on patents and difficulties distinguishing technological from non-technological things, but concluding that technology cannot simply be understood as applied science); *State Street Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 1376-77 (1998) (citing, *inter alia*, *Hotel Security Checking Co. v. Lorraine Co.* 160 F. 467 (2d Cir. 1908)).

In the late 20<sup>th</sup> Century, in *Parker v. Flook*,<sup>28</sup> the Supreme Court held that “[t]he notion that post-solution activity, no matter how conventional or obvious in itself, can transform an unpatentable principle into a patentable process exalts form over substance.”<sup>29</sup> Three years later, the Court held again, in *Diamond v. Diehr*,<sup>30</sup> that “insignificant post-solution activity will not transform an unpatentable principle into a patentable process” and that inventions implementing mathematical formula do not become patentable “simply by having the applicant ... limit[] ... the formula to a particular technological use.... [or] merely by including in the claim ... token postsolution activity.”<sup>31</sup> The Court in *Flook* thus articulated a significance threshold regarding when science is transformed by its application into technology:

“We think the case must be considered as if the principle being well known, the plaintiff had first invented a mode of applying it....” We think this case must also be considered as if the principle or mathematical formula were well known.... Respondent's process is unpatentable under § 101, not because it contains a mathematical algorithm as one component,

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<sup>28</sup> 437 U.S. 584 (1978).

<sup>29</sup> *Id.* at 590.

<sup>30</sup> 450 U.S. 175 (1981).

<sup>31</sup> *Id.* at 192 & n.14. *See id.* at 191 (“A mathematical formula as such is not accorded the protection of our patent laws ... and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment.”). Because *Diehr* expressly reaffirmed this holding of *Flook*, I do not agree that “trivialization of the holding in *Flook* and the principle underlying *Benson* may be *Diehr*'s most important legacy,” even though I agree that to date lower courts have construed *Diehr* to trivialize *Flook*. Oddi, *supra* note 8, at 1082. Significantly, and as reflected by the initial grant of certiorari in *Laboratory Corp. of America Holdings*, the Supreme Court appears to have returned to the law of patents and may soon restore life to the exclusions from patentable subject matter expressed in *Flook* and *Diehr*. *See generally* John F. Duffy, *The Festo Decision and The Return of the Supreme Court to the Bar of Patents*, 2002 SUP. CT. REV. 273. As Duffy has noted, the Court historically has taken the role of infrequently reviewing patent cases and focusing “on institutional arrangements[ and] a cautious adherence to precedent.” *Id.* at 305. When considering the transition costs of overturning the doctrinal changes imposed by the Federal Circuit, the Court should keep in mind that no natural law rights are at issue, that patent rights are wholly creatures of federal legislative discretion, that constitutional values beside stability are at stake (as discussed below), and that a regulatory takings approach to correcting lower court doctrinal errors is unwarranted, even if such decisions would wholly deprive particular patent holders of previously granted property rights. *See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabusiki Co.*, 535 U.S. 722, 724, 733 (2002) (noting concerns that the Federal Circuit not upset settled expectations and that the Court itself should leave to Congress any such changes); *cf. Penn Central v. City of New York*, 438 U.S. 104, 124, 131 (1978) (noting factual inquiries focusing on the character of the regulatory action and the nature and extent of the interference with the property as a whole); *Eastern Enterprises v. Apfel*, 524 U.S. 498, 522-37(1998) (discussing takings concerns with retrospective legislation affecting economic interests in property); *Landgraf v. USI Film Prods.*, 511 U.S. 244, 272 (1994) (noting that “constitutional impediments to retroactive civil legislation are now modest”); William J. Baumel & Thomas W. Merrill, *Deregulatory Takings, Breach of the Regulatory Contract, and the Telecommunications Act of 1996*, 72 N.Y.U. L. REV. 1037, 1041-45 (1997) (rejecting takings arguments that would require recovery of backward-looking costs for regulated industries). *See generally* Joshua D. Sarnoff, *Equality as Uncertainty*, 84 IOWA L. REV. 377, 392-93 (1999) (discussing equality concerns with consistency of judgments over time); Jill E. Fisch, *Retroactivity and Legal Change*, 110 HARV. L. REV. 1055 (1997) (discussing stare decisis and retroactive adjudication); Richard H. Fallon, Jr., *Stare Decisis and the Constitution: An Essay on Constitutional Methodology*, 76 N.Y.U. L. REV. 570 (2001) (discussing retroactivity concerns regarding constitutional decision making).

*but because once that algorithm is assumed to be within the prior art, the application, considered as a whole, contains no patentable invention.... [T]he discovery of such a phenomenon cannot support a patent unless there is some other inventive concept in its application....*<sup>32</sup>

In *Flook* and *Diehr*, the Court required the PTO and lower courts to engage in line-drawing to determine when inventions merely implement scientific knowledge or comprise technological inventions (which may then be evaluated for novelty and obviousness). Although the Court gave an example of a sufficient transition from science to technology, “e.g., transforming or reducing an article to a different state or thing,” it did not provide sufficient guidance regarding “when[,] considered as a whole, [the claimed invention] is performing a function which the patent laws were designed to protect.”<sup>33</sup> The remainder of the article provides such guidance, by seeking to explain why science, nature, and ideas are unpatentable and must be treated as prior art, by identifying constitutional concerns with patenting science, nature, and ideas, and by relating these concerns (at the statutory level) to concreteness and abstractness distinctions.

Part II of the article makes an effort to explore the *unstated* origins of the exclusions for science, nature, and ideas and why these things are free for all to use.<sup>34</sup> In theology and philosophy leading up to the 19<sup>th</sup> Century, science, nature, and ideas were understood as God’s work discovered by human analysis, and not as human work invented by human synthesis, *i.e.*, scientific principles reflect the hand of God whereas manufactures reflect “the hands of man.”<sup>35</sup> For Protestant Christians, nature either revealed God’s active presence in the world or reflected a clockwork mechanism operating according to natural laws (*i.e.*, nature’s laws) that had been established by God. Either way, science and nature were God’s work, free for all to use. Seeking to appropriate such providential or divinely presented materials to private property would reflect both untenable hubris and the sin of pride (a denial of God by crediting human agency), which had a long history even before becoming the first of the seven deadly sins.<sup>36</sup> Given the hold that religious concepts had over the minds of early Americans,

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<sup>32</sup> *Flook*, 437 U.S. at 593-94 (citing *Neilson v. Harford*, Web. Pat. Cases 295, 371 (1841), and quoting *O’Reilly v. Morse*, 56 U.S. (15 How.) 62, 115 (1853)) (second emphasis added).

<sup>33</sup> *Diehr*, 450 U.S. at 192.

<sup>34</sup> These origins were clearly perceived by some earlier analysts of the patent system. *See, e.g.*, 1 WILLIAM C. ROBINSON, *THE LAW OF PATENTS FOR USEFUL INVENTIONS* (Little, Brown 1890). However, I hope to contribute to these earlier analyses, by placing these origins in their historic context of broader developments in Western religious and philosophical thought and by explaining how earlier concerns may apply in our modern secular humanist culture.

<sup>35</sup> *Hornblower v. Boulton*, 8 T.R. 95, 99 (1799) (Lord Kenyon, C.J.). *See* CHRISTINE MACLEOD, *INVENTING THE INDUSTRIAL REVOLUTION: THE ENGLISH PATENT SYSTEM 1660-1800*, at 198, 220-221 (Cambridge 1988); DUTTON, *supra* note 18, at 72-73; EDWARD C. WALTERSCHEID, *THE NATURE OF THE INTELLECTUAL PROPERTY CLAUSE: A STUDY IN HISTORICAL PERSPECTIVE* 140-41 (William S. Hein & Co. 2002).

<sup>36</sup> *See, e.g.*, Proverbs 16:5-6, 18-19 (“The LORD doesn’t like anyone who is conceited – you can be sure they will be punished. If we truly love God, our sins will be forgiven; if we show him respect, we will keep away from sin.... To much pride will destroy you. You are better off to be humble and poor than to get rich from what you take by force.”) (Biblical quotations (other than those cited by other authors) are to the

even if it were not literally unthinkable to appropriate God's work as private property by claiming scientific discoveries to be human inventions, the exclusions for science, nature, and ideas simply "[went] without saying."<sup>37</sup>

By the end of the 18<sup>th</sup> Century, however, Enlightenment thinking also had begun to develop competing utilitarian conceptions of science, nature, and ideas (reviled by some as atheism).<sup>38</sup> Although utilitarian conceptions had begun to penetrate scientific, technological, and legal thinking within the aristocracy, they were not yet in serious competition with the dominant revelationist and deist Protestant theologies of Puritan

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Contemporary English Version (American Bible Society 1995)); THOMAS HARRISON, DIVINITY AND HISTORY: THE RELIGION OF HERODOTUS 62-70 (Oxford U. 2000) (discussing divine retribution for hubris); Wikipedia, Seven Deadly Sins, [http://en.wikipedia.org/wiki/Seven\\_deadly\\_sins](http://en.wikipedia.org/wiki/Seven_deadly_sins) (last visited Sept. 25, 2006) (identifying Pride as the most serious of the sins, attributing selection of the seven to GREGORY THE GREAT, MORALIA, SIVE EXPOSITIA IN JOB [COMMENTARY ON JOB] (578-95), and as the original sin (of Lucifer causing him to be cast out of heaven resulting in his transformation into Satan)); 2 THOMAS AQUINAS, SUMMA THEOLOGICA 1848 (Q.162, 1<sup>st</sup> Art., "Of Pride") (Christian Classics 1981) (1266-73) ("Pride (*superbia*) is so called because a man thereby aims higher (*supra*) than he is.... Now right reason requires that every man's will should tend to that which is proportionate to him. Therefore it is evidence that pride denotes something opposed to right reason, and this shows it to have the character of sin because ... *the soul's evil is to be opposed to reason.*"). Although similar concerns may animate other mythic and religious traditions, I stick here to those that were most familiar to the Protestant context of America – the Greek and Judeo-Christian traditions. Cf. KAREN ARMSTRONG, A SHORT HISTORY OF MYTH 2-4 (2005) (discussing the relationship between myth, imagination, and scientific creativity, noting that "the world of the gods ... informed the mythology, ritual, and social organization of all societies before the advent of our scientific modernity"). See generally RICHARD LATTIMORE, CLASSICAL PHILOLOGY 24-35 (1939) (discussing classical hubris); 1 REINHOLD NIEBUHR, THE NATURE AND DESTINY OF MAN 186-203 (Charles Scribner's Sons 1964) (1941) (discussing the sin of pride). As a copyright scholar, Lewis Hyde suggests that medieval Christians would have treated intellectual property as the sin of simony, because (as knowledge is a gift from God) "[t]o sell knowledge was to traffic in the sacred... Reformation Protestants were particularly sensitive to the sin of simony." LEWIS HYDE, FRAMES FROM THE FRAMERS: HOW AMERICA'S REVOLUTIONARIES IMAGINED INTELLECTUAL PROPERTY 2 (Dec. 13, 2005), available at <http://ssrn.com/abstract=870073>. But nature comes before man, and pride is the greater sin. Simony is a sin against God's sacred human creations; pride a sin directly against God. Thus, where Hyde also suggests that post-reformation Protestants would have treated intellectual creations as allodial property (with the property owners owing civic republican duties accomplished through disposition of the property to the public domain at the end of a short term), see *id.* at 23, avoiding the sin of pride would entirely prohibit property in nature *qua* nature, and thus science and nature are in the public domain "in the Beginning."

<sup>37</sup> NORTON JUSTER, THE PHANTOM TOLLBOOTH 79 (Bullseye 1996) (1961). See, e.g., Eileen M. Kane, *Patent Ineligibility: Maintaining a Scientific Public Domain*, 80 ST. JOHN'S L. REV. 519, 545 (2006) ("The absence of extensive justifications by the Court may speak for itself."). Cf. Kane, *supra*; Pamela Samuelson, *Benson Revisited: The Case Against Patent Protection for Algorithms and Other Computer Program-Related Inventions*, 39 EMORY L.J. 1025, 1097 (1990) (noting that the *Diehr* "opinion does not really explain the reasons for this rule" and that "such discoveries are considered unpatentable partly because of their 'abstractness' and partly because of the Court's view that such discoveries are merely recognizing what was already in existence, rather than creating something new").

<sup>38</sup> See, e.g., JOHN S. MILL, UTILITARIANISM (1863); Woodbridge Riley, *The Rise of Deism in Yale College*, 9 AM. J. THEOLOGY 474, 481-82 (1905) (discussing beliefs of Jared Spark that "the overvaluing of reason tends to promote atheism," that were not shared by Ezra Stiles, who believed that deistic theology already had "got such Head" that suppression of books could not combat it but rather discussion "'on even Footing'" would provide "'Evidences of Revelation ... nearly as demonstrative as Newton's Principia'") (citing JARED SPARK, TWO WITNESSES: OR RELIGION SUPPORTED BY REASON AND DIVINE REVELATION (New London 1746), and Ezra Stiles, Manuscripts 460 (postscript of letter of Aug. 6, 1759)).



America even within that elevated stratum of society.<sup>39</sup> Thus, even deists such as Benjamin Franklin and Thomas Jefferson, much less the more providentialist John Adams,<sup>40</sup> would have believed that science, nature, or ideas were not properly or morally subject to appropriation and commodification as private property.<sup>41</sup>

This can be understood even more clearly by tracing historic conceptions of “natural” law, which preceded and shaped the positive law generally and of patents in particular. Beginning in the late middle ages, Western religious and metaphysical thought had returned to the Biblical, nominalist stance towards nature (in contrast to earlier Aristotelian essentialist conceptions). God transcended nature rather than was immanent in it.<sup>42</sup> By the 18<sup>th</sup> Century, although deists believed that God was no longer providentially active in nature, they also believed that nature operated according to fixed principles established by God. These principles were uniformly accessible by observation through empirical analysis, and provided such knowledge of God as was humanly possible.<sup>43</sup> By the end of the 18<sup>th</sup> Century, conceptions of natural law had developed that treated physical nature and by extension its intangible principles of operation as a commons free for all to use.<sup>44</sup> Withdrawal of physical nature from the commons was permitted for a first “occupier,” given that rivalrous depletion of the occupied property might occur, so as to protect the outputs of human labor from being treated as the labor of another.<sup>45</sup>

But labor and property were invested with religious teleological significance. The right to *private* property was based on the expanded productive capacity of cultivated land, given the moral imperative (the injunction from God after the Creation in God’s image) to increase production so as to “Have a lot of children! Fill the earth with people and bring it under ... control.”<sup>46</sup> Some basic aspects of nature therefore, *i.e.*, those which

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<sup>39</sup> See generally WINTHROP S. HUDSON, RELIGION IN AMERICA: AN HISTORICAL ACCOUNT OF THE DEVELOPMENT OF AMERICAN RELIGIOUS LIFE (Charles Scribner’s Sons 1965); SYDNEY E. AHLSTROM, A RELIGIOUS HISTORY OF THE AMERICAN PEOPLE (Yale 1972).

<sup>40</sup> See AHLSTROM, *supra* note 31, at 359 (noting that Franklin, Jefferson, and Adams “represented the classical Enlightenment at its typical best... [seeking] to express the new rationalism with complete intellectual integrity... [and] to deal coherently with the separate but interrelated problems of man, God, nature, and society.”).

<sup>41</sup> See *infra* notes \_\_\_-\_\_\_ and accompanying text. Cf. MARGARET JANE RADIN, CONTESTED COMMODITIES 114 (Harvard U. 1996) (“it seems that the values of personhood and community pervasively interact with the market and alter many things from their pure free-market form”). See generally *id.* at 1-29, 79-114 (describing “Commodification as a Worldview,” “Market-Inalienability,” “Human Flourishing and Market Rhetoric,” and “Incomplete Commodification”).

<sup>42</sup> See WILLIS B. GLOVER, BIBLICAL ORIGINS OF MODERN SECULAR CULTURE: AN ESSAY IN THE INTERPRETATION OF WESTERN HISTORY 83 (Mercer 1984).

<sup>43</sup> See, e.g., ARMSTRONG, *supra* note 28, at 125 (for emancipating “science from the shackles of mythology” and discussing Isaac Newton’s belief that scientific discovery of the cosmic system proved the existence of God (citing FRANCIS BACON, ADVANCEMENT OF LEARNING (1605))).

<sup>44</sup> See JOHN LOCKE, TWO TREATISES OF GOVERNMENT 327-28 (Peter Laslett ed., New York 1965) (1690); 2 WILLIAM BLACKSTONE, COMMENTARIES ON THE LAW OF ENGLAND, 1765-69, at 14 (U. of Chicago 1979) (1766).

<sup>45</sup> See WILLIAM WOLLASTON, THE RELIGION OF NATURE DELINEATED 127-37 (1722).

<sup>46</sup> Genesis 1:28. See Genesis 1:27 (“So God created humans to be like himself; he made men and women.”); JEREMY WALDRON, GOD, LOCKE, AND EQUALITY 165, 169 (Cambridge U. Press 2002)

would not increase the stocks of nature for human expansion, were off-limits as private property except as temporary usufructory rights lost upon relinquishment of *possession*, as things for which rivalrous depletion (it was thought) could not occur and which did not contribute to greater productivity through property.<sup>47</sup> Because they were not rivalrous, science, the stocks of nature (understood as fungible), and ideas simply were not the proper subjects of property rights. They were not susceptible of exclusive possession in any person, and their widespread dissemination rather than their propertization would fulfill the Biblical imperative by increasing the productive capacity of nature for human, and thus for divine, ends.

By the 18<sup>th</sup> Century, science, nature, and ideas were to be free for all to use for the common good, based upon religious grounds of God's initial creation of nature as a commons and the equal claims of all humans to use the commons for self-preservation (to preserve God's human work). Science, nature, and ideas were not nothing, but as they were non-rivalrous they were no thing (*res* in the latin) capable of being property, whether (as the Romans had treated things tangible) *res publica* or *res privata*.<sup>48</sup> It was not until atheist utilitarianism took hold as a religious theology in America that science, nature, and ideas could conceptually become positive law property, based on the idea that society would be better off (*i.e.*, would make a more productive use of natural resources) if they could be temporarily owned. But they never did become positive property as a legislative or judicial matter, and there is good reason to think that they could not under the Constitution (at least under originalist interpretations thereof).

Further, an even more basic theological conception also prohibited granting property rights in science, nature, and ideas. This was a moral duty to share freely with fellow humans the intangible information they had discovered about nature (which as a result but not as a cause would increase production for common benefit).<sup>49</sup> Obtaining knowledge of God through nature was the central moral purpose of human life. God had created nature so as to communicate God's awareness of self-goodness, and by acquiring knowledge of God through knowledge of nature humans would glorify God.<sup>50</sup>

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(focusing on “the enormous distinction between cultivation and other modes of subsistence so far as seventeenth- and eighteenth-century thought about European settlement in the Americas is concerned,” and noting that Locke based his theory of property on the idea that “God has commanded us to work hard and subdue the earth, making it bring forth just as much plenty and enabling it to sustain just as many people as it possibly can. ‘[T]he great Design of God, *Increase and Multiply*’ ... and ‘the main intention of Nature, which willeth the increase of Mankind’ ... are what drive Locke’s sense of the importance of labor and cultivation.”) (citations omitted).

<sup>47</sup> See, e.g., 2 BLACKSTONE, *supra* note 36, at 14.

<sup>48</sup> Cf. Frank D. Prager, *The Influence of Mr. Justice Story on American Patent Law*, 5 AM. J. LEGAL HIST. 254, 257 (1961) (“Undeniably, all inventions are intangible things – a fact which is reflected by the lack of an inventor’s right in Roman law. Method inventions may appear particularly intangible – a fact which is reflected by the first Watt case and by [Justice] Story’s *Note*.”). See generally Michael J. Madison, *Law as Design: Objects, Concepts, and Digital Things*, 56 CASE W. RES. L. REV. 381 (2005) (discussing thingness and its myriad forms, which affect legal concepts and doctrines).

<sup>49</sup> See WALDRON, *supra* note 38 at 155-58 (discussing John Locke’s belief in the Golden Rule); *id.* at 170-72 (discussing Locke’s spoliation limitation on removing property from the commons).

<sup>50</sup> See, e.g., JONATHAN EDWARDS, *A Dissertation Concerning the End for Which God Created the World: Showing that the ultimate End of the Creation of the World is but one, and what that one end is, in*

Privatizing knowledge of nature would interfere with the divine plan of revelation itself. Because this duty was not grounded in production but rather in moral duty, it could not be eliminated by a new utilitarian productivity calculus. This moral duty continues in force, reflected in current patent law doctrine by the requirement that newly discovered scientific principles must be treated as if they were already known.<sup>51</sup> But the religious origins of this doctrine have for many years remained hidden, concealed from modern understanding by at least two centuries of development of secular humanism.

In sum, the *right of access to discovered knowledge* was understood as a natural law right held *by the public*. Social living confers on all persons (and particularly on scientists) a corresponding *moral duty* to promote “the mutual universal progress ... [and] the fulfillment of the earthly destiny of the human race.”<sup>52</sup> The discovery of scientific principles thus was understood at the end of the 18<sup>th</sup> Century as the revelation of God’s nature working through humanity for the benefit of all humans, and inventors (discoverers) thereof were merely the “favored mortals” through whom God’s divine providence was revealed for “universal benefit; they must not be niggards to the world, or hoard up for themselves the common stock.”<sup>53</sup> Private property in science, nature, and ideas would not just have been theft from the public, it would have been a sin committed directly against God.

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PURITAN SAGE: COLLECTED WRITINGS OF JONATHAN EDWARDS 598, 598-99 (Vergilius Ferm ed. Library Publishers 1953); 1 BLACKSTONE, *supra* note 36, at 39-40.

<sup>51</sup> See Parker v. Flook, 437 U.S. 584, 593-94 (1978); O’Reilly v. Morse, 56 U.S. (15 How.) 62, 115 (1854); Neilson v. Harford, (1841) 151 Eng. Rep. 1266, 1273 (Exch.), 8 M. & W. 806, 823 (1841).

<sup>52</sup> 1 ROBINSON, *supra* note 26, at 39. Again, Lewis Hyde suggests that early American Protestants would have located this social duty regarding disposition of intellectual property once acquired, in a “Republican Two Step.” HYDE, *supra* note 28, at 25. To do so would avoid the sin of simony, but not of pride; it would close the barn door once the cow is already gone.

<sup>53</sup> 17 THE PARLIAMENTARY HISTORY OF ENGLAND col. 999 (William Cobbett ed., 1806-20) (1774) (Lord Camden). Although not the subject of the present article, this understanding also makes sense of the constitutional significance of the public domain in copyright law, as a moral imperative to make culture available for the rest of humanity. See Pamela Samuelson, *The Constitutional Law of Intellectual Property After Eldred v. Ashcroft*, 50 J. COP. OFF. SOC’Y 547, 559 (2003) (“the public domain is a vast repository of raw material out of which new creations are made and vast repository of a society’s cultural heritage from which all should be able to draw once the period of protection that induced the works’ creation has expired (or should have.)”) (citing, *inter alia*, James Boyle, *The Second Enclosure Movement and the Enclosure of the Public Domain*, 66 LAW & CONTEMP. PROBS. 33, 34-35 (2003); and Symposium, *The Public Domain*, 66 LAW & CONTEMP. PROBS. 33 (2003)). See generally Pamela Samuelson, *Enriching Discourse on Public Domains*, 55 DUKE L.J. 783 (2006). More attention thus should be paid to our stance towards cultural transmission of “discoveries of history” (particularly given our secular humanist culture). Cf. GLOVER, *supra* note 34, at 200 (“Secularization has intensified man’s sense of historical existence.... The historicisms find in history a substitute for nature. The individual can thus find in the deified historical process a place to retreat from the terror of history.... Paradoxically, this extreme interpretation of historical existence [in existentialism] may nullify history itself. If each individual is nothing but what he makes himself, as Sartre has asserted, if there is complete discontinuity between individuals, or alternately, if the only possible relationship between humans is conflict, then there can be no common humanity and no history.”); WALTERSCHEID, *supra* note 27, at 265-77 (discussing the public domain in regard to granting exclusive rights for limited times, without addressing the social obligation to make science free for use immediately upon discovery).

As revealed in the legal doctrinal history traced in Part I, the exclusions from patentable subject matter for science, nature, and ideas clearly distinguished the works of God (science, nature, and ideas) from the useful human Arts. The latter were patentable; the former were not. Complex rules were developed to distinguish between these categories, to avoid the foundational and ever-tempting sin of pride. As these discovered concepts and objects were religiously proscribed from appropriation, moreover, the exclusions from patentable subject matter for science, nature, and ideas were both categorical and unexamined in the case law. They have remained fixtures in United States patent law from their inception before the 18<sup>th</sup> Century through the present.

Part III relates these historical developments to potential constitutional limitations on the patent power granted in the “Progress Clause,” or the “Authors and Inventors Clause.”<sup>54</sup> Four such limitations are briefly discussed, which would apply so long as the preamble or the body of the Clause impose limitations on the granted power (without regard to where the grant of power is actually supplied).<sup>55</sup> The first limitation is the modern utilitarian understanding that granting patents on science, nature, and ideas will impede rather than “*promote the Progress*” of “*useful Arts*,”<sup>56</sup> which motivated the

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<sup>54</sup> See U.S. CONST. art. I, § 8, cl. 8. I will refer alternately to the “Progress Clause” or to the “Authors and Inventors Clause,” depending on whether I am focusing on limitations suggested by the preamble or limitations suggested by the granted power, notwithstanding the many other possible formulations (e.g., the “Science and useful Arts” Clause or the “Writings and Discoveries” Clause).

<sup>55</sup> See generally Edward C. Walterscheid, *The Preambular Argument: The Dubious Premise of Eldred v. Ashcroft*, 44 IDEA 331, 331-34 (2004) [hereinafter Walterscheid, *Preambular Argument*] (discussing different interpretive approaches to the “Science and useful Arts Clause,” wherein the power is granted either in the preamble or the body and limited or explained by the body or the preamble); WALTERSCHEID, *supra* note 27, at 154-200 (same, also discussing potential constitutional limitations on rewards for authors and inventors other than securing exclusive rights); Edward C. Walterscheid, *To Promote the Progress of Science and Useful Arts: The Anatomy of a Congressional Power*, 43 IDEA 1, 29-71 (2002) [hereinafter Walterscheid, *Anatomy*] (discussing the potential meanings of various phrases of the Progress Clause); Anthony W. Deller, *The United States Patent System*, in MAINLY ON PATENTS: THE USE OF INDUSTRIAL PROPERTY AND ITS LITERATURE 47-48 (Felix Liebesny ed., 1972) [hereinafter MAINLY ON PATENTS] (describing five limitations in the constitutional language: (1) to “*discoveries*” (2) “which will ‘*promote the progress of useful arts*’” and (3) “which have been made by ‘*inventors*,’” (4) “limited to the ‘*exclusive right*’” and (5) “securing ... the exclusive right ... for ‘*limited times*.’”).

<sup>56</sup> See, e.g., Edward C. Walterscheid, *Divergent Evolution of the Patent Power and the Copyright Power*, 9 MARQ. INTEL. PROP. L. REV. 307, 307, 308 & n.5 (2005) (describing the parallel drafting form common at the time and the subsequent distributive interpretation of the copyright and patent provisions of the Progress Clause, or Authors and Inventors Clause) (citing *Wheaton v. Peters*, 33 U.S. (8 Pet.) 591, 684 (1834) (Thompson, J., dissenting)). There are good reasons to believe that the parallel form was intended and that exclusive rights to promote useful Arts were limited to patents (and those to promote Science were limited to then-literary copyrights, although copyrights might also extend to physically embodied expressions of principles of technological invention), as interpretive problems otherwise result. See also *infra* notes \_\_\_-\_\_\_ and accompanying text. The utilitarian framework could impose restrictions on patenting when exclusive rights for patented scientific discoveries or invented technologies would unduly retard the progress of science or technology, but might not clearly do so if patents would promote science at the expense of technology, or vice-versa. This concern is particularly acute if patents may be granted for science, nature, and ideas or if the experimental use exception were inapplicable to patented “upstream” scientific discoveries used as research tools. See, e.g., Arti K. Rai, *Regulating Scientific Research: Intellectual Property Rights and the Norms of Science*, 94 NW. U. L. REV. 77, 125-29 (1999) (discussing changing practices in light of patenting on upstream research); Henrick Holzapfel & Joshua D. Sarnoff, A Cross-Atlantic Dialog on Experimental Use and Research Tools, 48 IDEA \_\_\_ (forthcomgin 2008)

dissenting Justices in *Laboratory Corporation of America Holdings, Inc.*<sup>57</sup> The second limitation is the historic understanding traced in Part I that “*useful Arts*” (like the English “*manufactures*”) does not include scientific knowledge per se, but rather only its tangible and concrete applications (technology), even if patents on science, nature, and ideas would promote the useful Arts indirectly by creating incentives to expand scientific knowledge through discovery.<sup>58</sup> Because the first requires economic analysis beyond the scope of the present paper and the second falls out of the history in Part I and has been extensively surveyed before, I accord them relatively little discussion.

The third limitation, based on the analysis in Parts I and II of the Article, is the historic understanding that patentable “*Discoveries*” of “*Inventors*” were limited to technological advances that transform science, nature, and ideas, because patents on newly discovered scientific principles were prohibited on religious and philosophical grounds. As with the limitation to “*useful Arts*,” line-drawing to distinguish science from technology is required. Because science, nature, and ideas should be free for all to use, *patentable Discoveries* require an inventive principle beyond any newly discovered scientific principle. But given the religious nature of the limitation, such line drawing is both more important and requires steering clearer of the mark. Thus, as the Court held in *Flook* and *Diehr*, you can’t fool Mother Nature with insignificant efforts to transform scientific principles into technology.<sup>59</sup>

The religious concerns that animated the historic exclusions for science, nature, and ideas were critically important prior to, during, and after the time of the Constitution. Nevertheless, modern atheist-utilitarian sensibilities (as well as changes to our

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(discussing exclusion of research tools from European national experimental use exceptions and uncertainty regarding their status under U.S. law). See generally Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCIENCE 698, 698-701 (1998) (discussing transaction costs for scientific research of licensing upstream technologies); Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017 (1989) (discussing concerns with propertizing scientific discoveries and competing norms for free access to such discoveries, including moral norms on which free access norms are based, but without addressing any religious origins of such norms) (citing, inter alia, Robert K. Merton, *The Normative Structure of Science*, in ROBERT K. MERTON, THE SOCIOLOGY OF SCIENCE 267, 270-78 (Chicago 1973); and BERNARD BARBER, SCIENCE AND THE SOCIAL ORDER 90-91, 152 (Free Press 1952)); Rebecca S. Eisenberg, *Proprietary Rights and the Norms of Science in Biotechnology Research*, 97 YALE L. J. 177 (1987) (same).

<sup>57</sup> See *Lab. Corp. of Am. Holdings v. Metabolite Laboratories*, 126 S.Ct. 2921, 2922 (2006) (“the reason for the exclusion is that sometimes *too much* patent protection can impede rather than ‘promote the Progress of Science and useful Arts,’ the constitutional objective of patent and copyright protection.”). See generally Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839 (1990).

<sup>58</sup> See, e.g., WALTERSCHEID, *supra* note 27, at 348-70 (discussing the history of “*manufactures*” and “*principles of invention*” in regard to the “*useful arts*” language of the preamble). Cf. Pollack, *supra* note 12, at 108-19 (arguing that “*useful arts*” limits the patent power to exclusive rights in technological inventions and that such inventions did not include methods of doing business, but that Congress might approve exclusive rights similar to business method patents under the Commerce Clause); Walterscheid, *Preambular Argument*, *supra* note 47, at 332 (describing the “*traditional*” view that the preamble of the Progress Clause constitutes the grant of power and is limited to the objects described by its language).

<sup>59</sup> See *Parker v. Flook*, 437 U.S. 584, 590, 593-94 (1978); *Diamond v. Diehr*, 450 U.S. 175, 192 & n.14 (1981).

understanding of how physical nature and intangible information can be constructed and manipulated) may dampen the modern force of the exclusions for science, nature, and ideas (subsuming the “Discoveries” limitation within the first “promoting the Progress” limitation). Assuming that history matters to modern constitutional interpretation, however, historic religious concerns would require exclusions for discoveries of science, nature, and ideas if any legislative grants of patent-like exclusive rights were attempted under different heads of legislative power such as the Commerce Clause.<sup>60</sup>

More importantly, the history makes clear that patentable subject matter decisions have moral significance. They express our ethical stances towards nature and society, and whether we owe duties to (or at least show concern for) other members of society.<sup>61</sup> Even within a purely utilitarian framework, patentable subject matter decisions may involve more complex issues and more difficult line-drawing than simply calculating and comparing incentive effects on initial and sequential investment, invention, and disclosure.<sup>62</sup> As was recognized under the common law of England, patents must not be

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<sup>60</sup> See U.S. CONST., art. I, § 8, cl. 3; Thomas B. Nachbar, *Intellectual Property and Constitutional Norms*, 104 COLUM. L. REV. 272 (2004) (“one must identify the values underlying the different Section 8 restrictions and whether they are worthy of general application”). Cf. WALTERSCHEID, *supra* note 27, at 89-90 (speculating that the Framers thought an Authors and Inventors Clause was necessary, notwithstanding power under the Commerce Clause, because the means to the end of “encourage[ing] industrial innovation” otherwise might have been prohibited). Thus, not only may many utility patents be invalid, but many plant variety protection certificates for sexually reproduced plants and many patents for asexually reproduced plants (and other forms of *sui generis* protection) may be suspect. See 7 U.S.C. §§ 2321-2583 (2000); 35 U.S.C. §§ 161-64 (2000). Although I do not here elaborate on the novelty standard for plants, there are reasons to suspect it may be unconstitutional. Further, design patents would raise serious concerns when they were to protect useful functions based on their information content, and thus protect only the ornamental appearance of the functional tangible and concrete objects to which they apply. See 35 U.S.C. §§ 171-73 (2000); *In re Carletti*, 328 F.2d 1020, 1021-22 (C.C.P.A. 1964) (noting that the statute permits only ornamental designs and holding that given a functional goal, “what is more obvious than to arrange ... as was done? But it was done without thought of ornament. The creation or origination of an ornamental design does not arise in the mere avoidance of dissymmetry.”). See generally Gerard Magliocca, *Ornamental Design and Incremental Innovation*, 86 Marquette L. Rev. 845, 848 (2003) (discussing “a little-known, but disastrous, experiment [in the 19<sup>th</sup> Century] with extending a property rule over incremental design improvements that gave excessive protection to functional inventions,” *i.e.* that granted patents on utilitarian-function-dictated aspects of designs). Further, given the discussion below regarding the parallel structure of the Authors and Inventors Clause, there are reasons to question whether such “patents” should issue and whether any such protection should be limited to copyrights and thereby subjected to the originality standards and other constitutional and doctrinal limitations that have been developed therefore. See *infra* notes \_\_\_ and accompanying text.

<sup>61</sup> See MARTIN HEIDEGGER, *BEING AND TIME* (Harper & Row 1962) (1927) (discussing “Dasein,” or being in the world of nature as the basic condition of “human beings,” in which they find themselves “thrown,” and thus the relationship of human beings to the natural world is a fundamental concern, expressed for humans through the awareness of time; in other words, like inventions human beings are not abstract ideas but the modes through which the ideas are expressed – as a secular vision, by themselves – in the physical world).

<sup>62</sup> Cf. Rochelle Dreyfuss, *Protecting the Public Domain of Science: Has the Time for an Experimental Use Defense Arrived*, 46 Ariz. L. Rev. 457, 468 (2004) (noting the difficulty of line-drawing that would result from distinguishing “fundamental principles of science and ... products of nature” from patentable inventions, within a utilitarian framework of “too little incentive to the end use dimension, leading to under-dissemination and utilization” and of “retroactively legislating carve outs highly destabilizes patent value”). See generally Madison, *supra* note 40 (discussing various ways that physical and conceptual things can be constructed, understood, and evaluated for law).

“mischievous to the state by raising the price of commodities at home, or hurt of trade, or generally inconvenient,”<sup>63</sup> although these terms must now be understood in a modern sense. We must take seriously the social and personal consequences of allowing discoveries of science, nature, and ideas to be subject to private control.<sup>64</sup> This commonsense understanding of the morality of the patent system to date has been almost wholly ignored as a legal matter, although the public (and perhaps the Supreme Court) is increasingly concerned that individual patent holders are not longer performing their social duties.<sup>65</sup>

The fourth limitation, also based on “*promoting the Progress*,” is the requirement for an invention to constitute a significant technological advance over prior public knowledge (now understood as a nonobvious contribution to the art).<sup>66</sup> Unlike the categorical line-drawing regarding “Discoveries” just discussed, this limitation imposes a restriction on granting exclusive rights to “*Inventors*” based on the degree of inventive creativity involved, so as to avoid withdrawing constructively possessed knowledge from the public domain.<sup>67</sup> The history of this limitation (briefly traced in Part III) reflects both

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<sup>63</sup> Statute of Monopolies, 21 Jac. 1, c. 3, § 6 (1623).

<sup>64</sup> See 1 NIEBUHR, *supra* note 28, at 107 (“In John Stuart Mill the obligation toward the general welfare is held within a hedonistic scheme only with the greatest difficulty. This naturalism is Stoic rather than epicurean, despite its protestations.... That this virtue is not as perfect as had been assumed dawns upon the last of the great utilitarians, Jeremy Bentham, who discovers.... this egoistic tendency [against which] Bentham is forced to set political rather than purely rational restraint.... which means that he will use government to distribute rewards and punishments in such a way as to counteract the tendency in individual welfare to seek his own advantage at the expense of the general welfare.”).

<sup>65</sup> See, e.g., Kane, *supra* note 29, at 45 (discussing the increased involvement of “a vigorous public interest sector in intellectual property law” policing “the borders of patentable subject matter”); Duffy, *supra* note 23, at 283, 294-95 (discussing the Court’s increasing interest in “directing the development of [patent] law” and its historic attention to preemption of state law, federal common law of licensing, and federal misuse-antitrust issues). Cf. Joseph Vining, *Law’s Own Ontology A Comment on Law’s Quandary*, 55 CATH. U. L. REV. 695, 704 (2006) (discussing legal ontological commitments – different from those of science and more similar to those of religion – “to the presence of persons whose statements and actions may be spread over time both within and beyond an individual span of life”); Carol M. Rose, *Property as the Keystone Right?*, 71 NOTRE DAME L. REV. 329, 351-56 (1996) (discussing the role of property and conceptions about property play in developing “moral sentiments”); Elizabeth Weise, *Outrage pending over Net patents: Do grants harm free exchange of ideas?*, USA Today (2000), <http://www.usatoday.com/tech/columnist/cceli011.htm> (last visited Sept. 25, 2006) (“The problem with patent law - and the problem for the people at the U.S. Patent and Trademark Office who enforce it - is that it's a 19th century construct trying to deal with 21st century issues.”); ROSEMARY BECHLER, UNBOUNDED FREEDOM: A GUIDE TO CREATIVE COMMONS THINKING FOR CULTURAL ORGANIZATIONS 3-51 (2006), [http://www.counterpoint-online.org/doclibrary/british\\_council/download/335/Unboundedfreedom.pdf](http://www.counterpoint-online.org/doclibrary/british_council/download/335/Unboundedfreedom.pdf) (discussing concerns over posthumous copyright control of authors works, the “second enclosure” by the development of copyright in England, and modern moral concerns with restricting the form of organizations that control information and the effects thereof on individuals who want access to information).

<sup>66</sup> See Patent Act of April 10, 1790, ch. 7, 1 Stat. 109, 110, § 1 (1790) (requiring the Patent Office to review applications to determine if the disclosed “invention or discovery [was] sufficiently useful and important” to warrant granting a patent); *Hotchkiss v. Greenwood*, 52 U.S. (11 How.) 248 (1851); 35 U.S.C. § 103(a) (2000). See generally Edward C. Walterschied, *The Hotchkiss Unobviousness Standard: Early Judicial Activism in the Patent Law*, 13 J. INTELL. PROP. L. 103 (2005) (hereinafter Walterschied, *Hotchkiss*).

<sup>67</sup> See *Graham v. John Deere Co.*, 383 U.S. 1, 5-6 (1966); *Great Atl. & Pac. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 152-53 (1950). Although this limitation might be though more utilitarian than

categorical rules and repetitive case-specific decisions that exclude inventions from patentability and which look very similar to subject matter exclusions. The reason for the similarity becomes apparent from the discussions in Part I and Part II. So long as newly discovered scientific principles are required by social duty to be placed in the prior art free for all to use, some additional and sufficiently creative inventive principle beyond the mere application of scientific principles must be identified for patentable invention. Only then can one draw the line “between the things which are worth to the public the embarrassment of an exclusive patent, and those which are not.”<sup>68</sup>

Nevertheless, the categories of ineligible subject matter and of obvious inventions are not coextensive, *i.e.*, our theoretical understanding of and policy decisions regarding what sufficiently transforms nature to constitute a patentable technological invention may differ from those regarding what comprises a sufficiently creative contribution to warrant granting a patent. Stated differently, the Supreme Court must decide whether claimed new inventions sufficiently transform new scientific, natural, and abstract discoveries to contain patentable *invention* and whether the claim reflects sufficient inventive creativity to be a *patentable* invention.<sup>69</sup> Thus, the courts and Congress will continue to be faced by related but ultimately dissimilar line-drawing concerns, the one raised in *Flook* and *Metabolite*, the other currently at issue in *KSR International Co. v. Teleflex, Inc.*<sup>70</sup> It matters which of the categories are chosen, because administrative and judicial decisions made on the basis of subject matter ineligibility play an important gate-keeping role,<sup>71</sup>

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deontological in its nature, based on the “promoting progress” language, it should be understood as deontological in origin and thus as significantly different from the first constitutional limitation. If the public has a right to use knowledge already in its constructive possession, giving exclusive rights to individuals over such knowledge is an infringement of that right, a form of compelled transfer. Such “property is theft,” and theft is a moral wrong (and potentially a criminal offense). See Wikipedia, Property is theft!, [http://en.wikipedia.org/wiki/Property\\_is\\_theft](http://en.wikipedia.org/wiki/Property_is_theft) (last visited Oct. 10, 2006) (noting the origin of the expression as a slogan coined by a French anarchist, “La Propriété, c’est le vol!,” and similar sentiments expressed 200 years earlier by the English Diggers) (quoting PIERRE-JOSEPH PROUDHON, QU’EST-CE QUE LA PROPRIÉTÉ? OU RECHERCHE SUR LE PRINCIPE DU DROIT ET DU GOUVERNEMENT (1840), and citing GERARD WINSTANLEY ET AL., THE TRUE LEVELLERS STANDARD ADVANCED: OR, THE STATE OF COMMUNITY OPENED, AND PRESENTED TO THE SONS OF MEN (1649)). Cf. LOCKE, *supra* note 36, at 41 (“[H]aving renounced Reason, the common Rule and Measure God hath given Mankind... [the criminal] hath committed [an offense] ... and therefore may be destroyed, as a Lyon or a Tyger, one of those wild Savage Beasts, with whom Men can have no Society nor Security.”).

<sup>68</sup> Jefferson MacPherson letter, *supra* note 15, at 531-32.

<sup>69</sup> See, e.g., HAROLD G. FOX, MONOPOLIES AND PATENTS: A STUDY OF THE HISTORY AND FUTURE OF THE PATENT MONOPOLY 235 (U. of Toronto 1947) (noting that in *Crane v. Price*, 1 W.P.C. 377 (1842), “a new idea had been injected into the law of patents” that “the *subject matter* of a particular patent was not of sufficient significance to be dignified by the grant of letters patent... Gradually there grew up the theory that in order for a patent to have proper subject matter, the invention which it disclosed must be such as would have required an inventive act of the mind to have produced it.”) (emphasis added).

<sup>70</sup> 127 S.Ct. 1727, 1739, 1740 (2007). See generally Brief of Economists and Legal Historians as Amicus Curiae in Support of Petitioner, in *KSR International, Co. v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007) (No. 04-1350).

<sup>71</sup> See David S. Olson, *Patentable Subject Matter: The Problem of the Absent Gatekeeper* (Stanford Law School Center for Internet and Society 2006), available at <http://ssrn.com/abstract=933167> (concluding on the basis of “economic modeling and a case study of business method patents” that the abandonment of the gatekeeping role “is bad for society, because it results in patents being granted in areas in which inventors do not need the incentive of monopoly grants.”). Although this utilitarian analysis is likely accurate, such



and because case-specific obviousness determinations are burdensome for administration if categorical rules of obviousness are not adopted.<sup>72</sup> Further, there is an increasing tendency of Congress to create exceptions to and limitations on the obviousness standard, affecting social relations and scientific-industrial organization.<sup>73</sup>

Different kinds of line-drawing problems thus arise under the different constitutional theories. Utilitarian concerns regarding promoting progress have yet to be explicitly enforced in regard to patentable subject matter, and have been only weakly enforced in regard to copyright subject matter<sup>74</sup> (although utilitarian concerns have been enforced in regard to “Inventors” under the obviousness standard and its predecessors). In contrast, until the late 1990s under the Federal Circuit’s jurisprudence, deontological concerns regarding “useful Arts” or “Discovery” were much more vigorously enforced.<sup>75</sup> Given the dramatic transformations since the 18<sup>th</sup> Century in religious, philosophical, and scientific thought, the Federal Circuit’s efforts to abandon tangibility and concreteness limitations are understandable (even if they may be unconstitutional).<sup>76</sup> But given the understanding discussed in Part II that science, nature, and ideas are free for all to use (and thus when newly discovered are treated as prior art), concerns over abandoning tangibility and concreteness limitations should and do remain salient. Even if no constitutional limitations are imposed, lines must be drawn. Sections 101, 102, and 103 of the Patent Act must always be interpreted with the exclusions for science, nature, and ideas as their foundation.

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gatekeeping may be more needed to symbolize and reinforce conceptions of social duty than to prevent temporal delays and waste of productive resources.

<sup>72</sup> See, e.g., *Dann v. Johnston*, 425 U.S. 219 (1976) (deciding unpatentability on obviousness grounds, although a subject matter challenge also was presented); *Atlantic Works v. Brady*, 107 U.S. 192, 200 (1883) (such patents “embarrass[] the honest pursuit of business with fears and apprehensions of concealed liens and unknown liabilities to lawsuits and vexatious accountings for profits made in good faith”).

<sup>73</sup> See, e.g., 35 U.S.C. §§ 103(b), (c). See generally Dan L. Burk, *Intellectual Property and the Firm*, 71 U. CHIC. L. REV. 3 (2004); Dan L. Burk, *Intellectual Property in the Context of E-Science* (Minnesota Legal Studies Research Paper, Working Paper No. 06-47, 2006), available at <http://ssrn.com/abstract=929479>.

<sup>74</sup> See, e.g., *Eldred v. Ashcroft*, 537 U.S. 186, 205 n.10, 212-213 (2003) (rejecting a “congruence and proportionality” standard of review in favor of “rational basis scrutiny” for legislative enactments to “promote the Progress of Science,” finding such rationality for legislative extension of copyright terms from Congressional purposes to harmonize U.S. law with that of the European Union, to provide greater incentives for creation and dissemination of works, and to encourage copyright holders to invest in restoration and public distribution, and relying on “consistent congressional practice” and “‘contemporaneous legislative exposition’”) (citation omitted); *id.* at 212 (noting that “petitioners do not argue that the Clause’s preamble is an independently enforceable limit on Congress’ power”). See generally Walterscheid, *supra* note 27; Walterscheid, *Preambular Argument*, *supra* note 47; Pamela Samuelson, *Economic and Constitutional Influences on Copyright Law in the United States*, 23 EURO. INTELL. PROP. REV. 409 (2001).

<sup>75</sup> See, e.g., *Parker v. Flook*, 437 U.S. 584 (1978); *Gottschalk v. Benson*, 409 U.S. 63 (1972).

<sup>76</sup> Cf. e.g., Madison, *supra* note 40, at 382 (noting “the paradox that in an era of increasing depysicalization of the artifacts of our lives, thingness may matter more than ever”); Brian Greene, *A Theory of Everything? Some physicists believe string theory may unify the forces of nature*, NOVA SCIENCE PROGRAMMING ON AIR AND ONLINE, <http://www.pbs.org/wgbh/nova/elegant/everything.html> (last visited Sept. 25, 2006) (discussing how nature may be understood as the result of music-like vibrations of strings, so that the information content of the performance determines the structure of physical reality); Michael W. Carroll, *Whose Music Is It Anyway?: How We Came to View Musical Expression As a Form of Property*, 72 U. CIN. L. REV. 1405, 1245-48 (2004) (discussing social roles in regard to owning music as property).

Finally, Part IV seeks to apply the insights from Parts I, II, and III to a few specific line-drawing questions presented by life and information sciences (in particular, patents on genetic sequences and diagnostic methods, computer software, data structures, and information signals) and business methods.<sup>77</sup> The discussion is impressionistic, seeking to highlight both that the Federal Circuit and the PTO have identified the right categories for analysis (requiring for patentability a “useful,”<sup>78</sup> “concrete” and “tangible” result) and that they have improperly sought to avoid having to draw the necessary lines between scientific (discovered) and technological (inventive) principles.<sup>79</sup> This history

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<sup>77</sup> See, generally Rebecca S. Eisenberg & Robert P. Merges, *Opinion Letter as to the Patentability of Certain Inventions Associated with the Identification of Partial cDNA Sequences*, 23 AIPLA Q.J. 1 (1995); John H. Barton, *Patents, Genomics, Research and Diagnostics*, 77 ACAD. MEDICINE 1339 (2002); John M. Conley & Robert Makowski, *Back to the Future: Rethinking the Product of Nature Doctrine as a Barrier to Biotechnology Patents* (pt. 1), 85 J. PAT. & TRADEMARK OFF. SOC’Y 301 (2003); John M. Conley & Robert Makowski, *Back to the Future: Rethinking the Product of Nature Doctrine as a Barrier to Biotechnology Patents* (pt. 2), 85 J. PAT. & TRADEMARK OFF. SOC’Y 371 (2003); Richard S. Gruner, *Intangible Inventions: Patentable Subject Matter for an Information Age*, 35 LOY. L.A. L. REV. 355 (2002); Jay Dratler, Jr., *Does Lord Darcy Yet Live? The Case Against Software and Business-Method Patents*, 43 SANTA CLARA L. REV. 823 (2003).

<sup>78</sup> Both the PTO and the Federal Circuit appear more willing to engage in necessary line drawing regarding the “useful” (or utility) criterion than in regard to the tangibility and concreteness criteria. See, e.g., *PTO Interim Utility Guidelines*, supra note 7, at 4 (requiring “‘real world’ value” as distinct from “an idea or concept, or ... a starting point for future investigation or research”); *In re Fisher*, 421 F.3d 1365, 1369-78 (Fed. Cir. 2005) (rejecting as having insufficient utility broad claims to certain expressed sequence tags, or ESTs, for identifying nucleic acid sequences in maize genes). Whether utility has been sufficiently developed raises particularly cogent concerns regarding promoting technological progress and the abstractness of scientific discoveries, because granting of broad patents on new scientific discoveries having broad potential application would unduly interfere with sequential innovation. See, e.g., Arti K. Rai & Rebecca S. Eisenberg, *Bayh-Dole Reform and the Progress of Biomedicine*, 66 LAW & CONTEMP. PROBS. 289, 289 (2003) (“One important reason for this change [to open science norms by patenting of upstream technologies] has been a narrowing of the conceptual gap between fundamental research and commercial application”); Joshua D. Sarnoff, *The Historic and Modern Doctrines of Equivalents and Claiming the Future, Part I (1790-1870)* (pt. 1), 87 J. PAT. & TRADEMARK OFF. SOC’Y 371 (2005) [hereinafter Sarnoff, *Claiming the Future Part I*] (tracing the expansion of the permissible scope of claims under American patent law, in particular in regard to claiming language and enablement requirements); Joshua D. Sarnoff, *The Historic and Modern Doctrines of Equivalents and Claiming the Future, Part II (1870-1952)* (pt. 2), 87 J. PAT. & TRADEMARK OFF. SOC’Y 441 (2005) [hereinafter Sarnoff, *Claiming the Future Part II*] (same).

<sup>79</sup> See, e.g., Rebecca S. Eisenberg, *Analyze This: A Law and Economics Agenda for the Patent System*, 53 VAND. L. REV. 2081, 2085 (2000) (“The trend of authority in the Court of Appeals for the Federal Circuit is to exclude from the ambit of the patent system only useless abstractions.”). This article does not directly address concerns regarding the requirement to develop an understanding of and to disclose only for some of the uses of inventions for which exclusive rights are granted, particularly in light of the expanding scope of permissible claims relative to disclosed utilities. Patents historically have provided exclusion for all but experimental uses, and not just the uses contemplated and disclosed by the inventor. This derives from the idea (traced here) that the “principles of invention” are inherent in mechanical inventions (or in the modes of process inventions). See, e.g., *Odiorne v. Winkley*, 18 F. Cas. 581 (C.C.D. Mass. 1814) (No. 10,432) (discussing the need to determine whether allegedly infringing machines “were not substantially, in principles and mode of operation, like the plaintiff’s” in which case they would infringe regardless of the purposes to which they were put); Prager, supra note 40, at 262 (“Story seemed inclined to interpret these terms “‘useful’” in the American patent act and “‘not mischievous’ and ‘not hurtful to trade’” in the English Statute of Monopolies, suggesting discretionary *moral and social harm* limits). See generally Robert Lutz, *Evolution of the Claims of U.S. Patents* (pt. 2), 20 J. PAT OFF. SOC’Y 377, 377-78 (1938)

discussed in Part I reveals that patents may not properly be granted for intangible principles of invention that do not have tangible and concrete *applications* that are sufficiently distinct from the physical embodiments of the scientific principles on which they operate. Although some inroads have been made on patenting nature in the 20<sup>th</sup> Century (once God was banished and the physical cause of nature replaced with a big bang that lacks any moral imperative), the scientific principles on which nature operates and nature itself have remained off-limits from patent protection. Thus, for example, the thousands of existing patents for isolated and purified genetic sequences and the forthcoming flood of patents on information signals should be understood as both unconstitutional and unauthorized by statute.

By allowing patents for physical structures or intangible processes that either do not transform nature or that comprise only trivial physical applications of the information outputs of the process (howsoever much labor was involved in scientific discovery and howsoever socially useful the results), the Federal Circuit and the PTO have severed patent law from its theological, metaphysical, and historical origins. The recent decision of the PTO's Board of Patent Appeals and Interferences in *Ex Parte Lundgren* is thus profoundly wrong, as there has always been and there still remains (as reflected in cases saying that science, nature, and ideas are not patentable) a "technological arts" test in patent law.<sup>80</sup> Further, even if the border between science and technology is now porous, there remains a moral and legal imperative to distinguish scientific principles and natural phenomena from patentable human technological inventions.

How should we distinguish science from technology in our modern secular culture? Given that scientists in the 18<sup>th</sup> Century understood that nature, science, and ideas were God's handiwork, of which they were only discoverers using the empirical

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(discussing the principle of invention approach to determining patent scope, under section 3 of the 1793 Patent Act and section 6 of the 1836 Patent Act). Because such patents could be found void at English common even if granted under the Royal prerogative, one can treat this as either a restriction on subject matter or as an additional statutory requirement. Prager thus describes how usefulness ceased to be enforced when obviousness took the place of usefulness, but even then it was recognized that "a patent cannot be valid if it covers 'the mere change of one known mechanical equivalent for another' or the mere new use of an old means." Prager, *supra* note 40, at 263. In any event, to be patentable, an invention had to contain a new principle of invention, but the patent would then exclude others from all uses of the principle. Although new uses of an existing physical invention were not then considered patentable, as they applied no new inventive principle, they are now. See R.S. FITTON, *THE ARKWRIGHTS: SPINNER OF FORTUNE* 41 (Manchester 1989) (discussing Lord Kenyon's answer in the negative to Arkwright's question whether a patent could be granted for a new use of an existing patented machine, because "'It is the Machine, & not the application of it, that is the object of the patent.'"). Compare, e.g., *Howe v. Abbott*, 12 F. Cas. 656, 658 (C.C.D. Mass. 1842) (No. 6,766) (patents may not issue solely for new uses of processes or machines) with *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 809-10 (Fed. Cir. 2002) (blocking patents for new uses of machines are a commonplace). Further discussion of these issues is beyond the scope of the current article. However, I hope to return at a later date to the question of whether patents should be limited to disclosed utilities.

<sup>80</sup> See *Ex Parte Lundgren*, 76 U.S.P.Q.2d 1385, 1388 (B.P.A.I. 2004) ("Our determination is that there is currently no judicially recognized separate "technological arts" test to determine patent eligible subject matter under Section 101. We decline to create one.").

method,<sup>81</sup> they perceived relatively clear boundaries between the formal categories of science and the technology of human handiwork.<sup>82</sup> This was true even though they understood that technology was distinguished from science only by reflecting the principles of the nature that they had discovered back upon nature itself.<sup>83</sup> Thus, although atheist utilitarianism later allowed them to more fully blur the conceptual lines between God-given science and human-created technology, at that time scientists needed to keep these lines sufficiently clear to avoid the hubris of claiming God's work as their own. Their distinctions may help us to understand the ways that appropriate lines may be drawn between science and technology if we reject any religious grounds for distinction.

In sum, we must continue to take the historic distinctions between God's work and human work seriously, as reflected in the requirement for significant post-solution activity and an additional inventive principle as articulated in *Flook*. Once the information content of the discovered scientific principle is (metaphorically) wrested from the inventor and transferred to public's conceptual domain for free use, many of the current patents must be understood merely to apply the discovered principle to a particular technological context and to lack either any other principle of invention or any such principle for which the public *should* suffer the embarrassment of exclusive rights. This is true even in an age where physicality is less important because we routinely manufacture information objects. Allowing the discoverer to retain possession of the information content of scientific discoveries regarding nature without imposing a duty to share that information freely (and permitting dissemination only subject to a bargained-for trade) may conflict with our basic egalitarian premises of government.<sup>84</sup>

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<sup>81</sup> See *id.*; GLOVER, *supra* note 34, at 96 (discussing Newton's "belie[f] that God had not only created the world but that he continues its existence by his will and actively governs all aspects of it"). See generally JAMES GLEICK, ISAAC NEWTON (Pantheon 2003).

<sup>82</sup> See, e.g., P. M. Heimann, *Voluntarism and Immanence: Conceptions of Nature in Eighteenth Century Thought*, in PHILOSOPHY, RELIGION AND SCIENCE IN THE SEVENTEENTH AND EIGHTEENTH CENTURIES 393-94, 401 (John W. Yolton ed., U. of Rochester 1990) [hereinafter PHILOSOPHY, RELIGION AND SCIENCE]; Shirley A. Roe, *Voltaire v. Needham: Atheism, Materialism, and the Generation of Life*, in PHILOSOPHY, RELIGION AND SCIENCE, *supra*, at 420-22; Francesca Rigotti, *Biology and Society in the Age of Enlightenment*, in PHILOSOPHY, RELIGION AND SCIENCE, *supra*, at 440; JOHN H. BROOKE, *SCIENCE AND RELIGION: SOME HISTORICAL PERSPECTIVES* 177 (Cambridge U. 1991).

<sup>83</sup> See, e.g., Heimann, *supra* note 74, at 401 (discussing view of Thomas Reid that distinguished between laws of nature and efficient causes); BROOKE, *supra* note 74, at 177 (discussing changes to the understanding of matter when associated with God's power). Cf. EDWARDS, *supra* note 42, at 598 ("In the creature's knowing, esteeming, loving, rejoicing in, and praising God, the glory of God is both *exhibited* and *acknowledged*; his fulness is *received* and *returned*. Here is both *emanation* and *re-emanation*.").

<sup>84</sup> See WALDRON, *supra* note 38, at 13-14 ("If we are to develop an egalitarian political philosophy for our own use ... it would have quite a different character from Locke's. It would be secular in its foundations – if it had any foundations – and it would not be confined in its appeal, to those who were willing to buy into a particular set of Protestant Christian assumptions.... I actually don't think it is clear that we – now – *can* shape and defend an adequate conception of basic human equality apart from some religious foundation. And I think it is quite an open question how specific, or sectarian, or scriptural, such a foundation has to be."); *id.* at 81 ("There is no reason for an atheist to recognize such a threshold [regarding the power of abstraction to reason from nature to God as distinguishing humans from beasts,] and there is no reason to believe that he could defend it if he did."); *id.* at 106 (for Locke, laborers have access to moral common sense that "involves reasoning to the existence of God using the basic capacities of human rationality and to the idea of oneself as a person required to obey Him.... [Validation in the claims of the ordinary intellect of the connection between the theological and epistemic basis of morality] lies at the heart of Locke's

Worse yet, by separating patentable subject matter decisions from their theological and philosophical origins, existing patent practices may be understood as immoral. Patentable subject matter decisions reflect our ethical stances toward the physical world and social obligation, and there are reasons to believe that our patent law and scientific and business ethics are sadly lacking.<sup>85</sup> This article thus seeks to clear the ground of the existing moral structure, so as to begin laying the groundwork of a patent-law metaphysic of morals, one of patent-law duties and not just of patent law rights.<sup>86</sup> By taking the exclusions for science, nature, and ideas, principles of patentability, and *Parker v. Flook* seriously, we will indeed “shake the foundation upon which these patents stand.”<sup>87</sup>

## I. The Legal History of the Exclusions for Science, Nature, and Ideas

### A. In the United Kingdom through the Early 19<sup>th</sup> Century

#### 1. *Boulton, Hornblower, and Exclusions for Scientific Principles*

What’s old is new again.<sup>88</sup> Over two centuries ago, in *Boulton v. Bull*,<sup>89</sup> British judges construing the English Statute of Monopolies of 1623<sup>90</sup> sought to determine the type of new knowledge that qualified as “any manner of new Manufactures,” which might entitle a “true and first Inventor” to “letters patent and grants of privilege” for its “sole working or making” for up to fourteen years (if other public-interest conditions were met).<sup>91</sup> The judges of the Court of Common Pleas who heard the case were equally

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commitment to equality.”); JOHN E. COONS & PATRICK M. BRENNAN, BY NATURE EQUAL: THE ANATOMY OF A WESTERN INSIGHT 33 (Princeton U. 1999) (“properly understood, the capacity for moral personality may not be a ‘range property’ at all but rather one that is uniform in degree. And if it is uniform, it might be the host property for the relation of human equality.”).

<sup>85</sup> See 1 NIEBUHR, *supra* note 28, at 179 (“The religious dimension of [the sin of pride] is man’s rebellion against God, his effort to usurp the place of God. The moral and social dimension of sin is injustice. The ego which falsely makes itself the centre of existence in its pride and will-to-power inevitably subordinates other life to its will and thus does injustice to other life.”); *id.* at 191 (identifying greed as the “besetting sin of a bourgeois culture,” because it tempts humans “to regard physical comfort and security as life’s final good”); G.A. COHEN, IF YOU’RE AN EGALITARIAN, HOW COME YOU’RE SO RICH? 119-20 (Harvard U. 2000) (“even granting selfishness in motivation, structure can block equality in the upshot... if people are by no *irreversibly* selfish (not by nature but) as a result of capitalist history, then, so I now think, structure alone could not suffice to deliver equality, in the face of selfishness. Even on reasonably sunny views about the limits of human nature itself, capitalist history would have thrown us into a cul-de-sac from which we could not exit and regain the road to socialism.”).

<sup>86</sup> See IMMANUEL KANT, GROUNDWORK OF THE METAPHYSICS OF MORALS (1785) (discussing the “Common Sense of Duty”).

<sup>87</sup> *Boulton v. Bull*, 2 H. Bl. 463, 494 (1795) (Opinion of Lord Eyre, C.J.).

<sup>88</sup> See Robert Browning, *The Last Ride Together*, in 1 ROBERT BROWNING, THE POEMS (John Pettigrew ed., Penguin 1981) (“With life forever old yet new, Changed not in kind but in degree, The instant made eternity.”).

<sup>89</sup> 2 H. Bl. 463 (1795).

<sup>90</sup> Statute of Monopolies, 21 Jac. 1, c. 3, § 6 (1623).

<sup>91</sup> *Id.* I use modern spellings for references to the Statute of Monopolies. The exception for such patents and grants was necessary because the Statute generally prohibited monopolies and other grants of rights affecting free trade. See *id.*, § 1 (all “monopolies ... grants ... and letters patent ... of or for the sole

divided on the question of whether the patent at issue (which had been extended to twenty-five years by an Act of Parliament) was drawn to an invention that comprised a manufacture within the meaning of the statute.<sup>92</sup> The patent addressed a broadly claimed improved method of heating steam-engines (then called fire-engines)<sup>93</sup> invented by James Watt, which was a major contributing factor to rapid industrial growth during the Industrial Revolution, and for this reason received a highly unusual legislative extension.<sup>94</sup> There was no question that Watt was the first and true inventor, particularly as the term “invention” did not then require the mental conception of an idea, but rather “denoted primarily a physical act rather than a mental process.”<sup>95</sup>

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buying, selling, making, working, or using of anything are altogether contrary to the laws of this realm, and so are and shall be utterly void and of none effect”). The history of the Statute of Monopolies as a response to royal grants of privilege, the exclusion for patents of invention, and subsequent application of the Statute in English courts is recounted in detail in Walterscheid, *Antecedents 5 Part II*, *supra* note 10; Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents* (pt. 3), 77 J. PAT. & TRADEMARK OFF. SOC’Y 771 (1995) [hereinafter Walterscheid, *Antecedents Part 3*]; and Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents* (pt. 3 continued), 77 J. PAT. & TRADEMARK OFF. SOC’Y 847 (1995) [hereinafter Walterscheid, *Antecedents Part 3 Continued*]. I do not repeat the history here, except as relevant to the points at issue. However, it is important to note that patents may grant exclusive trade privileges (as rights to exclude others), but that they do not thereby necessarily convey monopoly market power and in any event even monopolies in the economic sense were not uniformly opposed in the Statute of Monopolies or otherwise. See Statute of Monopolies, 21 Jac. 1, c. 3, §§ 5-14 (1623); FOX, *supra* note 61, at 19-145 (tracing various kinds of monopolies, monopoly grants, and concerns with them from the ancient world through the 17<sup>th</sup> Century in England); Thomas B. Nachbar, *Monopoly, Mercantilism, and the Politics of Regulation*, 91 Va. L. Rev. 1313, 1818-1867 (2005) (discussing monopoly concerns in 17<sup>th</sup> Century England in light of the dominant mercantilist economic order of the time, how they shaped the Statute of Monopolies, and their relation to modern intellectual property laws). See generally Giles S. Rich, *The Relation between Patent Practices and the Anti-Monopoly Laws*, 24 J. PAT. & TRADEMARK OFF. SOC’Y 85 (1942) (describing historic beliefs that patents are monopolies and confusion regarding the terminology). As an economic matter, monopoly market power cannot be presumed, and depends on the degree to which adequate commercial substitutes exist for the patented technology. See, e.g., *Walker Process Equip., Inc. v. Food Mach. & Chem. Corp.*, 382 U.S. 172, 177-78 (1965); *Illinois Tool Works Inc. v. Independent Ink, Inc.*, 126 S.Ct. 1281, 1288-91 (2006).

<sup>92</sup> See *Bulton*, 2 H. Bl. at 463-64, 500; An Act for vesting in James Watt, Engineer, his executors, administrators and assigns the sole use and property of certain steam engines commonly called fire engines, of his invention, for a limited time, 15 Geo. 3, c. 61 (1775).

<sup>93</sup> Watt was advised to claim his invention broadly so as to apply to many potential mechanical applications of his inventive “principles,” which would “secure you as effectively against piracy as the nature of the invention will allow.” DUTTON, *supra* note 18, at 73 (quoting Eric Robinson, *James Watt and the Law of Patents*, 13 TECH. AND CULTURE 115, 120 (1972), for instructions given to Watt by Dr. Small). Applicants legitimately feared that by claiming arrangements of structure that implement principles, rather than the principles themselves, courts would narrowly construe the patented invention and would not find infringement for machines that employed the principle. See Walterscheid, *Antecedents Part 3*, *supra* note 83, at 798-99.

<sup>94</sup> See 1 ROBINSON, *supra* note 26, at 118; Walterscheid, *Antecedents Part 3*, *supra* note 83, at 799. See generally MACLEOD, *supra* note 27; DUTTON, *supra* note 18.

<sup>95</sup> Walterscheid, *Antecedents 5 Part II*, *supra* note 10, at 856 n.25 (citing E. Wyndham Hulme, *The History of the Patent System Under the Prerogative and at Common Law*, 12 L. Q. REV. 141, 151-52 (1896); and E. Wyndham Hulme, *The History of the Patent System Under the Prerogative and at Common Law, A Sequel*, 16 L. Q. REV. 44, 44, 52 (1900)). See *id.* at 877 (discussing Lord Coke’s interpretation of “first and true inventor” as a person responsible for conceiving or importing, so as to exclude such royal grants solely to reward court favorites)..

All of the judges apparently agreed, in the words of Chief Judge Lord Eyre, that “[u]ndoubtedly there can be no patent for a mere principle....”<sup>96</sup> In the words of Defendant Bull’s counsel, “mere principles” could not be patented because: (1) they could not provide an enabling disclosure for using the invention “without the expence of trying experiments”; (2) because they were not “manufactures”; and (3) by obtaining patents on principles “the public is prevented, during the term from improving on those principles, and at the end of the term is left in a state of ignorance as to the best, cheapest and most beneficial manner of applying them.”<sup>97</sup> Bull also had argued (in the alternative) that if the patent was for a principle, it was initially void and could not have been extended; if it was for a machine, as indicated in the language of the extension Act, it was void because what machine was covered was uncertain and inadequately described by the specification; and that if the extension applied to a machine described in the original patent it must be invalid because it was not limited to the improvement actually invented.<sup>98</sup>

No judgment was rendered by the Court, although the earlier-issued injunction was continued.<sup>99</sup> The judges differed in regard to whether the patent did or could claim a disembodied method (*i.e.*, a process distinct from particular arrangements of physical embodiments<sup>100</sup> – mechanical structures – that accomplished the useful result of decreased energy consumption) and thus differed as to whether the invention was patentable.<sup>101</sup> Lord Eyre noted “that it was admitted in the argument at the bar that the word ‘manufacture’ ... applied not only to things made but to the practice of making, to principles carried into practice in a new manner, to new results of principles carried into

<sup>96</sup> *Boulton*, 2 H. Bl. at 495 (Lord Eyre, C.J.). See *id.* at 485 (Buller, J).

<sup>97</sup> See *id.* at 472-73 (citing *Turner v. Winter*, 1 Term Rep. B.R. 606 (K.B. 1787), *Millar v. Taylor*, 4 Burr. 2303, 2361 (1769), and Judge Buller’s summary to the jury in *Rex v. Arkwright*, 25 Geo. 3 (1875)); DUTTON, *supra* note 18, at 73.

<sup>98</sup> See *Boulton*, 2 H. Bl. at 470-76.

<sup>99</sup> See Walterscheid, *Antecedents Part 3*, *supra* note 83, at 800.

<sup>100</sup> See *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 386 (1996) (“the whole subject-matter of a patent is an embodied conception outside of the patent itself.”) (citation omitted).

<sup>101</sup> Compare *Boulton*, 2 H. Bl. at 495 (Lord Eyre, C.J.) (describing the invention as a practical manner of accomplishing a result, *i.e.*, a “process” rather than a “principle,” and holding patentable “a principle so far embodied and connected with corporeal substances as to be in a condition to act, and to produce effects”), *with id.* at 478 (Rooke, J.) (the “new invented method therefore conveys to my understanding the idea of a new mode of construction. I think those words are tantamount to fire engines of a newly invented construction”), *id.* at 482 (Heath, J.) (“This is a new species of manufacture, and the novelty of the language is sufficient to excite alarm. I asked in the argument for an instance of a patent for a method, and none could be produced.... [I]t has been always holden, that the organization of a machinery may be the subject of a patent, but principles cannot.”), and *id.* at 486, 489-90 (Buller, J.) (“I think it impossible to support a patent for a method only, without having carried it into effect and produced some new substance.... This brings us to the true foundation of all patents, which must be the manufacture itself.... When a patent is taken for an improvement only, the public have a right to purchase that improvement by itself, without being incumbered with other things.... But here the Plaintiffs claim the right to the whole machine.”). See Walterscheid, *Antecedents Part 3 Continued*, *supra* note 83, at 855, 856, 857 & n.193 (noting the common law understanding at the end of the 18<sup>th</sup> Century that a principle of nature could not be patented because knowledge of the physical universe should be available to all, and the early 19<sup>th</sup> Century understanding that most patents were for methods of doing things and if not accompanied by separately patentable embodiments were “‘not good’”) (quoting DUTTON, *supra* note 18, at 74 (quoting WILLIAM HANDS, *THE LAW AND PRACTICE OF PATENTS FOR INVENTIONS* 6 (1808))).

practice.”<sup>102</sup> By the practice of making Lord Eyre apparently contemplated processes accomplishing useful results through physical (tangible) means: “Under the practice of making we may class all new artificial manners of operating with the hand, or with instruments in common use, new processes in any art producing effects useful to the public.”<sup>103</sup> Nevertheless, Lord Eyre appeared to support patents for processes disembodied from any particular physical means: “[The patent] must then be for the method; and I would say ... it must be for the method detached from all physical existence whatever.”<sup>104</sup>

Given the prior issuance of many patents for general principles of operation rather than for particular mechanical or chemical embodiments of those principles, Lord Eyre was very concerned not to “shake the foundation upon which these patents st[oo]d.”<sup>105</sup> In contrast, Judge Buller was concerned that most scientific principles of operation were already well known, and thus patents that were not limited to new structures that applied scientific principles in a particular manner would withdraw useful knowledge from the public domain free for all to use. “[I]f the principle alone be the foundation of the patent, it cannot possibly stand, with that knowledge and discovery which the world were in possession of before.”<sup>106</sup>

In a subsequent case on the same Watt patent, in *Hornblower v. Boulton*,<sup>107</sup> the Court of Errors<sup>108</sup> unanimously held the patent valid.<sup>109</sup> Following a change in arguments

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<sup>102</sup> *Boulton*, 2 H. Bl. at 492.

<sup>103</sup> *Id.* Justice Heath and Justice Rooke parted company on whether intangible processes could be claimed, based on differences regarding the level of abstraction or generality of the invention and thus the scope of the patent and its ability to dominate and retard sequential innovation. See Oren Bracha, *Owning Ideas* ch. 1. 77-80, 85-88 (unpublished thesis 2005) (on file with author). For a discussion of similar concerns regarding the abstractness and level of generality of patented principles in regard to permissible claiming language, see Sarnoff, *Claiming the Future Part I*, *supra* note 70, at 382-84, 386-91, and Sarnoff, *Claiming the Future Part II*, *supra* note 70, at 454-73. Nevertheless, Justice Rooke conceded that the mere application of scientific principles alone could not be patented. See *Bulton*, 2 H. Bl. at 479 (“There is no newly discovered natural principle as to steam, nor any new mechanical principle in his machine; the only invention is a new mechanical employment of principles already known.”).

<sup>104</sup> *Bulton*, 2 H. Bl. at 494. See Bracha, *supra* note 95, at 81-82 (“For Eyre both copyrights and patents became completely dephysicalized.”).

<sup>105</sup> *Boulton*, 2 H. Bl. at 494. See Walterscheid, *Antecedents Part 3 Continued*, *supra* note 83, at 854 & n.180 (noting the general view in the 18<sup>th</sup> Century that the Statute did not preclude such patents) (citing MACLEOD, *supra* note 27, at 63-64). See generally E. Wyndham Hulme, *Privy Council Law and Practice of Letters Patent for Invention from the Restoration to 1794* (pt. 1), 33 L. Q. REV. 63 (1917) [hereinafter Hulme, *Privy Council I*] (describing issued patents and how they were treated in the English courts); E. Wyndham Hulme, *Privy Council Law and Practice of Letters Patent for Invention from the Restoration to 1794* (pt. 2), 33 L. Q. REV. 180 (1917) [hereinafter Hulme, *Privy Council II*] (same).

<sup>106</sup> *Boulton*, 2 H.Bl. at 485. Judge Buller also noted the difficulty of limiting such patents to the improvement that the principle of invention actually represents. “When a patent is taken for an improvement only, the public have a right to purchase that improvement by itself, without being incumbered with other things.” *Id.* at 489.

<sup>107</sup> (1799) 101 Eng. Rep. 1285 (K.B.), 8 T.R. 95.

<sup>108</sup> Although a general verdict was found for the plaintiffs and judgment given for them by the Court of Common Pleas, the case was not argued in the Common Pleas, given the earlier split opinion of that Court in *Boulton v. Bull*. See *id.* at 1287 & n.(a). The defendant then brought a writ of error in the Court of Errors, arguing that the invention for which the patent was granted was “not an invention of any formed or



by Boulton and Watt to treat Watt's invention as an improvement of a machine,<sup>110</sup> the judges all appeared to conclude that the patent was not for a disembodied method or process, but rather for the machinery that implemented it.<sup>111</sup> The judges, moreover, appeared to agree that patents for newly discovered scientific principles (in 18<sup>th</sup> Century parlance "philosophical" principles<sup>112</sup>) would be invalid. In the words of Chief Judge Lord Kenyon, "[t]he principle objection made to this patent ... is, that it is a patent for a philosophical principle only, neither organized nor capable of being organized; and if the objection were well founded in fact, it would be decisive...."<sup>113</sup> In contrast, Lord Kenyon understood the term manufacture "to be something made by the hands of man."<sup>114</sup>

The distinction of patentable manufactures from unpatentability of scientific principles articulated in *Hornblower* was confirmed in the 19<sup>th</sup> Century in *Rex v. Wheeler*,<sup>115</sup> which addressed a method of drying and preparing malt. The Court held the patent invalid for lack of correspondence between the issued patent (for a method for drying malt) and the subsequently filed specification (for a method for imparting solubility and coloring of beer by malt, which method also was not adequately described

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organized machine, instrument, or manufacture, but of mere principles only, for which no such letters patent could by law be granted." *Id.* at 1287.

<sup>109</sup> *Hornblower*, 101 Eng. Rep. at 1292 (per curiam judgment).

<sup>110</sup> See Walterscheid, *Antecedents Part 3 Continued*, *supra* note 83, at 856 & n.190 (citing DUTTON, *supra* note 18, at 74).

<sup>111</sup> See DUTTON, *supra* note 18, at 74 (discussing Watt's change in strategy, based on fears that Lord Kenyon would deny the validity of a patent for a method); Compare *Hornblower*, 101 Eng. Rep. at 1288 (Lord Kenyon, C.J.) ("it evidently appears that the patentee claims a monopoly for an engine or machine, composed of material parts, which are to produce the effect described; and that mode of producing this is so described, so as to enable mechanics to produce it"), with *id.* at 1290, 1291 (Grose, J.) ("the patent is not merely for principles, nor does the specification describe principles only. The patent ... shews in his specification the manufacture by means of which those principles are to take effect ... I do not consider it as a patent for the old engine, but only for the addition to or improvement of the old engine ... [A] method of making or doing ... then becomes in effect (by whatever name it may be called) ... A manufacture for the thing so made, and not merely for the principle on which it is made."); *id.* at 1291 (Lawrence, J.) ("it appears that Watt applied for and obtained a patent for an engine or mechanical contrivance for lessening the consumption of steam in fire engines.... 'Method,' properly speaking ... may signify a contrivance or device; so may an engine, and there I think it may answer the word 'method.'").

<sup>112</sup> See, e.g., *The Compact Edition of the Oxford English Dictionary* 2154 (Oxford U. Press 1971) (defining "[p]hilosophical" as "[p]ertaining to, or used in the study of, natural philosophy, or some branch of physical science"); William Shakespeare, *Hamlet*, in THE RIVERSIDE SHAKESPEARE 1151 n.167 (Houghton Mifflin 1974) (defining "philosophy" as "natural philosophy, science" in regard to Hamlet's famous line to Horatio at I.v.166-67); *Pennsylvania Gazette* (Jan. 13, 1790) (discussing receipt of "a Philosophical Apparatus," by which Yale University was "furnished with a complete set of instruments and machines for exhibiting a whole course of experiments in natural philosophy and astronomy.").

<sup>113</sup> *Hornblower*, 101 Eng. Rep. at 1288. See *id.* at 1289, 1289-90, 1290-91 (Grose, J.) ("I am not prepared to say that a patent for a mere principle was intended to be comprehended within those words.... This [partial] method [of working an engine by alternate expansion and contraction of steam], however, if not effected or accompanied by a manufacture, I should hardly consider as within the Statute of James.... I am inclined however to think that a patent cannot be granted for a mere principle").

<sup>114</sup> *Id.* at 1288.

<sup>115</sup> (1819) 2 B. & Ald. 345 (K.B.), 106 E.R. 392.

in the specification).<sup>116</sup> Before so holding, Chief Judge Abbott for the Court stated that a manufacture may be understood as things “made and vendible,” as parts of “an engine or instrument” to be employed for a useful purpose, or “perhaps ... [as] a new process to be carried on by known implements, or elements, acting upon known substances and ultimately producing some other known substance, but producing it in a cheaper or more expeditious manner, or of a better and more useful kind.”<sup>117</sup> Like Judge Buller in *Boulton*,<sup>118</sup> Chief Judge Abbott understood that to be patentable a “method” invention could not comprise an intangible principle (or set of operations) distinct from the tangible physical objects through which the principle accomplished a functional result.<sup>119</sup> Rather, a manufacture must be either a tangible object or the process resulting in a tangible object.

[N]o merely philosophical or abstract principle can answer to the word manufactures. Something of a corporeal and substantial nature, something that can be made by man from the matters subjected to his art and skill, or at the least some new mode of employing practically his art and skill, is requisite to satisfy this word.<sup>120</sup>

Significantly, by “mode” was meant a particular, physical application of the principle accomplishing a tangible result by acting through particular, specifiable structures.<sup>121</sup> If

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<sup>116</sup> See *id.* at 351-52. Chief Judge Abbott suggested, however, that a patent “might be good” for a “new method of drying and preparing malt for the coloring of beer ... that is, for the malt so dried and prepared,” suggesting in modern terminology that product-by-process claims would be patentable. *Id.* at 352. See Brian S. Tomko, Comment, *Scripps or Atlantic: The Federal Circuit Squares Off Over the Scope of Product-By-Process Patents*, 60 BROOKLYN L. REV. 1693, 1703-14 (1995) (tracing the 20<sup>th</sup> Century history of product-by-process claims used to meet written description requirements where the structure of the invention is unknown or difficult to put into language and discussing conflicting precedents regarding the permissible scope of such claims); Pollack, *supra* note 12, at 85, 86 & n.86 (discussing 18<sup>th</sup> Century patent treatises suggesting that cases upholding patentability of methods “should be read to protect only the vendible product produced”) (citing JOHN CORYTON, A TREATISE ON THE LAW OF LETTERS-PATENT, FOR THE SOLE USE OF INVENTIONS IN THE UNITED KINGDOM OF GREAT BRITAIN AND IRELAND 58-84 (Phila., Johnson 1855); and RICHARD GODSON, A PRACTICAL TREATISE ON THE LAW OF PATENTS FOR INVENTIONS AND COPYRIGHT 78-98 (London, Joseph Butterworth & Son 1823)).

<sup>117</sup> *Wheeler*, 2 B. & Ald. at 349-50 (emphasis added). See DUTTON, *supra* note 18, at 74 (noting the intervening treatise of William Hands, stating that patents for methods “not affected or accompanied by a manufacture, it seems the patent is not good,” and a subsequent case that suggested that a patent could be “taken out ‘even for a new method’”) (citing WILLIAM HANDS, THE LAW AND PRACTICE OF PATENTS FOR INVENTION 6 (1808), and *Hill v. Thompson*, (1817) 1 WEBSTER’S REPORTS 237, 36 E.R. 239).

<sup>118</sup> See *Boulton v. Bull*, 2 H. Bl. 463, 486 (1795) (Opinion of Buller, J.) (“The method and the mode of doing a thing are the same: and I think it impossible to support a patent for a method only, without having carried it into effect and produced some new substance.... [A] principle reduced into practice ... can only mean a practice founded on principle, and that practice is the thing done or made, or in other words the manufacture which is invented”).

<sup>119</sup> See *Wheeler*, 2 B. & Ald. at 353 (“Again, this is a patent for the invention of a method, that is, of an engine, instrument, or organ, to be used for the accomplishment of some purpose.”).

<sup>120</sup> *Id.* at 350.

<sup>121</sup> See, e.g., THE COMPACT EDITION OF THE OXFORD ENGLISH DICTIONARY 557-58 (1971) (defining the sixth, philosophical, sense of “mode” as a “manner or state of being of a thing; a thing considered as possessing certain attributes that do not belong to its essence, and may be changed without destroying its identity,” as an “attribute or quality of a substance; ‘an accidental determination,’” or, in “Locke’s use” as a “‘complex idea’ which denotes neither a substance nor a relation”) (quoting, *inter alia*, JOHN LOCKE, AN

abstract principles were patentable, moreover, the range of claimed embodiments would not (in modern terminology) be fully enabled by the inventor.<sup>122</sup>

Finally, in 1841, in *Neilson v. Harford*,<sup>123</sup> British judges again avoided finding an unpatentable principle by construing the invention to comprise “a machine embodying a principle, and a very valuable one.”<sup>124</sup> The invention was “very difficult to distinguish it from the specification of a patent for a principle.”<sup>125</sup> Significantly, Judge Parke treated the invention as a mechanical structure upon which the principle operated, and the newly discovered principle itself as being common knowledge. “We think the case must be considered *as if, the principle being well known*, the plaintiff had first invented a mode of applying it by a mechanical apparatus to furnaces; and his invention then consists in this – interposing a receptacle for heated air between the blowing apparatus and the furnace.”<sup>126</sup> Why the newly discovered principle was to be treated as well known was not adequately explained, but seemed to follow from its being unpatentable.

In summary, scientific principles were unpatentable as lacking physical embodiment (tangibility) and as being abstract (and thus overbroad compared to the actual inventive contribution). Even if the scientific principles were newly discovered, they were not to be treated as inventions but rather as public knowledge free for all to use (even if they had not previously been published).<sup>127</sup> Concrete and tangible inventions

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ESSAY CONCERNING HUMAN UNDERSTANDING, bk. II, ch. Xii, § 4 (1690), that modes “I call such complex Ideas, which, however compounded, contain not in them the supposition of subsisting by themselves, but are consider’d as Dependences on, or Affectations of Substances; such are the Ideas signified by the Words Triangle, Gratitude, Murder,” and SAMUEL CLARKE, BEING & ATTRIBUTES OF GOD Wks. 1738, Bk. II, 527 (1704), an influential metaphysician and Newtonian philosopher of the relation between space and God, that “Modes and Attributes exist only by they Existence of the Substance to which they belong.” This understanding of particularly and concreteness is captured in the modern statistical sense of “mode,” which is the most frequent value of a random variable (a particularized and concrete application of some statistical process), and not the entire range or distribution of potential values (generated through the process). See, e.g., Wikipedia, Mode (statistics), [http://en.wikipedia.org/wiki/Mode\\_\(statistics\)](http://en.wikipedia.org/wiki/Mode_(statistics)) (last visited Sept. 25, 2006).

<sup>122</sup> See *Wheeler*, 2 B. & Ald. at 354 (“A specification which cases upon the public the expense and labour of experiment and trial is undoubtedly bad.”).

<sup>123</sup> (1841) 151 Eng. Rep. 1266, 1273 (Exch.), 8 M. & W. 806.

<sup>124</sup> *Id.* at 1273.

<sup>125</sup> *Id.*

<sup>126</sup> *Id.* (emphasis added).

<sup>127</sup> Cf. Walterscheid, *Antecedents Part 3 Continued*, *supra* note 83, at 855 (“the common law view at the end of the eighteenth century was that a principle of nature could not be patented, because this amounted to patenting knowledge of the physical universe which should be available to all to use”). If publication had occurred, the “trade secret” would be public knowledge and thus would not be grounds for a patent as it would withdraw that which the public already had possession. See JOHN D. COLLIER, AN ESSAY ON THE LAW OF PATENTS FOR NEW INVENTIONS 99-100 (2d ed. 1803) (“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 the possession of the discovery, the patentee can make no such return or compensation for the patent he obtains. If a patent (which is a right of exclusive sale) be granted for a thing which is already sold by the public, an emolument is taken out of the hands of the public, contrary to the clause of the statute of monopolies, which enacts that no patent shall be valid, which is mischievous to the state.”). See generally Katherine J. Strandburg, *What Does the Public Get? Experimental Use and the Patent Bargain*, 2004 WIS. L. REV. 81 (2004) (discussing self-disclosing and non-self-disclosing inventions and the relationship of

applying scientific principles were patentable, however, if they constituted machines or the specified modes by which a process employed physical structures to accomplish useful results. This was clearly understood by the author of the earliest treatise on English patent law, who stated just after the turn of the 19<sup>th</sup> Century that:

The term manufacture ... is confined ... to its etymology, something made by the hands of man.... A patent cannot be granted for a method or principle, its object must be some substantial thing produced.... That which is the subject of a patent ought to be specified, and it ought to be that which is vendible, otherwise it cannot be a manufacture.... It must be for the vendible matter, and not the principle.... The very statement of what a principle is, proves it not to be a ground for a patent: it is the first ground and rule for arts and sciences, or in other words, the elements and rudiments of them. A patent must be for some new production from these elements, and not for the elements themselves.<sup>128</sup>

## 2. The Historical Context of Natural Law and Positive Law in Regard to Patents

During the 16<sup>th</sup> Century, English patents were limited by concerns that they not displace existing workers from their trades, as monopolies were considered legal when imposed for the benefit of the public (and not for individual reward).<sup>129</sup> By the early 17<sup>th</sup>

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trade secrets to patents). The reasons for the treatment of unpublished or unsold scientific knowledge being treated as public property was not addressed by Collier. The moral grounds for requiring the scientific discovery to be treated as in the public domain are supplemented by the rationale that the public was given possession (*i.e.* publication had occurred) upon the filing of an application in the Patent Office (at least if it matured into a patent). *See* *Alexander Milburn Co v. Davis-Bournonville Co.*, 270 U.S. 390 (1926); 35 U.S.C. § 102(e) (2000). In this context, it is important to note that there is no constitutional taking of trade secret property if the government conditions voluntary submission of such information (in order to seek publicly granted benefits) on disclosure. *See* *Ruckelshaus v. Monsanto Co.*, 467 U.S. 986, 1006-07 (1984) (“If, despite the data-consideration and data-disclosure provisions in the statute, Monsanto chose to submit the requisite data in order to receive a registration, it can hardly argue that its reasonable investment-backed expectations are disturbed when EPA acts to use or disclose the data in a manner that was authorized by law at the time of the submission. Monsanto argues that the statute’s requirement that a submitter give up its property interest in the data constitutes placing an unconstitutional condition on the right to a valuable Government benefit.... Nor could Monsanto successfully make such a challenge, for such restrictions are the burdens we all must bear in exchange for “the advantage of living and doing business in a civilized community.”... Thus, as long as Monsanto is aware of the conditions under which the data are submitted, and the conditions are rationally related to a legitimate Government interest, a voluntary submission of data by an applicant in exchange for the economic advantages of a registration can hardly be called a taking.”).

<sup>128</sup> COLLIER, *supra* note 119, at 75-78.

<sup>129</sup> *See, e.g.,* MACLEOD, *supra* note 27, at 13 (discussing how such concerns to protect employment precluded patents for “mere improvements”) (citing *Bircot’s* case, 3 Inst. 184 (1572)); Walterscheid, *Antecedents 5 Part II*, *supra* note 10, at 859, 878 (same); 3 EDWARD COKE, INSTITUTES OF THE LAWS OF ENGLAND 183 (1797) (1644) (describing *Bircot’s* case and also discussing the distinction between “add[ition]” and “invention,” preventing grants of patents for improvements); Bracha, *supra* note 95, at 64-65 (discussing changes to technology during the 18<sup>th</sup> Century that resulted in innovation being predominantly a matter of improvement, resulting in improvements ultimately being declared patentable because “the rule lost the context that supported its meaningfulness”) (citing *Morris v. Bramson*, 2 H. Bl. 489 (1776)). *See also* FOX, *supra* note 61, at 162 (discussing how royal authority “can prohibit or license

Century, common law prohibitions had been imposed on royal monopolies that would “take away free trade, which was the birthright of every subject,” but the common law courts began to accept such monopolies ““for a certain time”” when:

“a man hath brought in a new invention and a new trade within the kingdom ... in recompense of his costs and travail ... because at first the people of the kingdom are ignorant, and have not the knowledge or skill to use it; but when the patent is expired, the King cannot make a new grant thereof, for when the trade has become common, and others have been bound apprentices in the same trade, there is no reason why such should be forbidden to use it.”<sup>130</sup>

Significantly, the right to make royal grants of privilege in the first instance was “based upon [the Crown’s] position as ‘*parens patriae et paterfamilias totius regni*, and ... as *Capitalis Justiciriaus Angliae*,”” *i.e.*, as the parent of the country and thus as the guardian of the public’s interest and of justice.<sup>131</sup>

During the 17<sup>th</sup> Century, English patents reflected a motley set of policies and patronage decisions that were not coherent and often had little to do with technological progress from imports or inventions. “For, on the whole, late-Stuart patents had less to do with technological developments than with franchises and the validation of enterprises which impinged on the rights of other bodies, particularly the guilds.”<sup>132</sup> Although during the earlier Stuart period patents were considered a means of cementing “a crown-patentee business partnership[, s]ince the early eighteenth century it had been made

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*mala prohibita* and can restrain matters of pleasure for the public good although it may involve damage to private persons.”).

<sup>130</sup> FOX, *supra* note 61, at 89-90 (quoting *The Cloth Workers of Ipswich Case*, (1615) 78 Eng. Rep. 147 (K.B.), Godb. R. 252). In other words, freedom to use knowledge in trade was a natural law right, and a monopoly could be sustained only based on the lack of such knowledge and the inability to conduct trade based on it. By 1639, concerns over corporate monopolies that restricted trade but might not introduce new inventions led to a working requirement, that ““all patents for new inventions not put in practice within three yeas next after the date of the said grants”” were not to be put in execution by the patent holder. *Id.* (citing the Royal Proclamation of April 9, 1639).

<sup>131</sup> *Id.* at 57 n.3 (quoting *Darcy v. Allen*, (1602) 11 Co. Rep. 85 (the Case of the Monopolies)). This followed from the idea that “as every right connotes and obligation, no one can lawfully interfere with another’s trade or business unless there exists some just cause or excuse for such interference.” *Id.* at 9. In *Darcy*, Edward Coke had argued (for the plaintiff patent holder) that the public interest was in prohibiting the “loss of service and work of servants” from playing cards, and thus as the Queen ““might utterly suppress them”” she might also provide the “sole making” and thereby regulate them. *Id.* at 319. See Jacob I. Corre, *The Argument, Decision, and Reports of Darcy v. Allen*, 45 EMORY L.J. 1261, 1267 (1996) (suggesting that the “pleadings and lawyers’ arguments [are] the best evidence of the range of meanings that the judgment could have taken at the time it was handed down”). In contrast, Doderidge argued (for the defendant) that the patent was void because ““without limiting the price would cause great oppression”” and it ““took away rights in an ancient trade, freely enjoyed.”” FOX, *supra* note 61, at 321. Fuller argued (for the defendant) that the patent ““was against the laws of God, that every “man should live by labour, and that he that will not labour, let him not eat,”” as it would deprive apprentices the ability to live by their labor, even if it was not a necessary trade. *Id.* at 322-23 (quoting 2 Thessalonians 3:10). The Court held the patent was ““against the common law and the benefit and liberty of the subject,”” given that the common law did not prohibit dice or cards and thus was not *malum in se*. *Id.* at 325.

<sup>132</sup> FOX, *supra* note 61, at 34.

increasingly clear that the business transaction and the patent were quite separate.”<sup>133</sup> Further, patents issued for a wide variety of economic purposes, ranging from securing a franchise to mediate social relations (with the novelty of an invention as a pretext for the grant) to: avoiding social legislation or guild restrictions on more efficient or improved practicing of particular trades; securing competition and investments through improved reputation; preventing others from patenting and thereby preempting the commercial marketing of an invention; and providing secure market entry for various kinds of outsiders who might need to disclose their inventions.<sup>134</sup> In this context, where patents were granted for the privilege of the “sole working or making of ... manufactures”<sup>135</sup> that were commercially valuable inventions, it would have been remarkable for the exclusions for science, nature, and ideas to have become expressed explicitly in legal doctrine.

In the late 17<sup>th</sup> Century and early 18<sup>th</sup> Century, however, competition for patents by multiple inventors became significant, developing a consequent need to distinguish which person had invented what invention first (particularly when important economic interests were at stake).<sup>136</sup> The practice of filing caveats<sup>137</sup> thus changed from its earlier use in the Restoration period to assure that established interests would not be jeopardized by grants of patents on existing industries.<sup>138</sup> Similarly, the filing of specifications, *i.e.*, “the enrollment of a separate, more detailed description of the invention within a certain time of the patent’s issue,” changed from an “exceptional” occurrence to “a standard practice after 1734.”<sup>139</sup> This allowed a clearer understanding of otherwise intentionally nondescript patent grants, both for the purpose of improved infringement determinations by courts and for the purpose of improved priority determinations by law officers. Because of the splits in jurisdiction, it was only after the Privy Council relinquished its jurisdiction over patent validity determinations to the common law courts in 1752<sup>140</sup> that

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<sup>133</sup> *Id.* at 38.

<sup>134</sup> *See id.* at 78-96. *See generally* WILLIAM H. PRICE, *THE ENGLISH PATENTS OF MONOPOLY* (Harvard U. Press 1913).

<sup>135</sup> Statute of Monopolies, 21 Jac. 1, c. 3, §6 (1623).

<sup>136</sup> Walterscheid has described the changes in the English patent system during the 18<sup>th</sup> Century from one where “patents ceased largely to be instruments of patronage and ... [e]ffectively became instruments of economic competition.” Edward C. Walterscheid, *The Early Evolution of the United States Patent Law: Antecedents* (pt. 4), 78 J. PAT. & TRADEMARK OFF. SOC’Y 77, 89 (1995) [hereinafter Walterscheid, *Antecedents Part 4*].

<sup>137</sup> In 18<sup>th</sup> Century patent practice, an inventor could file a caveat (a document describing a general area of invention) that would trigger a notification if another inventor filed a relevant patent petition (application), thereby allowing the caveat filer to oppose the patent. *See, e.g.*, Walterscheid, *Antecedents Part 3, supra* note 83, at 789-90.

<sup>138</sup> *See* MACLEOD, *supra* note 27, at 43-45.

<sup>139</sup> *Id.* at 48-49. *See id.* at 50-53. In 1723, novel wording in patent grants was introduced that voided the patent if a specification was not enrolled within a specified time. *See id.* at 49. Requirements for specifications culminated in Lord Mansfield’s decisions in *Liardet v. Johnson*, 1 WPC 52 (1778), which definitively established an enabling disclosure as the quid pro quo for the patent grant. *See* E. Wyndham Hulme, *On the Consideration of the Patent Grant, Past and Present*, 13 L. Q. REV. 313, 315-16 (1897); MACLEOD, *supra* note 27, at 49. *See generally* Walterscheid, *Antecedents Part 3, supra* note 83, at 793-97.

<sup>140</sup> *See* MACLEOD, *supra* note 27, at 59 (discussing the challenge of Walter Baker to Robert James’s patent for a powder to cure fevers, leading the Privy Council to review its constitutional authority to determine patent validity) (citing Hulme, *Privy Council II, supra* note 97, at 189-91, 193-94).

case law began to develop to define the nature of patentable inventions, beginning with *Dollond v. Champneys* in 1766.<sup>141</sup>

Significantly, prior to requirements to file specifications, the patent did not need to specify the precise invention patented, and permitted flexibility in the scope of the invention (e.g., in the choice of ingredients for compounds).<sup>142</sup> Thus, patents had issued on inventions that constituted little more than a principle of operation,<sup>143</sup> as noted by Chief Justice Lord Eyre in *Boulton v. Bull*.<sup>144</sup> With requirements for specifications,<sup>145</sup> the patent grant could be more closely tailored to the inventive labor and contribution made by the applicant.<sup>146</sup>

However, even if the patent grant created a particular form of property, then understood as a chose-in-action (or a right to bring a lawsuit to protect against invasions of intangible interests protected at law),<sup>147</sup> there were no natural law or common law rights to patents for inventions.<sup>148</sup> In contrast, it was a matter of substantial dispute

<sup>141</sup> See MACLEOD, *supra* note 27, at 60-61; Walterscheid, *Antecedents Part 3, supra* note 83, at 793 & n.100 (arguing that the crown and common law courts, beginning in *Dollond's* case, begin to view the goal of the patent system as a broader dissemination of knowledge and skill than simply working the invention) (citing E. Wyndham Hulme, *On the History of the Patent Law in the Seventeenth and Eighteenth Centuries*, 18 L. Q. REV. 280, 283 (1902)).

<sup>142</sup> See MACLEOD, *supra* note 27, at 62-63 (describing Robert James's statements that his patent would use whatever salts were ultimately found to be best suited for the purpose of treatment); *id.* at 63 (describing the desire of patent petitioners to limit the details of their inventions or the inability of petitioners to specify the nature of their inventions at the time of filing a petition).

<sup>143</sup> See *id.* at 63-64 (describing the 1720 petition of Joshua Haskins for use of mercury to raise water, by reducing friction).

<sup>144</sup> 2 H. Bl. 463, 495 (“we have been in the habit of seeing patents granted, in the immense number in which they have been granted for methods of using old machinery, to produce substances that were old, but in a more beneficial manner, and also for producing negative qualities by which benefits result to the public”).

<sup>145</sup> See *Liardet v. Johnson*, 1 WPC 52 (1778); Walterscheid, *Antecedents Part 3, supra* note 83, at 777-92 (describing developing practices of law officers to require – in part to distinguish between similar inventions – and applicants to supply – in part to assure clarity regarding and public knowledge of the invention and enforceability of the patent – distinguishing descriptions of the inventions patented, often as required within a specific period of time filing grant of the patent). See generally John N. Adams & Gwen Averly, *The Patent Specification: The Role of Liardet v. Johnson*, 7 J. LEGAL HIST. 158 (1986).

<sup>146</sup> See Adam Mossoff, *Rethinking the Development of Patents: An Intellectual History, 1550-1800*, 52 HASTINGS L.J. 1255, 1288-94 (2001) (arguing that changes to novelty requirements and development of specification practices resulted from dissemination of the moral premises of John Locke's labor theory of property, which converted the premise of patents to a social contract exchanging exclusive rights for the labor of the inventor) (citing Hulme, *supra* note 131, at 315-16, discussing the specification filed by Sturtevant for in 1611, which anticipated the grounds for requiring specifications over 150 years later); Walterscheid, *Antecedents Part 3, supra* note 83, at 793 (noting that by 1795, the specification was understood as the “consideration” for the patent “monopoly”) (quoting *Turner v. Winter*, 1 T.R. 605 (1787), and citing *Boulton v. Bull*, 2 H. Bl. 463, 472 (1795) (Buller, J.)).

<sup>147</sup> See Walterscheid, *Antecedents Part 4, supra* note 128, at 91-92 (citing 7 WILLIAM HOLDSWORTH, A HISTORY OF ENGLISH LAW 516, 529-30 (London 1936)). Cf. Mossoff, *supra* note 138, at 1296, 1297-1302 (focusing on whether “patents were property rights,” without addressing whether there was a right to a patent, and explaining how patents came to be considered property rights in light of the developing influence of the labor theory of John Locke).

<sup>148</sup> See Walterscheid, *Antecedents Part 4, supra* note 128, at 91, 92, 93 (discussing 16<sup>th</sup> Century legal theory that property rights were given “by the law of man, not by the law of God or reason” and that during the

whether the registration system of the stationers' company in regard to printed writings of authors had accreted expectations sufficiently as to develop property rights in intangible ideas protected at common law.<sup>149</sup>

This is the context in which Lord Eyre declared in *Boulton v. Bull* the unpatentability of "mere" principles:

Undoubtedly there can be no patent for a mere principle, but for a principle so far embodied and connected with corporeal substances as to be in a condition to act, and to produce effects in any art, trade, mystery, or manual occupation, I think there may be a patent.... It is not that the patentee has conceived an abstract notion that the consumption of steam in fire-engines may be lessened but he has discovered a practical manner of doing it; and for that practical manner of doing it he has taken this patent. Surely this is a very different thing from taking a patent for a principle; it is not for a principle, but for a process.<sup>150</sup>

Although this legal exposition is lacking in explanatory power to distinguish abstract scientific principles from their concrete technological applications (the power being provided, as discussed below in Part II, from first principles of religion and philosophy), the distinction between science and technology was then familiar and easily understood.

As noted in the copyright case of *Millar v. Taylor*,<sup>151</sup> which determined the relationship between any common law rights in copies and the Statute of Anne of 1710,<sup>152</sup> patented technology might teach the science on which it was based, which was then free for all to use, but the technology itself ("the mechanical instruments") was controlled by the letter patent.<sup>153</sup> As noted by Justice Willes:

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17<sup>th</sup> and 18<sup>th</sup> Centuries common law rights also were not recognized) (citing 4 HOLDSWORTH, *supra* note 139, at 316, LYMAN R. PATTERSON, *COPYRIGHT IN HISTORICAL PERSPECTIVE* 195 (Vanderbilt U. Press 1968), Frank D. Prager, *A History of Intellectual Property From 1545 to 1787*, 26 J. PAT. OFF. SOC'Y 711, 739 (1944), and 6 HOLDSWORTH, *supra* note 139, at 362-63); Bracha, *supra* note 10, at 31 & n.168 (describing the lines of division as between pre-political natural rights and positive rights on the one hand, and between case-specific privileges and general rights based on ex-ante eligibility criteria on the other, and noting that the combination of positive law and general criteria became popular in the 19<sup>th</sup> Century with the rise of utilitarian thinking, which viewed the natural rights idea as "'nonsense on stilts'") (citing MOUREEN COULTER, *PROPERTY IN IDEAS: THE PATENT QUESTION IN MID-VICTORIAN BRITAIN* 79-81 (1990), and DUTTON, *supra* note 18, at 19-20). *See also* Walterscheid, *Antecedents Part 4*, *supra* note 128, at 95 (quoting an argument for common law, assignable property rights in "'the productions of the Brain ... and their interest and possession'" of the stationers' guild) (citing 6 HOLDSWORTH, *supra* note 139, at 370 n.5).

<sup>149</sup> *See* Walterscheid, *Antecedents Part 4*, *supra* note 128, at 96-97 (also noting that the copy right was protected by letters patent involving royal prerogative and the royal courts of the High Commission and the Star Chamber, but that the lack of common law cases is not dispositive of common law recognition during this period given that better remedies were available in the royal courts).

<sup>150</sup> *Boulton v. Bull*, 2 H. Bl. at 495-96.

<sup>151</sup> 4 Burr. 2303 (1769).

<sup>152</sup> Copyright Act of 1710, 8 Anne c. 19 (1710).

<sup>153</sup> *Millar*, 4 Burr. at 2331 (Willes, J.).



As by communication of an invention of an invention in trade, manufacture or machines, men are taught the art or science, they have a right to use it; so all the knowledge, which can be acquired from the contents of a book, is free for every man's use: if it teaches mathematics, physic, husbandry; if it teaches to write in verse or prose; if, by reading an epic poem, a man learns to make an epic poem of his own; he is at liberty.<sup>154</sup>

Similarly, Justice Aston noted that “the capacity to fasten on, as a thing of a corporeal nature, being a requisite in every object of property, plainly partakes of the narrow and confined sense in which property has been defined by authors in the original state of things.”<sup>155</sup>

Five years after deciding *Millar*, in *Donaldson v. Beckett*,<sup>156</sup> the House of Lords determined that if any post-publication common law copy right were to have existed (which remained questionable, notwithstanding *Millar*), the Statute of Anne had extinguished it.<sup>157</sup> It was argued that scientific ideas were protectable, if at all, only as “literary property,” *i.e.*, as protecting the right of recognition in the words of the author.<sup>158</sup> Specifically:

[t]hat an ingenious and speculative man improves his intellectual powers more, and makes a better use of them than his neighbors. But this cannot come under the denomination of *property*, any more than the circumstance of one man's blood circulating faster than another's.... If by the word *property* is meant ... that the work is the result of his labour and ingenuity ... this definition will be of no avail in the present question; it is merely a metaphorical property, and an abusive signification of the word. It may likewise be admitted, without hurt to the argument, that by publication the author is not divested of this species of property. He still remains entitled to the character of *author*.... That he does make [the words, sentiments, and composition] common, and put it in the power of all mankind to copy, transcribe, and print them at pleasure is, with submission, a self-evident

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<sup>154</sup> *Id.*

<sup>155</sup> *Id.* at 2340 (Aston, J.).

<sup>156</sup> 4 Burr. 2408 (1774).

<sup>157</sup> See Walterscheid, *Antecedents Part 4*, *supra* note 128, at 98 n.114 (noting uncertainties regarding the views of the Lords in *Donaldson*, because they were constrained by the questions presented for decision). Cf. E.B. INLOW, *THE PATENT GRANT* 66 (Baltimore 1950) (“On the question of the common-law right, the Lords were quite certain that no such right ever existed.”).

<sup>158</sup> See Information for *Donaldson* against *Hinton* at 5, in *THE LITERARY PROPERTY DEBATE: SIX TRACTS 1764-1774* (Garland 1975) (1773) [hereinafter *LITERARY PROPERTY DEBATE*] (“The assertors of *literary property* define it to be, ‘A right ‘which the author of any work has in the combination of ideas ‘produced by himself, and of which his book is composed.’... something incorporeal and invisible ... to the doctrine contained in the book; to a set of ideas, or modes of thinking”)(modern spellings); Walterscheid, *Anatomy*, *supra* note 47, at 62-64 (discussing “reason to believe that in the early republic ‘writings,’ as used in the [Authors and Inventors] Clause, was perceived to be directed to various forms of literary expression,” and thus excluded other contemporaneous physical expressions or records of information, such as art and maps).

proposition. He can have no hold of the sentiments which he has published.... In certain cases, the law acknowledges a *possession animi*; but here, no such mental possession can be figured: For the very purpose of publication is, to communicate the possession to all mankind; and this is the natural and necessary consequence of the act.... In all such cases, the act of publication must make an essential difference.... While the inventor retains his discovery to himself, or the author, his ideas, it is plain that none other can interfere in the use or practice of what is known to none but him; but when the secret is once discovered, and the ideas are published, every person is at liberty to take benefit from them, where no lawful impediment occurs.<sup>159</sup>

Whatever the status of natural law or common law rights of authors to (perpetual) copy rights,<sup>160</sup> such natural law and common law rights did not extend to patents for

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<sup>159</sup> *Id.* at 6, 9, 12. In contrast, the Information for *Hinton* against *Donaldson* stated “Shall it be said, that a man who, without any uncommon genius, or by mere habit, without almost any thought at all, can, by the labor of his hands, turn a piece of wood into a chair or table ... has more property in, or right to, what is so produced by his labour, than he who, by efforts of the most bright understanding and sublime genius, does, in so many words, communicate ideas or principles in any art or science of the greatest utility to mankind, shall have in this his intellectual work, when reduced to writing? To hold such a proposition, would seem disgraceful to that sense of justice which may now be expected to obtain in the world.” *Id.* at 11.

<sup>160</sup> For example, Baron Eyre rejected that ideas were a proper subject of property. See Opinions of the Judges, *id.* at 32 (“A Right to appropriate Ideas, is a Right to appropriate something so ethereal as to elude Definition; so intellectual as not to fall within the Limits of the human Mind to describe with any tolerable Degree of Accuracy. Ideas ... are such Incorporealities as not to be subject to any one of the Conditions which constitute the very Essence of Property original or derivative; are such Incorporealities liable to *exclusive appropriation*, by any Right founded in the Common Law.”). Similarly, Baron Perrot thought that an “Inventor of a Machine or mechanical Instrument, like an Author, gives his Ideas to the Public... And yet it never was heard that an Inventor, when he sold one of his Machines or Instruments, thought the Purchaser, if he chose it, had not a Right to make another after its Model.” *Id.* at 40-41. The Statute of Monopolies had “taken away from the Author or Inventor” any “Right of exclusively making any Mechanical Invention” and the “Argument, that when a Book is published and sold, there is an implied Contract between the Author and Purchaser cannot be maintained. The Purchaser ... buys a Right to use the Ideas, the incorporeal Part of it.” *Id.* at 41. (The idea of limiting subsequent reproduction of the patented product by licensing sales was thus rejected as inconsistent with the very act of sale, which says something about our modern failure to treat such restrictions as misuse. Cf. *Monsanto Co. v. McFarling*, 363 F.3d 1336, 1341-43 (Fed. Cir. 2004) (rejecting claim of misuse in regard to a licensing prohibition on replanting patented seeds), *cert. denied* 125 S.Ct. 2956 (2005).) Baron Smythe distinguished between mechanical inventions and literary works based on reputational interests, and held that incorporeal rights may be subject to property but that they were not recognized at the common law. See LITERARY PROPERTY DEBATE, *supra* note 150, at 44-45. “An Orerry none but an Astronomer can make; and he may fashion a second as soon as he hath seen a first; It is then in a Degree an original Work. Whereas, in multiplying an Author’s Copy, his Name as well as his Ideas are stolen, and it is passed upon the World as the Work of the original Author.... I acknowledge, though this claim of Property is abstract and idea, novel and refined, it is yet intelligible and may be as easily made to exist for ever as for a Term of Years.... But after investigating the Decisions of the Courts of Common law, I can find no such determinations.” *Id.* at 44. In contrast, Justice Aston believed that “a natural Right to the Produce of his mental Labor” existed, that a “real Abandonment on the Part of the first Owner must take Place, before his original Right becomes common,” and that publication did not reflect either actual relinquishing of possession or an intent to do so. LITERARY PROPERTY DEBATE, *supra* note 150, at 39.

inventions.<sup>161</sup> As noted by a prominent British patent law academic in the middle of the 19<sup>th</sup> Century, “[n]o inventor can, in fact, have any natural right to prevent any other person from making and using the same or similar invention, and therefore the law does not recognise any right or property whatsoever in an invention which is not made subject to a grant by patent.”<sup>162</sup> And if any such natural law rights in inventions were to have existed, they could have been protected only by “keeping the invention secret or by obtaining a patent for it,” the few references to the contrary notwithstanding.<sup>163</sup> Similarly, to the extent the Statute of Monopolies was declaratory of the common law, its own terms precluded patents to protect inventions that lost their secrecy (*i.e.*, had been published by having entered into public use).<sup>164</sup>

Because there was no “common law right to a patent,”<sup>165</sup> it was necessary for royal or legislative action to “secure” the exclusive right to an invention by the grant of a patent.<sup>166</sup> And even then, as Christine Macleod has noted in reviewing patents issued during the 18<sup>th</sup> Century, various types of knowledge either could not be or simply were not secured into property rights by patents, so as to protect the knowledge from appropriation and use. Methods of agriculture were copyrighted rather than patented, there was “little trace” of engineering knowledge being patented,<sup>167</sup> and although patents

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<sup>161</sup> See DUTTON, *supra* note 18, at 17-18 (discussing the case for the patent system between 1750 and 1850, noting that the “natural rights’ thesis was the least important [rationale] and was practically abandoned by the late 1820s,” and “[o]ccasionally some writers would resort to the argument, but no worthwhile commentator took it seriously.”). In contrast, such natural rights theories were much more prevalent on the European Continent, particularly in France. See *id.* at 18. See also Walterscheid, *Antecedents Part 4*, *supra* note 128, at 104 (“the common-law tradition with its reliance on custom and precedent posed an instinctive barrier to natural-rights theories, and justification of the patent system on the basis of this thesis was never very common in England.”). But cf. Mossoff, *supra* note 138, at 1296-98 (arguing that Locke’s natural law theory of property motivated the common law judges Mansfield and Buller “to reinterpret the specification as the inventor’s consideration for his patent”).

<sup>162</sup> DUTTON, *supra* note 18, at 18 (quoting WILLIAM HINDMARCH, *LAW AND PRACTICE OF LETTERS OF LETTERS PATENT FOR INVENTION* 228 (1848)).

<sup>163</sup> *Id.* at 100 (discussing references cited by MACLEOD, *supra* note 27, at 198).

<sup>164</sup> See Statute of Monopolies, 21 Jac. 1, c. 3, §§ 5, 6 (1623) (limiting the exception to the general prohibition on monopolies for “first [and/or] true inventor or inventors” to inventors only of “such manufactures which others at the time of making of such letters patents and grants shall not use”); PRICE, *supra* note 126, at 33-34 (the significance of the Statute “was not so much due to radical innovation as to the emphatic parliamentary sanction which it gave to principles already accepted at common law”). In any event, even if the Statute was not merely declaratory, it had clearly extinguished any common law (not natural law) rights of inventors on publication, given the general prohibitions of Section 1. See Statute of Monopolies, 21 Jac. 1, c. 3, § 1 (1623).

<sup>165</sup> *Id.*

<sup>166</sup> See Walterscheid, *Anatomy*, *supra* note 47, at 31-40 (noting the need to construe “securing” as “creating” a singular “exclusive right,” given the lack of common law patent right in England, the colonies, or the states prior to the Constitution, and arguing that this implied a sole constitutional purpose to promote progress of science and useful arts, not to “secure[] a property right or rewarding creativity (or genius, for that matter; and rejecting as “demonstrably false” the views of William Robinson that “patent acts have always depended upon common-law principles for their construction”),” which was only the designated means to the constitutional end) (citing *Wheaton v. Peters*, 33 U.S. 591, 661-62 (1834), and I ROBINSON, *supra* note 26, at n.15).

<sup>167</sup> MACLEOD, *supra* note 27, at 103. See *id.* at 98 (citing Jethro Tull, *The horse-hoing husbandry* (2<sup>nd</sup> ed. 1733), and *By the king’s royal letter patent and license, Charles Baker’s treatise for the preventing of smut*

for chemical processes existed, the science of chemistry had not then developed sufficiently to make “patenting of processes a more viable option.”<sup>168</sup>

The historic distinction of the unpatentable knowledge of the intangible principle of an invention from its patentable tangible embodiment, moreover, has its contemporaneous corollary in the history of copyrights. During the early 18<sup>th</sup> Century, the author’s right had developed into an “incorporeal property in a ‘copy’ [that] was, so to speak, like the shadow of the physical text at ‘high noon’ – its sharply defined outline was coextensive with the dimensions of the thing shadowed.”<sup>169</sup> In the second half of the 18<sup>th</sup> Century, the concept of a work began to take its modern form, but “[t]he processes of the objectification of the writer’s labor and of her alienation from that object were not at an end.”<sup>170</sup> It took further developments in the 19<sup>th</sup> Century for the work to take on a meaning as a wholly intangible entity casting a broader penumbra than the physical copy<sup>171</sup> (or using patent terminology, a literary principle or disembodied literary method having a broad range of tangible embodiments).

## B. In the United States from Colonial Times to the Present

### 1. Patent Privileges in the Colonies and the Early Republic and Alternative Theories of Exclusions from Patentability as Lack of Invention Under the 1790 Patent Act.

The American colonies typically granted patents by special legislative act, and did not develop the practice of requiring enrolled specifications.<sup>172</sup> Some colonies developed general legislation similar to the Statute of Monopolies (but that did not impose any real restrictions on the grant of patent privilege<sup>173</sup>), using slightly different language that replaced the term manufactures with the term “inventions.”<sup>174</sup> But patent grants were

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*in wheat* (Bristol 1797)). *Cf. id.* at 104-05 (speculating that patents were not sought for engineering knowledge based on professional reputation or an embryonic ethos of sharing scientific knowledge).

<sup>168</sup> *Id.* at 112.

<sup>169</sup> Peter A. Jaszi, *Toward a Theory of Copyright: The Metamorphosis of “Authorship,”* 1991 DUKE L.J. 455, 474 (1991).

<sup>170</sup> *Id.* at 475.

<sup>171</sup> *Id.* at 475-77.

<sup>172</sup> *See* Bracha, *supra* note 10, at 35-38. For example, the South Carolina Assembly appointed a committee to evaluate the petition and examine a model of a rice-pounder invention of Hugh Swinton. The committee “reported favorably on the practicability and prospective economy of the device, and proposed” to grant exclusive rights for six months, to provide time for Swinton to “perfect his invention in that time,” in which case a patent bill “should be drawn up and submitted to the assembly.” BUGBEE, *supra* note 10, at 78. Swinton’s application was subsequently abandoned. *Id.* at 79. Similarly, the Assembly granted a patent to Adam Pedington, conditioned on his ability to perfect his machine within two years, subject to review by a committee of nine men who would “pass judgment on the ‘perfected’ machine.” *Id.* at 82. These were clearly grants of privilege intended to provide “due encouragement ... to ingenuity and industry, when it tends to the public good. *Id.* at 81. For this reason, some of the granted patents contained working clauses. *See id.* at 86.

<sup>173</sup> *See* Bracha, *supra* note 10, at 38 (the “assembly that was the granting authority was left to decide on a case-specific basis what were ‘new Inventions that are profitable to the COUNTRY.’”).

<sup>174</sup> *See* C.H. Greenstreet, *History of Patent Systems, in* MAINLY ON PATENTS, *supra* note 47, at 11 (citing the 1641 “Body of Liberties” adopted by the General Court of Massachusetts).

among many other grants designed to foster mercantilist policies.<sup>175</sup> Thus, the early American patent system looked “more similar to the early English patent grant than were English patents of the time,”<sup>176</sup> with the royal prerogative replaced by the legislative.<sup>177</sup> Because the legislature granted the patents, “there was simply no institutional center or substantive drive to initiate a struggle for enforcing limitations on the grant power.... [and] the fact that each grant was a separate legislative act preserved the nature of the patent as a particularistic discretionary decision clear and visible.”<sup>178</sup>

The American states largely followed the same model of legislative grants.<sup>179</sup> Like the colonial grants, they often noted “the grantee’s allegation of ‘long study and frequent as well as expensive experiments,’” and in a 1780 Pennsylvania patent began to require a written description “before or as soon as [the grantee] ... begins to manufacture the aforesaid oil and blubber” invention.<sup>180</sup> Patents issued in 1787 to Oliver Evans by different states had common descriptions, but these were not specifications.<sup>181</sup> In justification of particular patent grants, legislatures sometimes expressed the deontological desire “to reward[] inventors for their useful services with a just desert,” and other times the utilitarian desire to “encourage useful inventions.”<sup>182</sup> Significantly, under the state practices, a new meaning was accreting to the term “inventor,” which excluded its historic meaning of any person who introduced a trade in favor of the modern meaning of an original creator. Thus, the Pennsylvania Society for the Encouragement of Manufacture and the Useful Arts praised the award of a prize to Joseph Hague, a British importer who smuggled into Philadelphia a machine for carding cotton, stating that Hague was “the ingenious Artizan, who counterfeited the Carding and Spinning Machine, though not the original inventor (being only the introducer).”<sup>183</sup> Further, rudimentary specification requirements began to appear, to facilitate public understanding of what had been patented.<sup>184</sup>

At the time the Articles of Confederation were adopted, there was a lull in patent granting activity by the states, and “the framers of the Articles made no attempt to transfer the protection of inventive property to the national scene.”<sup>185</sup> During the Confederation patent granting activity steadily increased, and for a short while after the

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<sup>175</sup> See Bracha, *supra* note 95, at 99-101.

<sup>176</sup> Bracha, *supra* note 10, at 40.

<sup>177</sup> See Bracha, *supra* note 95, at 99 n.224 (discussing how colonial legislatures rather than royal governors assumed greater powers than those corresponding to Parliament, referred to as the “rise of the assemblies’ thesis,” and thus issued the patents based on “local politics, material conditions and ... ideology”) (citations omitted).

<sup>178</sup> *Id.* at 105, 107.

<sup>179</sup> See Bracha, *supra* note 10, at 39 (also noting that the South Carolina copyright statute of 1784 treated “Inventors of useful machines” as having similar privileges to those of authors, but without providing a process for implementing the patent grant); Bracha *supra* note 95, at 109-13 (same).

<sup>180</sup> BUGBEE, *supra* note 10, at 86-87.

<sup>181</sup> See BUGBEE, *supra* note 10, at 100.

<sup>182</sup> Bracha, *supra* note 95, at 111 (citing *inter alia* BUGBEE, *supra* note 10, at 86, 95).

<sup>183</sup> *Id.* at 114 (quoting I Minutes of the Manufacturing committee, Papers of Tench Coxe Historical Society of Pennsylvania, (Jan. 19, 1788; Jan. 22, 1788; March 12, 1788).

<sup>184</sup> See *id.* at 114-15 (citing *inter alia* BUGBEE, *supra* note 10, at 94).

<sup>185</sup> BUGBEE, *supra* note 10, at 103.

Constitution was adopted and the federal government enacted legislation to issue federal patents states continued to grant patents.<sup>186</sup> Further, following the Revolutionary War, America embarked on a policy to encourage domestic industry and a “national literature,” but states did not immediately adopt suggestions for copyright laws and by the early 19<sup>th</sup> Century “American publishers were involved in wholesale piracy of foreign works.”<sup>187</sup> In 1783, the Continental Congress enacted a resolution “to consider the most proper means of cherishing genius and useful arts ... by securing to the authors or publishers of new books their property in such works.”<sup>188</sup> Later the same year, the Congress subsequently enacted a resolution recommending that states “to secure to the authors or publishers ... the copyright of such books ... by such laws and under restrictions as to the several states may seem proper,” eliminating recommended language from the committee regarding “the protection and security of literary property.”<sup>189</sup> Following the resolution, a few states (notably Virginia, in a bill drafted by a committee that included James Madison) enacted copyright laws, largely based on the English model of the Statute of Anne.<sup>190</sup> Although in many such laws, the focus was on “securing” the author’s “property,” as noted earlier the ambiguity regarding the existence of natural law copyrights did not extend to inventions.<sup>191</sup> The distinction was further emphasized by the simultaneous proposals submitted by Madison and Charles Pinckney during the Constitutional Convention, as both proposed to “secure” to “Authors” “copy rights” or “exclusive rights” but only Pinckney proposed to “grant patents for useful inventions.”<sup>192</sup>

In this context, the United States Constitution, and in particular Article I, Section 8, clause 8, was enacted. As the constitutional history has been traced in detail by others, I do not do so here.<sup>193</sup> Rather, along with Edward Walterscheid, I note that the framers

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<sup>186</sup> See *id.* at 102 & n.53 (noting a “general belief that states could legally grant patents today” so long as they do not conflict with federal provisions) (citing *Livingston v. Van Ingen*, 9 Johns. 507 (N.Y. 1812), and *Gibbons v. Ogden*, 22 U.S. (9 Wheat.) 1, 44-47, 59 (1824)).

<sup>187</sup> *Id.* at 104-05.

<sup>188</sup> *Id.* at 112 (citation omitted).

<sup>189</sup> *Id.* at 113 (citation omitted). The Continental Congress did not itself issue any patents, however, because it had not been delegated the power to do so by states under Article II of the Articles of Confederation. See WALTERSCHEID, *supra* note 27, at 32-37.

<sup>190</sup> See BUGBEE, *supra* note 10, at 114-24.

<sup>191</sup> See *id.* notes 128-46 and accompanying text (discussing *Millar, Donaldson, and Wheaton*).

<sup>192</sup> See *id.* at 126 (citations omitted). Walterscheid has discussed that Madison’s *unedited* notes included a proposal from him “to secure to inventors of useful machines and implements the benefits thereof,” deletion of which he concludes demonstrates that only Pinckney proposed an Inventors Clause. WALTERSCHEID, *supra* note 27, at 102-03 (citation omitted). But even if Madison had proposed such a clause, use of “secure” in this context would not necessarily have suggested a natural law or common law property right in the invention itself.

<sup>193</sup> See, e.g., BUGBEE, *supra* note 10, at 125-31; WALTERSCHEID, *supra* note 27, at 99-110; Walterscheid, *Anatomy*, *supra* note 47, at 29-71; Edward C. Walterscheid, *To Promote the Progress to Useful Arts: American Patent Law and Administration, 1787-1836 (Part I)* (pt. 1), 79 J. PAT. & TRADEMARK OFF. SOC’Y 61, 66-72 (1997) [hereinafter Walterscheid, *Progress to Useful Arts*]; Edward C. Walterscheid, *To promote the Progress of Science and Useful Arts: The Background and Origin of the Intellectual Property Clause of the United States Constitution*, 2 J. INTELL. PROP. L. 1, (1994) [hereinafter Walterscheid, *Promote the Progress*]. See generally Pasquale J. Federico, *The Constitutional Provision*, 18 J. PAT. OFF. SOC’Y 55 (1936).

(James Madison included) did not understand that inventors had natural law rights to patents as property, and believed (perhaps James Madison excepted) that there were no common law rights in inventions.<sup>194</sup> Similarly, along with Oren Bracha, I note that there is no evidence that the Constitution intended a radical departure from colonial or state practices regarding patents as discretionary grants of privileges (which did not have associated with them substantial administrative practices or expectations).<sup>195</sup> Significantly, the Constitution adopts a power, not a duty, to secure exclusive rights.<sup>196</sup> In this context, it is unremarkable that Congress, in the 1790 Patent Act, delegated its discretionary power to a Patent Board, not principally to examine patent applications for conformity to statutory requirements providing an expectation of rights (although that was required) but rather to decide whether to grant particular requests for patent at all.<sup>197</sup>

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<sup>194</sup> See, e.g., WALTERSCHEID, *supra* note 27, at 206-26 (discussing ambiguity prior the Constitution as to whether the common law of England applied in the colonies and how the American common law might have differed, noting that the Statute of Monopolies and the Statue of Anne did not apply to the colonies or states, and thus there was no clear basis in common law for granting patents or copyrights, and that American courts subsequently treated English cases as persuasive rather than as binding authority; also discussing the meaning of “secure” and the views of James Madison in The Federalist No. 43 and why Madison likely did not believe in common law or natural law rights in inventions, given his opposition to the idea that the Constitution itself imported the common law of England as to do so would have established conflicting legal doctrines “*and even the ecclesiastical Hierarchy itself.*”) (citing Letter from James Madison to George Washington (Oct. 18, 1787), in III THE RECORDS OF THE FEDERAL CONVENTION OF 1787 129-30 (Max Farrand ed., 1937)); Walterscheid, *Anatomy*, *supra* note 47, at 31-35. In this regard, Bugbee seems not to have recognized the English understanding that natural law required rivalrous depletion and that the patent privilege in England and in the states did not create a common law right to a patent, whatever uncertainty might have existed in this regard for copy rights. See BUGBEE, *supra* note 10, at 129-30 (noting that the proposals of Madison and of Charles Pinckney (from South Carolina), as well as earlier state enactments, had “expressly set forth the concept of *securing* certain rights to individuals, with the implication that such rights were inherent. Within the eighteenth-century context of natural rights, this idea had received affirmative expression in the Declaration of Independence ... [and] had already been anticipated in American legal and constitutional development”). Madison’s letter to Jefferson following the Convention is not to the contrary. See Letter from James Madison to Thomas Jefferson, in V JAMES MADISON, THE WRITINGS OF JAMES MADISON 274-75 (Gaillard Hunt ed., New York 1900-1910); BUGBEE, *supra* note 10, at 130-31. Madison focused on the importance of vesting a patent power in Congress, and the potential to supercede monopoly harms by “abolish[ing] the privilege at a price to be specified in the grant,” and noted the political concerns that the “few” would be more likely to be “sacrificed” to the “many,” but did not thereby express a belief in natural rights of inventors. Letter from James Madison to Thomas Jefferson, *supra*. See also *infra* notes \_\_\_-\_\_\_ and accompanying text (discussing deist beliefs of the framers). However, it is clear that Madison incorrectly believed that there was a common law right to inventions. See THE FEDERALIST NO. 43 (James Madison) (“The copyright ... has been solemnly adjudged in Great Britain to be a right at Common law. The right to useful inventions seems with equal reason to belong to the inventors.”). Madison simply did not understand or care as much about inventions, as reflected by his failure to propose a patent power in the Constitution when proposing a copyright power. See BUGBEE, *supra* note 10, at 126 (listing Madison’s and Pinckney’s proposals). In contrast, Pinkney clearly did so, and was likely aware of *Millar* and not of *Donaldson*. See *id.* (proposing power “To grant patents for useful inventions”) and “To secure to Authors exclusive rights”) (citation omitted).

<sup>195</sup> See Bracha, *supra* note 95, Interlude at 272-77, Ch. IV at 401-03.

<sup>196</sup> See U.S. CONST. art. I, § 8 (introductory language: “The Congress shall have the Power”); U.S. CONST. art. I, § 8, cl. 8 (“To promote the Progress ... by securing”).

<sup>197</sup> See Patent Act of April 10, 1790, ch. 7, 1 Stat. 109, 110, § 1 (1790); Patent Act of July 4, 1836, ch. 357, 5 Stat. 117, 121, § 7 (1836); Prager, *supra* note 40, at 262 (discussing restoration of this discretionary language to the Patent Act in 1836 after its removal in 1793).

Within a month of convening the first Congress, two petitions for private legislation were filed, one for literary copyright in a published and a forthcoming historical work and the other for a patent grant (to John Churchman) for the invention of methods of navigation using magnetic variation, as well as funding to support further experiments into the origins of the variation in Baffin Bay.<sup>198</sup> That these were personal petitions reflects the continuity to the colonial and confederation discretionary patent privileges; they were not petitions for general copyright and patent laws under which the petitioners would then be entitled to exclusive rights. A three person committee of the House of Representatives favorably recommended passing a law “to secure to Mr. Churchman, for a term of years, the exclusive pecuniary emolument to be derived from the publication of these inventions,” but did not support the experiments due to lack of funds.<sup>199</sup>

During subsequent debate, in which James Madison wished to determine the costs of the experiments, Thomas Tucker “wondered whether the Constitution empowered Congress ‘to go further in rewarding the inventors of useful machines, or discoveries in sciences, than merely to secure to them for a time the right of making, publishing and vending them: in the case of doubt he thought it best to err on the safe side.’”<sup>200</sup> The language is significant for two reasons. First, as matter of constitutional interpretation, it suggests that if the Authors and Inventors Clause was restricted to particular means (exclusive rights), other powers either might not reach the same ends or the restriction might also bind Congress in the exercise of such other powers.<sup>201</sup>

Second, although the reference to “them” might at first blush be read to suggest that patents of invention might issue for discoveries of science, the parallelism of the language is striking (and helps to explain the parallel structure of the constitutional language itself).<sup>202</sup> “Making,” “publishing” and “vending” must take on dual meanings, most likely referring to patents for the “useful machines” and to copyrights for the “discoveries of science,” as it would be hard to comprehend how one could physically publish or vend a scientific principle (other than through publication of its physical

<sup>198</sup> See BUGBEE, *supra* note 10, at 131-32 (citations omitted). The published work was DAVID RAMSEY, THE HISTORY OF THE REVOLUTION OF SOUTH CAROLINA FROM A BRITISH PROVINCE TO AN INDEPENDENT STATE (Collins 1785)

<sup>199</sup> See BUGBEE, *supra* note 10, at 132 (citation omitted).

<sup>200</sup> See *id.* at 133 (citation omitted).

<sup>201</sup> See *supra* note 48 and accompanying text.

<sup>202</sup> See WALTERSCHEID, *supra* note 27, at 115-25 (discussing the parallel structure and interpretive disputes as to whether the ends are plural or singular for each means provided). Frank Prager suggested that the term “respective” in Article I, Section 8, clause 8 reflects an intent to focus on the particular contribution provided by Inventors “to be considered individually and with precision and that it be distinguished from the work of contemporaries and predecessors,” as had not been the case with patent custom, marking another transition from privileges to rights. See Frank D. Prager, *Historic Background and Foundation of American Patent Law*, 5 AM. J. LEGAL HIST. 309, 317 & n.20 (1961) (also noting but not exploring the idea that “respective” was meant “to correlate ‘writings’ with ‘science’ and ‘discoveries’ with ‘useful arts.’”) (citing, *inter alia*, Karl Lutz, *Patents and Science*, 32 J. Pat. Off. Soc’y 83 (1950)). The correlation thesis is the more persuasive. See, e.g., Pamela Samuelson, *Economic and Constitutional Influences on Copyright Law in the United State*, in UNITED STATES INTELLECTUAL PROPERTY LAW 24-26 (Hugh Hansen ed., Sweet & Maxwell 2000) (noting the constitutional intention to create “separate domains” for patent and copyright) (citing *Baker v. Selden*, 101 U.S. 99, 101-02 (1880)).



embodiment in a literary work).<sup>203</sup> In contrast, if the discovery were a physical product of nature, it might be published or vended, but would not then have been a fit subject for exclusive *intangible* rights. Physical embodiments of nature, whether given by God or simply existing, were subject to appropriation only by occupancy (of *particular* tracts of land or other *particular* manifestations). The claim to exclusive rights in products of nature would have been excessive, much as by having discovered a new species of fox one might excessively claim the right to exclude others from all foxes, wherever they might roam.<sup>204</sup> For this reason, the plural ends of the Progress Clause should most likely be understood as limited each to its respective means, promoting science through copyrights and useful arts through patents of invention.<sup>205</sup>

Although the committee had recommended only private bills for protecting the works of Ramsey and the invention of Churchman,<sup>206</sup> the motion approved by the House was to develop a general law of copyrights and patents, *i.e.*, “[t]hat a bill or bills be brought in, making a general provision for securing to authors and inventors the exclusive right of their respective writings and discoveries, and that [three named Representatives] do prepare and bring in the same.” As clearly understood by Bruce Bugbee, here (and not in the Constitution) was the transitional moment from patents as privilege to a future of patents as *positive* rights to a government entitlement decision on the satisfaction of discretionarily established legislative conditions (and which conditions to this day have

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<sup>203</sup> It was common before 1787 to refer to “publication” of a machine, meaning causing its introduction to the public by use. *See supra* note 136. *Cf.* BUGBEE, *supra* note 10, at 93-94 (discussing the 1784 South Carolina “Act for Encouragement of Arts and Sciences,” which was subject to “like exclusive privilege ... under the same privileges and restrictions hereby granted to, and imposed on, the authors of books,” which included state intervention if an author “neglected to publish [the work] or else published it at exorbitant prices”). “Making” appears to have had a singular referent (useful machines), as one does not normally “make” a scientific principle. But one does “make” a book describing the principle. Further, it is possible that making was understood in the sense of bringing into existence or causing to occur, such as in “making it happen,” for which an exclusive right could be provided. Nevertheless, scientific phenomena requiring human efforts for their instantiation would not have been considered at the time things subject to vending. *Cf.* Madison, *supra* note 40, at 399-410 (discussing licensing practices in regard to constructive things and essentialists views of physical things, which by extension may preclude thinking of things as vendible).

<sup>204</sup> *See, e.g.*, *Pierson v. Post*, 3 Cai. 175, 1805 N.Y. LEXIS 311, at \*2 (N.Y. 1805) (Pierson’s lawyer argued that bodily seizure – “occupancy” of an animal – was required for “title” to the possession of “an animal feroe naturor”) (citing 2 BLACKSTONE, *supra*, note 36, at 403). Post’s lawyer agreed that occupancy was required, but argued that mere intention to subject to possession was enough to establish occupancy, a position that was rejected. *See id.* at \*3-\*4 (citing, *inter alia*, 4 SAMUEL PUFFENDORF, LAW OF NATURE AND NATIONS bk. 4, ch. 4, § 5, n.6); *id.* at \*5-\*6 (decision citing *inter alia* 2 JUSTINIAN, INSTITUTES tit. 1, § 13). But even if intention to occupy were sufficient, an intention to occupy all physical manifestations of a new product of nature would have been seen as excessive and impossible of accomplishment, just like a claim to occupy all foxes. Such an excessive claim would constitute hubris. *See infra* notes \_\_\_-\_\_\_.

<sup>205</sup> Walterscheid reaches a similar conclusion, but based on contemporaneous understandings of the meanings of the terms. *See* WALTERSCHEID, *supra* note 27, at 132-33. Nevertheless, although patents might not issue to promote science, it is not so clear that copyrights might not issue to promote useful arts, as written knowledge (and dissemination thereof if relevant) regarding technology would clearly do so. *Cf.* Malla Pollack, *What is Congress Supposed to Promote?: Defining Progress in Article I, Section 8, Clause 8 of the United States Constitution, or Introducing the Progress Clause*, 80 NEB. L. REV. 754 (2001) (arguing that the most common meaning of “progress” at the time of the Constitution was spread or dissemination, rather than qualitative improvement).

<sup>206</sup> *See* BUGBEE, *supra* note 10, at 132-33. The Committee’s report for Ramsey recommended “that a law should pass to secure *to him* ... the two works mentioned in the petition.” *Id.* at 133 (citation omitted).

yet to eliminate all discretion in their application, as discussed in regard to obviousness in Part III).<sup>207</sup> Whether the discretionary exclusive rights thereby granted in fact amounted to property rights subject to constitutional restrictions on their abolishment (under the takings clause) may be a matter of great moment,<sup>208</sup>

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<sup>207</sup> See *id.* at 133; *infra* note 201 (discussing limits on judicial mandamus power to compel grants of patents). Cf. Prager, *supra* note 194, at 311 (noting the transition from the middle ages of monarchs “confus[ing] their power to protect [inventors and mechanics] with a power to license[, which t]he subjects, in turn, had come to accept ... until the American Revolution”). Prager (and later Fox) correctly emphasized the importance of the word “secure,” but wrongly suggested that its use necessarily distinguished it from “grant” given prior lack of natural law or common law rights described by Bugbee. See BUGBEE, *supra* note 10, at 318; FOX, *supra* note 61, at 192-93 (noting use of “‘securing’ ... Is here expressed as being no longer a matter of grace or expediency but a right to which, upon fulfillment of the prescribed conditions, any person is entitled”); *id.* at 200-01 (quoting views of Daniel Webster in 1852 that the Constitution does not “‘give’” patent rights but rather “‘recognizes’ an original, pre-existing, inherent right of property in the invention, and authorizes Congress to secure to inventors the enjoyment of that right.... Invention, as a right of property, stands higher than inheritance or devise, because *it is a personal earning*. It is more like acquisitions by the original right of nature.... But there is one remarkable difference in the two cases, which is this, that property in a man’s own invention presents the only case where he is made to pay for the exclusive enjoyment of his own. For by law the permission so to enjoy the invention for a certain number of years is granted, on the condition that, at the expiration of the patent, the invention shall belong to the public. Not so with houses, not so with lands; nothing is paid for them, except the usual amount of taxation; but for the right to use his own, which the natural law gives him, the inventor as we have just seen, pays an enormous price. Yet there is a clamour out of doors, calculated to debauch the public mind.”) (quoting 15 DANIEL WEBSTER, THE WRITINGS AND SPEECHES OF DANIEL WEBSTER 438, 439 (1852)). Although the patent grant was subject in the constitutional language to the term “secure,” it is unlikely in the extreme that Charles Pinkney and others would by accepting the application of the term to patents thereby have undergone the religious conversion necessary to subject inventions to natural and common law rights. See *supra* note 171. The subsequent history demonstrates that no such conversion was intended, and was not accomplished (at least until after the 1793 Patent Act). See *infra* notes \_\_\_-\_\_\_ and accompanying text. Thus, the irony should not be lost regarding Webster’s failure to recognize from the unique nature of the “property” of patents that inventions do not provide natural rights of property. Curiously, Fox immediately after the passage quoted above quoted the Supreme Court in *United States v. American Bell Telephone Co.*, 167 U.S. 224, 238 (1897), to the effect that the patent “‘conveyed to [the inventor] so far as respects rights in the instrument itself, nothing that he did not have theretofore.... After his invention he could have kept the discovery secret to himself.... and the purpose of the patent is to protect him in this monopoly, not to give him a use which, save for the patent, he did not have before, but only to separate to him an exclusive use.... The patentee, so far as *personal* use is concerned, received nothing which he did not have without the patent.’” FOX, *supra* note 61, at 201-02.

<sup>208</sup> See, e.g., Davida Isaacs, Not All Property is Created Equal: A Modern View of the Limits on Patents under the Fifth Amendment’s Takings Clause (unpublished manuscript) (arguing that granted patents are Fifth Amendment property for due process purposes but not for takings purposes) (on file with author); *supra* note 23 (discussing regulatory takings). Cf. Adam Mossoff, *Patents as Constitutional Private Property: The Historical Protection of Patents under the Takings Clause*, 87 B.U. L. REV. (forthcoming 2007), available at <http://ssrn.com/abstract=924226> (arguing that various cases in the 19<sup>th</sup> Century established patents as property for takings jurisprudence in regard to governmental uses of inventions, without addressing governmental regulation of inventions by amending patent laws) (citing, *inter alia*, *McKeever v. United States*, 14 Ct. Cl. 396 (1878), which also recognized that property in the mind-work of inventors was not recognized at common law, and *Campbell v. James*, 4 F. Cas. 1168 (C.C.S.D.N.Y. 1879) (No. 2,361), *rev’d on other grounds*, 104 U.S. 356 (1882)). See generally *Goldberg v. Kelly*, 397 U.S. 254 (1970); *Matthews v. Eldridge*, 424 U.S. 319 (1976); Charles Reich, *The New Property*, 73 YALE L.J. 733 (1964); Paul M. Schwartz & William M. Treanor, *The New Privacy*, 101 Mich. L. Rev. 2163 (2003) (reviewing JOHN GILLIOM, *OVERSEERS OF THE POOR: SURVEILLANCE, RESISTANCE AND THE LIMITS OF PRIVACY* (2001)).

The reasons for this change to a general law of patents are not visible in the historical record of the motion. But they may be understood in relation to the expanding numbers of petitions that had been received by states (and were presented to Congress while the bill was being prepared), and the demands on legislative time and attention servicing such bills would take.<sup>209</sup> A combined bill was brought forward by a House committee, the text of which has been lost but the title was based on the constitutional language.<sup>210</sup> After reading the bill, action was postponed and consideration was carried over into the next session of Congress.

On January 8, 1790, new President George Washington addressed the Congress and encouraged them to pass a patent and copyright bill quickly, because of “the expediency of giving effectual encouragement, as well to the introduction of new and useful inventions from abroad, as to the exertions of skill and genius in producing them at home,” and “there is nothing which can better deserve your patronage than the promotion of science and literature.”<sup>211</sup> Following Washington’s address, the House addressed the subject of the need for copyright and patent legislation together, until January 25, 1790, when Aedanus Burke of South Carolina made the case for proceeding more rapidly with copyright legislation in view of imminent publication of copies of various works. In response, a committee was formed to prepare “a bill or bills, making a general provision for securing to authors and inventors the exclusive right to their respective writings and discoveries,” which produced a copyright bill on January 28, 1790.<sup>212</sup>

Following the receipt by the House of additional patent petitions that were transferred to it, the House committee reported a proposed bill, H.R. 41, “to promote the progress of useful arts.”<sup>213</sup> The Bill was read on February 16<sup>th</sup> and 17<sup>th</sup>. The House then adopted a private bill that would have given a patent grant to Francis Bailey for a method of preventing counterfeiting (by printing on borders). Although Congress was considering whether to make Bailey the official printer to the government, Alexander Hamilton (then Secretary of the Treasury) had expressed “some doubts about the effectiveness of Bailey’s invention against counterfeiting, and add[ed] that the

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<sup>209</sup> Bugbee notes concerns with federal finances that had led to tabling of Churchman’s request for subsidies for his experiments. See BUGBEE, *supra* note 10, at 133. The financial resources for Congress to delegate the scientific evaluation of merit (as had occurred in the Committee for Churchman’s invention) to functionaries rather than Representatives would have required establishing a bureaucracy that could not then be supported. The precarious finances of the national government were recounted in *McCulloch v. Maryland*, 17 U.S. 316 (1819), which resolved uncertainties that the federal government had the power to create its own bank, and thus did not have to rely on the States, which after the Revolutionary War had significant debts to private citizens, the subject of *Chisholm v. Georgia*, 2 U.S. 419 (1793), which established federal judicial power to hear suits by private citizens against states by overriding their sovereign immunity, which in turn precipitated the 11<sup>th</sup> Amendment as a limitation on federal power.

<sup>210</sup> See BUGBEE, *supra* note 10, 135 (“a bill to promote the progress of science and useful arts, by securing to authors and inventors the exclusive right to their respective writings and discoveries”) (citation omitted).

<sup>211</sup> BUGBEE, *supra* note 10, at 137 (citation omitted).

<sup>212</sup> *Id.* at 138-39 (citation omitted).

<sup>213</sup> *Id.* at 141 (citation omitted). See *id.* at 140-41.

employment of Bailey himself should depend upon the success of his device.”<sup>214</sup> The bill was ultimately defeated in the Senate in light of the general patent law that Congress adopted.<sup>215</sup>

Significantly, when the Committee of the Whole resumed consideration of H.R. 41, it approved a motion to strike a right of appeal from a decision to a jury, both because juries were not thought competent and because “the right of trial by juries is not universal,” *i.e.*, was not a common law right that could not be eliminated (under the principle that would shortly thereafter be ratified in the 7<sup>th</sup> Amendment), and subsequently approved the bill and sent it to the Senate.<sup>216</sup> Significantly, the House bill “provided that the Secretary of State was *required* to issue a patent for an invention ‘not before known or used within the United States.’”<sup>217</sup>

The Senate read the bill and referred it to committee (along with a petition of John Fitch requesting reinstatement of the jury trial provision). The committee reported the proposed statute on March 29, 1790, which was read for a third time and passed “with twelve amendments” and returned to the House.<sup>218</sup> The House agreed to all of the changes, except one that would have authorized compulsory licensing, and the Senate after debate agreed to the House’s objection. Other changes were to reword the novelty provision to eliminate patents of importation, to eliminate a proposed interference procedure (of three referees) to determine priority of invention, and to eliminate a requirement of publication of the invention through newspapers and required a mandatory deposit (rather than a discretionary one) of a description of the invention – *i.e.*, “a provision for a true specification (and models, if necessary).”<sup>219</sup> The bill also

<sup>214</sup> *Id.* at 141 (citation omitted). *See id.* at 140-42.

<sup>215</sup> *See id.* at 141-42.

<sup>216</sup> *See id.* at 142 (citation omitted); U.S. CONST., amend. VII. There was no common law right to a patent, and it took a long while before the claim that a patent was *invalid* became a matter tried in English common law courts. *See* Statute of Monopolies, 21 Jac. 1, c. 3, § 2 (1623); FOX, *supra* note 61, at 119-24.

<sup>217</sup> BUGBEE, *supra* note 10, at 143 (citation omitted).

<sup>218</sup> *Id.* at 143 (citations omitted).

<sup>219</sup> *Id.* at 144. *See* Walterscheid, *supra* note 27, at 310-35 (discussing the constitutional requirement for “novelty” derived both from the Progress Clause preamble and from contemporaneous notions of an “inventor” as a person “who produces something new; a deviser of something not known before” and “discovery” as “the act of finding anything hidden, the act of revealing or disclosing a secret,” and discussing how these led to rejection of patents of importation) (citing SAMUEL JOHNSON, A DICTIONARY OF THE ENGLISH LANGUAGE (1818), *Livingston v. Van Ingen*, 9 Johns. 507 (N.Y. 1812) (use of “inventors” in the constitution forbade federal but not state patents of importation, *Reutgen v. Kanows*, 20 F. Cas. 555, 556 (C.C.D. Pa. 1804) (No. 11,710) (noting the difference of the 1793 Patent Act from the Statute of Monopolies), and *Evans v. Eaton*, 8 F. Cas. 846, 853 (C.C.D. Pa. 1816) (No. 4,559) (interpreting the first and sixth sections of the 1793 Patent Act patent act to defeat novelty if the invention was in use or described in a public work anywhere in the world), *aff’d*, 16 U.S. (3 Wheat.) 454, 513-14 (1818) (holding that the sixth section required original discovery)); Malla Pollack, *Originalism, J.E.M., and the Food Supply, or Will the Real Decision Maker Please Stand Up?*, 19 J. ENVTL. L. & LITIG. 495, 503 (2004) (discussing Alexander Hamilton’s Report on the Subject of Manufactures, which recognized that some (including Madison) read the Authors and Inventors Clause to prohibit patents of import, and which included among its objects for a prize system “agriculture,” but did not address “compositions of matter”) (citing Alexander Hamilton, *Report on the Subject of Manufactures*, reprinted in 4 ALEXANDER HAMILTON, THE WORKS OF ALEXANDER HAMILTON IN TWELVE VOLUMES, at 70-198 (Henry Cabot Lodge ed., Fed. Ed.

provided for a common law trial on damages, but not for a common law jury trial on appeal from a denial of a grant.<sup>220</sup> The bill was then forwarded to the President, who signed it into law on April 10, 1790.<sup>221</sup>

The relevant text of what kind of discoveries of inventors could receive exclusive rights was provided in Section 1 of the 1790 Patent Act: patents were potentially available when inventors had “invented or discovered any useful art, manufacture, engine, machine, or device, or any improvement therein.”<sup>222</sup> Once again, the language is important both for what was said and what goes without saying. Useful arts were included, but not compositions of matter. As Karl Lutz has argued, “Congress only once (in the 1837 Amendatory Act) included [as the objects of the patent laws] the word ‘science,’ and that one use was purely accidental.”<sup>223</sup> The limitation to useful arts and the exclusion of compositions of matter thus should not be understood as having included philosophical (scientific) principles within their ambit.<sup>224</sup> This is confirmed by the perceived need to create a separate statutory scheme (placed within the Patent Act) to address asexually reproduced plants in 1930, and a separate statutory scheme for sexually reproduced plants in 1976, because the Patent Act was not intended to cover them.<sup>225</sup>

The limitation either to “useful art” (or to useful “art, manufacture,” etc.), moreover, could only have been based on the permissible scope of the constitutional language “useful arts” as understood in light of the English and colonial and state precedents. Lutz also concluded that in the Constitution “the words ‘useful arts’ was deliberately used to broaden the field of patentable subject matter from ‘new manufactures’ as used in the Statute of Monopolies,” because “‘by the year 1787 it was being recognized even in Great Britain that the phrase ‘new manufactures’ was an unduly limited object for a patent system, since it seemed to exclude new processes.’”<sup>226</sup> In contrast, Edward Walterscheid has noted that “there is no contemporaneous documentation to indicate that the Framers either understood or intended a distinction of

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1904) (1791)). See generally Edward C. Walterscheid, *Priority of Invention: How the United States Came to Have a “First-to-Invent” Patent System*, 23 AIPLA Q.J. 263 (1995).

<sup>220</sup> See BUGBEE, *supra* note 10, at 144 & n.63 (also noting the Fitch’s views, rejected on the appeal but included for common law damages, were adopted in two other respects: first by distinguishing improvements from other inventions, impliedly recognizing blocking patents; and second by requiring a public disclosure from all applicants).

<sup>221</sup> See BUGBEE, *supra* note 10, at 144 (citation omitted).

<sup>222</sup> See Patent Act of April 10, 1790, ch. 7, 1 Stat. 109, 109, § 1 (1790).

<sup>223</sup> Karl B. Lutz, *Patents and Science: A Clarification of the Patent Clause of the U.S. Constitution*, 32 J. PAT. OFF. SOC’Y 83, 86 (1950).

<sup>224</sup> Cf. Walterscheid, *Anatomy*, *supra* note 47, at 54-55 (discussing potential constitutional limits on the legislative power to define patentable subject matter in the “to” and “useful arts” language of Art. I, § 8, cl.8).

<sup>225</sup> See Pollack, *supra* note 211, at 504 & n.48 (noting the rejection of earlier bills from 1892 to 1930, and in the 1960s, that would have created such protection within the scope of the utility patent law) (citing Mark D. Janis & Jay P. Kesan, *U.S. Plant Variety Protection: Sound and Fury...?*, 39 HOUSTON L. REV. 727, 733-39 (2002)). Cf. *Funk Brothers Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130-32 (1948) (holding invalid a patent for aggregated bacteria that had not been transformed from their natural state).

<sup>226</sup> WALTERSCHEID, *supra* note 27, at 349.

this type.”<sup>227</sup> Further, Walterscheid quotes extensively from the 1813 disquisition of Oliver Evans on patentable subject matter, noting that even by that date Evans “still had some difficulty in coming to grips with the idea that methods should be patentable.”<sup>228</sup>

A middle ground appears warranted, as both the framers of the Constitution and the drafters of the 1790 Patent Act clearly would have understood they were using different words than “manufactures” under British law. Certainly some change was intended. Although *Boulton* and *Hornblower* had yet to be decided,<sup>229</sup> it is unlikely that the framers and drafters would have intended to include “mere principles” (the unified position with which all the Judges in *Boulton* and *Hornblower* agreed) within the scope of any patent power and act. As discussed below, the religious beliefs of Protestant Americans, even more than of their English contemporaries, would have made such an intent wholly improper.<sup>230</sup> Rather, I suggest that the language was intended to suggest a revolutionary break with the Statute of Monopolies and English common law as the source of interpretation and *binding precedent* for the U.S. patent law, just as America had undergone a revolution from English political authority. This suggestion receives support in the Appendix on patent law written by Justice Story decades later, who noted that the:

patent acts of the United States are, in a great degree, founded on the principles and usages which have grown out of the England statute on the same subject[, so that i]t may be useful, therefore, to collect together the cases which have been adjudged in England, *with a view to illustrate the corresponding principles of our own laws*, and then bring in review the adjudications in the courts of the United States.<sup>231</sup>

As discussed immediately below, such a revolution from precedent was also implied by the legislative discretion delegated by Congress to an administrative (executive) body to issue patents.<sup>232</sup> Nevertheless, I believe Lutz was right in concluding that:

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<sup>227</sup> *Id.* Malla Pollack, citing conversations with Walterscheid, also notes there was no evidence that the framers of the Constitution or the drafters of the 1790 Act intended for “useful arts” to include compositions of matter, which also were excluded from patentability as manufactures under English law. See Pollack, *supra* note 211, at 503 & n.39.

<sup>228</sup> WALTERSCHIED, *supra* note 27, at 363 (citing OLIVER EVANS (WRITING UNDER THE PSEUDONYM OF PATRICK N.I. ELISHA), PATENT RIGHT OPPRESSION EXPOSED; OR, KNAVERY DETECTED. IN AN ADDRESS TO UNITED ALL GOOD PEOPLE TO OBTAIN A REPEAL OF THE PATENT LAWS 137-39 (Phila. 1813)). The one object of patenting that Evans suggested that might imply something close to a process, not limited to a specified range of physical means is expressly noted as having been developed in contradistinction to the law of England. “The discovery of an unknown principle, applicable to useful purposes without discovering the means of profitable application. Here the principle discovered will be secured by our laws, differing from the British.” *Id.* at 362-63 (citation omitted). But even then, the object had to be a “useful” purpose, which would have been understood then in terms of producing a tangible and concrete result, rather than information.

<sup>229</sup> See *supra* notes \_\_\_-\_\_\_.

<sup>230</sup> See *infra* notes \_\_\_-\_\_\_.

<sup>231</sup> *Evans v. Eaton*, 16 U.S. (3 Wheat.) 454, 519 (1818) (Story, J., app. Note II, *On the Patent Laws*) (emphasis added).

<sup>232</sup> See *infra* notes \_\_\_-\_\_\_.

we must assume that the [Constitutional] Convention intended to have patents stick pretty closely to their traditional field as included in the phrase “useful arts.” The term “useful arts,” as used in the Constitution and in the titles of the patent statutes is best represented in modern language by the word “technology.”<sup>233</sup>

Section 1 of the 1790 Patent Act also required a Patent Board consisting of the Attorney General, the Secretary of State, and the Secretary of War to review applications to determine if the disclosed “invention or discovery [was] sufficiently useful and important” to warrant granting a patent.<sup>234</sup> As Thomas Jefferson (one of the three members of the Patent Board, which was eliminated in favor of a registration system in the 1793 Patent Act<sup>235</sup>) later noted:

Considering the exclusive right to invention as given not of natural right, but for the benefit of society, I know well the difficulty of drawing a line between the things which are worth to the public the embarrassment of an exclusive patent, and those which are not. As a member of the patent board for several years, I saw with what slow progress a system of general rules could be matured. Some, however, were established by that board.... But there were still abundance of cases which could not be brought under rule, until they should have presented themselves under all their aspects; and these investigations occupying more time of the members of the board than they could spare from higher duties, the whole was turned over to the judiciary to be matured into a system, under which every one might know when his actions were safe and lawful. Instead of refusing a patent in the first instance, as the board was authorized to do, the patent now issues of course, subject to be declared void on such principles as should be established by courts of law. This business, however, is but little analogous to their course of reading, since we might in vain turn over all the lubberly volumes of the law to find a single ray which would lighten the path of the mechanic or the mathematician. It is more within the information of a board of academic professors, and a previous refusal of patent would better guard our citizens against

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<sup>233</sup> Lutz, *supra* note 215, at 87. However, as discussed in Part III, I believe that Lutz was wrong to further imply that there was no discretionary threshold capable of being imposed in regard to what constitutes sufficient technological progress to warrant granting a patent, even if he was right to argue that the “flash of genius” approach was misguided (if understood as a subjective measure of requisite creativity). *See id.* at 88 (arguing for rejection of the “flash of genius” standard of *Cuno Eng’g. Corp. v. Automatic Devices Corp.*, 314 U.S. 84, 91 (1941)); *infra* notes \_\_\_-\_\_\_ and accompanying text.

<sup>234</sup> *See* Patent Act of April 10, 1790, ch. 7, 1 Stat. 109, 110, § 1 (1790). Congress eliminated this language in the 1793 Act (substituting Section 2 of that act as discussed below), but restored it in the 1836 Act, and thus retained this language in the Patent Act until 1952, when it was eliminated as “unnecessary” in light of the newly codified obviousness standard in Section 103. Giles S. Rich, *The Principles of Patentability*, 42 J. PAT. OFF. SOC’Y 75, 80-81 (1960) (quoting 35 U.S.C.A. § 131 revision note (1954)); 35 U.S.C. § 103(a) (2000).

<sup>235</sup> *See* Patent Act of Feb. 21, 1793, ch. 11, 1 Stat. 318, 318, § 1 (1793).

harassment by lawsuits. But England had given it to her judges, and the usual predominancy of her examples carried it to ours.<sup>236</sup>

At most, Jefferson's comments can be understood as expressing a *desire to develop and fix* a set of expectations ("a system of general rules") that would govern what was otherwise still a discretionary grant of privileges regarding when to grant patents (albeit subject to legislation that created an expectation of government action to make the discretionary decision that, *if granted*, would create a property right).<sup>237</sup> Meeting the statutory requirements regarding the statutory *definition* of an invention or discovery either was not enough (devolving into the obviousness requirement, as discussed below and in Part III), or the statutory definitions themselves admitted of substantial uncertainty requiring employment of policy discretion in the application of law to fact (devolving into the patentable subject matter requirement).<sup>238</sup>

<sup>236</sup> Jefferson, MacPherson Letter, *supra* note 15, at 531-32.

<sup>237</sup> See Bracha, *supra* note 95, at Ch. IV, 412-13 (discussing how the Patent Board "purposefully bypassed deciding the most significant priority dispute brought before it... There is no shred of evidence of anyone assuming that he could 'demand' a patent as a right, much less evidence of anyone trying to turn to the courts in order to force the board to grant a patent."). In theory it might have been possible to seek a writ of mandamus (although not from the Supreme Court) against the Board, as a federal agency, for failing to discharge delegated executive power. See *Marbury v. Madison*, 5 U.S. (1 Cranch.) 137 (1803). However, the discretionary and legislative characteristics of the decision may have foreclosed any such mandamus action, because a right to a patent was not clearly established, it would raise serious separation of powers concerns (requiring decisions that are the essence of executive or legislative decision making) and because there had not been a waiver of sovereign immunity. See *e.g.*, *Miller v. French*, 530 U.S. 327, 339 (2000) ("the extraordinary remedy of mandamus requires a showing of a 'clear and indisputable' right to the issuance of the writ," and "the Constitution prohibits one branch from encroaching on the central prerogatives of another") (citations omitted); *Pennhurst State School & Hosp. v. Halderman*, 465 U.S. 89, 110 & n.20 (1984) (discussing precedents of refusing to compel state official's actions based on statutes "that command purely discretionary duties") (citations omitted). Cf. *Seminole Tribe of Florida v. Florida*, 517 U.S. 44, 170 (1996) (noting that where necessary to assure the supremacy of federal law, "the Court has recognized only one limitation on the scope of relief under [*Ex Parte Young*, 209 U.S. 123 (1908),] that prospective [injunctive] relief only [is available] and may not be applied to authorize suits for retrospective monetary relief"); *Marshall Field & Co. v. Clark*, 143 U.S. 649, 692-94 (1892) ("The fundamental precept of the delegation doctrine is that the lawmaking function belongs to Congress ... and may not be conveyed to another branch or entity.... "The true distinction ... is between the delegation of power to make the law, which necessarily involves a discretion as to what it shall be, and conferring authority or discretion as to its execution, to be exercised under and in pursuance of the law. The first cannot be done; to the latter no valid objection can be made."); *Loving v. United States*, 517 U.S. 748, 772 (1996) ("Had the delegation here called for the exercise of judgment or discretion that lies beyond the traditional authority of the President, Loving's last argument that Congress failed to provide guiding principles to the President might have more weight."). See generally Joshua D. Sarnoff, *Cooperative Federalism, The Delegation of Federal Power, and the Constitution*, 39 ARIZ. L. REV. 205 (1997) (discussing delegation and sovereignty concerns relating to cooperative federalism, and arguing on equal protection for more stringent enforcement of the "intelligible principle" requirement). Further, in modern administrative law terminology, the decision may have been committed to agency discretion, and no damages would lie for failure to discharge the discretionary function. See *e.g.*, *Heckler v. Chaney*, 470 U.S. 821, 829-31 (1985) (judicial review precluded when there is "no law to apply"); Fed. Torts Claims Act, 28 U.S.C. §§ 1346(b), 2680 (waiver of sovereign immunity and cause of action for money damages for claims based on acts or omissions by government officials, and exception for acts or omissions "based upon the exercise or performance or the failure to exercise or perform a discretionary function or duty").

<sup>238</sup> Although the interpretation by administrative agencies of legal terms to be applied is subject to *Skidmore* deference, unless authority to make such interpretations has been vested in the Agency (including



Section 6 of the 1790 Patent Act also contained unusual language regarding overbreadth and inoperability of the specification that was required to be deposited at the time of granting any patent under Section 2.<sup>239</sup> If a defendant “pled the general issue” and proved that the specification did not contain “the whole of the truth concerning his invention or discovery; or that it contains more than is necessary to produce the effect described; [and the concealment or addition] mislead the public, so as the effect described cannot be produced by the means specified,” then the verdict would go to the defendant.<sup>240</sup> This provision thus required careful drafting of specifications, so that the actual description would properly describe “the means specified” for accomplishing “the effect described” and would enable others to use the invention. It thus required an enabling description of the specific principle invented and patented, but without specifying whether any experimentation was required of the public before the specification would be held insufficient.<sup>241</sup>

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by delegation), in which case *Chevron* deference is to be accorded to the interpretation, the *discretionary application* of the interpreted terms to facts by judges and by administrators is best characterized as mixed question of law and fact. *See* *United States v. Mead Corp.*, 533 U.S. 218, 227, 229, 232, 234-35 (2001) (noting “interpretive choices” of agencies when “address[ing] ambiguity in the statute or fill[ing] a space in the enacted law” and recognizing legislative delegations to make such interpretations subject to *Chevron* deference in informal adjudications, but holding that Congress did not intend to delegate authority to the agency at issue to adopt customs’ classifications having force of law for other adjudications by “bind[ing] more than the parties to the ruling” and holding that the classifications at issue “are best treated like ‘interpretations contained in policy statements, agency manuals, and enforcement guidelines’” and thus should be accorded *Skidmore* deference) (citing *Skidmore v. Swift & Co.*, 323 U.S. 134 (1944), *Chevron v. Natural Resources Defense Council, Inc.*, 467 U.S. 837 (1984), and 5 U.S.C. § 706(2)(A) (2000)). The Supreme Court has not clearly resolved the legal review standard that applies to such judgments when made by district courts or administrative agencies (in light of the Administrative Procedure Act (“APA”)). *See* *NLRB v. Hearst*, 322 U.S. 111, 131 (1944) (because application decisions were “entrusted to” an agency by Congress, a determination was “to be accepted if it has ‘warrant in the record’ and a reasonable basis in law.”); *Al-Fayed v. CIA*, 254 F.3d 300, 308-09 (D.C. Cir. 2001) (“The ultimate question of whether a plaintiff has demonstrated [the statutory requirement] ... involves the application of a legal standard to a set of underlying facts, and hence may perhaps best be classified as a mixed question of law and fact.... The appropriate standard of appellate review for such mixed questions is often difficult to determine.”) (citing *Pullman-Standard v. Swint*, 456 U.S. 273, 289 n.19 (1982) (noting the split between circuits on whether Rule 52(a) clear error factual review or “independent[] review[]” for questions of law applies). In theory, the APA arbitrary and capricious, reasoned decision making standard (or perhaps the abuse of discretion standard) should apply to such determinations in administrative adjudication. *See* 5 U.S.C. § 706(2)(A) (2000) (“arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law”).

<sup>239</sup> *See* Patent Act of April 10, 1790, ch. 7, 1 Stat. 109, 111, § 2 (1790).

<sup>240</sup> Patent Act of April 10, 1790, ch. 7, 1 Stat. 109, 114, § 6 (1790).

<sup>241</sup> When the Court ultimately determined this issue under the 1836 Act, it concluded that if the specification required any experimentation, the specification was defective. Significantly, it did so by reference to the principle of an invention. *See* *Wood v. Underhill*, 46 U.S. (5 How.) 1, 5 (1847) (invented principles are not patentable if they “cannot be used ... without first ascertaining by experiment the proportion to be employed.”). After the 1870 Patent Act adopted the distinct claiming requirement, imposing a duty to identify the inventive principle claimed for protection in clear language, the Court restated the same holding. *See* *Consolidated Electric Light Co. v. McKeesport Light Co.*, 159 U.S. 465, 472, 474 (1895) (The Incandescent Lamp Patent) (citing, *inter alia*, *Wood* and *Grant v. Raymond*, 31 U.S. (6 Pet.) 218, 247 (1832)). *See generally* Sarnoff, *Claiming the Future Part II*, *supra* note 70, at 466-67 (discussing the enablement requirement and its constriction to an “undue experimentation” standard by the Federal Circuit).

In summary, under the 1790 Patent Act, no expectation could exist that the statute created a legal *entitlement* to a granted patent, or even to a decision on whether to grant a patent. Further, the Board developed “negative rules” that precluded patentability of inventions that consisted of only the application of a machine to a new use; changes in the material of construction; changes of form; and use of previously known implements in combination.<sup>242</sup> The premise of these rules was that the public constructively possessed novel inventions that were within the skill in the art to create or to apply, and thus public rights to use such inventions should not be taken away by legislative grants of exclusive rights.<sup>243</sup> This followed from the lack of natural rights in inventions and the limited power vested in Congress.<sup>244</sup> Because the public was entitled as a matter of natural right to the scientific principles that might be discovered, they were also entitled to the technologies that were already within their grasp once (or assuming that) that knowledge were made public.

As I have argued elsewhere,<sup>245</sup> the nonobviousness standard codified in the 1952 Patent Act was not meant to change the standards for patentable invention that were developed from 1790 onward (and which are described in Part III), and thus preserved significant policy discretion for the Patent Office and the Courts to make patentability judgments. Perversely, by eliminating earlier “negative rules” regarding what inventions constitute a sufficient creative contribution for patentability in favor of a purportedly objective factual question of prior art of a teaching, suggestion, or motivation to combine prior art elements,<sup>246</sup> current obviousness law may render patentability decisions into

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<sup>242</sup> See *Graham v. John Deere Co.*, 383 U.S. 1, 9, 10 & n.3 (1966); Jefferson, MacPherson Letter, *supra* note 15, at 531-32 (“Some [rules], however, were established by that board. One of these was, that a machine of which we were possessed, might be applied by every man to any use of which it is susceptible, and that this right out not to be taken from him and given to a monopolist, because the first perhaps had occasion so to apply it. Thus a screw for crushing plaster might be employed for crushing corn-cobs. And a chain-pump for raising water might be used for raising wheat: this being merely a change of application. Another rule was that a change of material should not give title to a patent. As the making a ploughshare of cast rather than of wrought iron; a comb of iron instead of horn or of ivory, or the connecting buckets by a band of leather rather than of hemp or iron. A third was that a mere change of form should give no right to a patent, as a high-quartered shoe instead of a low one; a round hat instead of a three-square; or a square bucket instead of a round one. But for this rule, all the changes of fashion in dress would have been under the tax of patentees....”). See also Walterschied, *Hotchkiss*, *supra* note 58, at 107-08.

<sup>243</sup> See Jefferson, MacPherson Letter, *supra* note 15, at 531 (“[T]his right [to use] ought not to be taken from him and given to a monopolist, because the first perhaps had occasion so to apply it.”); *Brown v. Piper*, 91 U.S. 37, 41 (1875) (inventions “within the circle of what was well known before ... belonged to the public”).

<sup>244</sup> See Jefferson, MacPherson Letter, *supra* note 15, at 531; *Graham*, 383 U.S. at 5-6 (Congress may not “enlarge the patent monopoly without regard to the innovation, advancement or social benefit gained thereby” nor “authorize the issuance of patents whose effects are to remove existent knowledge from the public domain, or to restrict free access to materials already available.”); See Statute of Monopolies, 21 Jac. 1, c. 3, §§ 5, 6 (1623) (exception from the monopoly prohibition for patents of new manufactures “so [as also] they be not contrary to law nor mischievous to the state”). See also *supra* notes 16, \_\_\_-\_\_\_ and accompanying text (discussing the common law and the common good).

<sup>245</sup> See Brief of Economists and Legal Historians as Amici Curiae in Support of Petitioner at 15-30, *KSR International, Inc. v. Teleflex Inc.*, No. 04-1350 (S. Ct. Aug. 22, 2006).

<sup>246</sup> *KSR International, Inc. v. Teleflex Inc.*, 119 Fed. App’x. 282, 285-86 (Fed. Cir. 2005).

more rather than less discretionary judgments.<sup>247</sup> At least before, the rules of the game were largely known.

## 2. Principles of Invention and Exclusions from Patentability From the 1793 Patent Act to the Present

### a. In the Congress

Given the burdens of administering a discretionary patent system through the *executive* branch,<sup>248</sup> Congress in 1793 eliminated the Patent Board and adopted a registration system.<sup>249</sup> The bill on which the Act was based, although undergoing some significant changes in the Senate, “was an imitation of the Patent System of Great Britain.”<sup>250</sup> The legislation is significant because, unlike the 1790 Act, it created a right to *receive* a patent (even an invalid one) upon satisfaction of the formal statutory criteria. Thus, Section 1 of the 1793 Act eliminated the language of Section 1 of the 1790 Patent Act requiring a Board and vesting discretion in the Board to “deem” an invention “sufficiently useful and important” to grant a patent, and required the Secretary of State to make out letters patent when an American citizen alleged they “have invented any new and useful art, machine, manufacture or composition of matter, not known or used *before the application*,” and for the Attorney General to grant the patent “if he finds the same conformable to this act.”<sup>251</sup>

The language of Section 1 of the 1793 Patent Act thus imposes a novelty requirement as of the date of filing an application, and not as of the date of invention, which the language of the 1790 Act had suggested.<sup>252</sup> The 1800 Patent Act extended the right to petition for a patent to non-citizens, and although it imposed a requirement for an oath that the “invention, art, or discovery hath not ... been known or used” (suggesting before invention), it also provided that “if it shall afterwards appear” that the invention for which the patent was granted “had been known or used previous to such application,” the patent was void.<sup>253</sup> Thus, like the Statute of Monopolies under which a patentee could lose the right to an invention if it became public before the grant,<sup>254</sup> a patentee could lose his right to the patent by making his invention public before applying for a

<sup>247</sup> See *supra* note 201 (discussing discretionary application of law to fact).

<sup>248</sup> See Pasquale J. Federico, *Operation of the Patent Act of 1790*, 18 J. PAT. OFF. SOC’Y 237 237, 244-46 (1936) (discussing the number of known applications, grants, and rejections, and the likely more significant but unknown number of rejections).

<sup>249</sup> See Patent Act of Feb. 21, 1793, ch. 11, 1 Stat. 318, 318, § 1 (1793); Walterscheid, *Progress to Useful Arts*, *supra*, note 185, at 72-74 (describing the transition from an examination to a registration system based on the English patent system).

<sup>250</sup> Walterscheid, *supra* note 211, at 304. See *id.* at 305. The Act was based on H.R. 204 (1793) (introduced Dec. 10, 1792), the text of which has not been found. See *id.* at 304.

<sup>251</sup> Patent Act of Feb. 21, 1793, ch. 11, 1 Stat. 318, 318, § 1 (1793) (emphasis added).

<sup>252</sup> See Patent Act of April 10, 1790, ch. 7, 1 Stat. 109, 110, § 1 (1790) (“have invented or discovered ... not before known or used”).

<sup>253</sup> Act of April 17, 1800, 2 Stat. 37, 38, § 1.

<sup>254</sup> Statute of Monopolies, 21 Jac. 1, c. 3, § 6 (1623). See *Pennock v. Dialog*, 27 U.S. (2 Pet.) 1, 20 (1829) (discussing the “at the time of making” language in the Statute of Monopolies and citing 3 COKE, *supra* note 121, at 184).

patent. The novelty requirement was restored to a date of invention in Section 6 of the 1836 Act (except to public use or sale with the patentee's consent or allowance),<sup>255</sup> following the decisions in *Pennock v. Dialog*<sup>256</sup> and *Grant v. Raymond*.<sup>257</sup> But there could not be a clearer statement that Congress in 1793 and 1800 did not think that it had codified a natural law right to a patent from the mere first discovery of an invention or from its disclosure to the public (and had not codified any common law right that might have existed except by operation of the patent grant).<sup>258</sup> Rather, any right would result only upon an exchange for disclosure of the secret of the invention to the public and then only as the *result* of the grant of the patent.<sup>259</sup> As recognized in *Grant*, moreover, the

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<sup>255</sup> Patent Act of July 4, 1836, ch. 357, 5 Stat. 117 (1836) (“new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement ... not known or used by others before his or their discovery or invention thereof, and not, at the time of his application for a patent, in public use or on sale”).

<sup>256</sup> 27 U.S. (2 Pet.) 1, 19-23 (1829) (excluding from “known or used before the application” the knowledge and use of the inventor, of others employed “to assist in the original structure,” and if the invention was “pirated by another, or used without his consent,” but suggesting in dicta that a second use by another inventor after the earlier invention by the patentee but before the application would make the invention public and that “there might be sound reason for presuming, that the legislature did not intend to grant an exclusive right to any one to monopolize that which was already common. There would be no quid pro quo--no price for the exclusive right or monopoly conferred upon the inventor for fourteen years.”).

<sup>257</sup> 31 U.S. (6 Pet.) 218 (1832).

<sup>258</sup> *See id.* at 244 (“It has been urged that the public was put into possession of the machine by the open sale and use of it under the defective specification, and cannot be deprived of it by the grant of a new patent. The machine is no longer the subject of a patent. This would be perfectly true, if the second patent could be considered as independent of the first.”). *But cf.* *Evans v. Weiss*, 8 F. Cas. 888, 889 (C.C.D. Pa. 1809) (No. 4572) (“any person, who, knowing that another is the first inventor, yet doubting whether that other will ever apply for a patent, proceeds to construct a machine, of which it may afterwards appear he is not the first inventor, acts at his peril, and with a full knowledge of the law, that, by relation back to the first invention, a subsequent patent may cut him out of the use of the machine thus erected.”). *Weiss* was decided, however, on the basis of a private bill that had been issued after the original patent had been declared invalid. Thus, although its reasoning was inconsistent with *Grant* unless premised on continuity with the original grant, *Weiss* confirms the patent privilege of the legislature to act notwithstanding the legal prohibition on patents that would have operated by virtue of the general 1793 Act (and the judicial declaration of invalidity of the earlier patent followed by public use). Thus, in *Evans v. Jordan*, 13 U.S. (9 Cranch) 199, 202-04 (1815), the Court discusses the consequence of legislative awareness of the void patent not in regard to invalidity of the subsequently granted patent but in regard to its clearly articulated choice to exercise its discretion to grant the patent without protecting the intervening public uses (except from retrospective damages, which would have raised ex post fact law concerns). Nevertheless, *Weiss* raises interesting questions about legislative power to withdraw public knowledge from the public domain,<sup>259</sup> *See Grant v. Raymond*, 31 U.S. (6 Pet.) 218, 227 (1832) (argument of Webster for the Plaintiff in Error) (“The whole system of patents rests on statute provision. There is no common law power, or prerogative right, in the president to issue a patent. In this particular, our law is different from the English. *Ours* is a statute grant; theirs is an emanation out of a statute prohibition. With us, the fountain is statute; with them, *prerogative*.”). Similarly, in *Pennock*, the Court refers to the “inchoate right to the exclusive use of the invention, to which a *patent* would have entitled him had it been applied for before such use. 27 U.S. (2 Pet.) at 15 (emphasis added). In contrast, Webster for the Plaintiff in Error had argued that “the right is created by the *invention*, and not by the *patent*,” and that therefore there was a requirement to show an intent to abandon the invention. *Id.* at 12. Similarly, Sergeant for the Defendant in Error had characterized the right as “to apply for and obtain a patent for his invention... that is, a right to have a title upon complying with the terms and conditions of the law.” *Id.* at 18. Thus, the grant, not the law or the invention, created the right. Nevertheless, by 1832, the idea of a reward for discovery had clearly taken hold. *See Grant*, 31 U.S. (6 Pet.) at 243 (“The great object and intention of the act is to secure to the public the advantages to be derived from the discoveries of individuals, and the means it employs are the

actions in issuing a grant were wholly ministerial,<sup>260</sup> leaving the judiciary free to determine whether to revoke the grant, on the terms of discretion transferred to the judiciary (per Jefferson) and supplied by the law.<sup>261</sup> (Further, although not directly relevant to the present discussion, the Act provided in addition to novelty requirements a means to determine the priority of invention.<sup>262</sup> However, because the grant was a ministerial act, the discretionary power to determine priority was seldom employed and no examination was made of the allegation of having invented something new (or useful), leading to a flood of invalid patents.<sup>263</sup>)

As indicated by the Jefferson letter quoted above, the 1793 Act it did not create a right to a *valid* patent, as the burden of determining the adequacy of the invention (or sufficiency of the inventive creativity) for patentability remained a discretionary decision transferred to the judiciary.<sup>264</sup> This was expressly Jefferson's contemplation in preparing

compensation made to those individuals for the time and labour devoted to these discoveries, by the exclusive right to make, use and sell, the things discovered for a limited time.”).

<sup>260</sup> See 31 U.S. (6 Pet.) at 242 (“The counsel for the plaintiffs in error have shown very clearly that the question of inadvertence or mistake is a judicial question, which cannot be decided by the secretary of state. Neither can he decide those judicial questions on which the validity of the first patent depends. Yet he issues it without inquiring into them. Why may he not, in like manner, issue the second patent also?”).

<sup>261</sup> Walterscheid and others have suggested that an originality requirement was created by the 1790 and 1793 Acts, deriving from statutory exclusion of patents of importation (based on unarticulated concerns expressed by Madison that the Constitution did not authorize such patents). See, e.g., Walterscheid, *supra* note 27, at 310-35. Although I agree with this analysis, it fails to recognize that the statute preserved the latent discretion to refuse (by the Board under the 1790 Act) and to invalidate (by the judiciary under the 1793 Act) the latent discretion retained in regard to granting patents. The latent discretion lay dormant until 1851, when the Court in *Hotchkiss v. Greenwood*, 52 U.S. (11 How.) 248 (1851), reasserted the “prerogative,” as discussed in Part III. And it is unremarkable that it waited until then, as the Court had its hands full policing patentable subject matter limitations under the registration system and took action under the examination system only in regard to perceived inadequacies of examination practice. See Steven Lubar, *The Transformation of Antebellum Patent Law*, 32 TECH. AND CULTURE 932, 941 (1991) (discussing the issuance and effects of patents under the 1793 Act); Robert C. Post, “*Liberalizers*” versus “*Scientific Men*” in the Antebellum Patent Office, 17 TECH. AND CULTURE 24, 33, 39-52 (1976) (following a political campaign against rigid examination, scientists were replaced by political appointees who lowered examination standards, fueling an explosion in patenting beginning in the 1850s.).

<sup>262</sup> See generally Walterscheid, *supra* note 27, at 305-17 (citing Patent Act of Feb. 21, 1793, ch. 11, 1 Stat. 318, 322-323, § 9 (1793) (repealed 1836), discussing administrative practices, noting uncertainties that existed regarding whether the Patent Office could exercise discretion to refuse to grant a patent based on priority of invention, and the decision of Justice Story in *Stearns v. Barrett*, 22 F. Cas. 1175, 1182 (C.C.D. Mass. 1816) (No. 13,337), that the failure to conduct an arbitration had no effect on the validity of the patent ).

<sup>263</sup> See *supra* note 229 and accompanying text; David J. Stein, A History of Patents and the Basis for Claim Construction 40-41 (May 26, 2000),

<http://www.djstein.com/IP/Files/History%20of%20Patents%20and%20the%20Basis%20of%20Claim%20Construction.doc> (citing PRESIDENT'S COMMISSION ON ECONOMY AND EFFICIENCY, INVESTIGATION OF THE UNITED STATES PATENT OFFICE, H.R. DOC. NO. 62-1110, at 219 (1912)).

<sup>264</sup> See Bracha, *supra* note 95, at Ch. IV, 416-24 (discussing the discretionary power exercised by the judiciary under the registration system of the 1793 Patent Act, focusing on their application of the utility aspect of patentable subject matter); *id.* at 417 (“The new power in charge of reviewing patents, [Judge] Van Ness concluded, was a judge invested with ‘a plenary supervision over the legality of patents’ and with ‘a discretionary power.’”) (citing *McGaw v. Bryan*, 16 F. Cas. 96, 99 (S.D.N.Y. 1821) (No. 8793)). The constitutionality of vesting such legislative decision making in Article III courts was less problematic then than it is now, given the extensive federal common lawmaking powers thought to exist before *Erie v.*

his draft bill, which would have established as an affirmative defense to the enforcement of a ministerially issued patent “the invention was ‘so unimportant and obvious that it ought not to be the subject of an exclusive right.’”<sup>265</sup> Any suggestion of contemporaneous legislative codification of natural law rights of inventors either is mistaken or, to the extent that such beliefs existed, they still had not achieved persuasive force.<sup>266</sup>

Further, Congress changed the language regarding the kinds of inventions that would qualify for patents. Significantly, the language is important both for what it said and what went without saying. Section 1 of the 1793 Act provided the potential for patents when anyone had “invented 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, not known or used.”<sup>267</sup> Congress thus added compositions of matter and improvements to the litany of objects that were the proper subject matter for patents. But Congress also removed “discoveries” from the language of the 1790 Patent Act, strongly suggesting that it had synthetic chemistry in mind; it did not have analytic chemistry in mind, and certainly did not have discovered products of nature in mind.<sup>268</sup> As noted above, movables were subject to private property and

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*Thompkins*, 304 U.S. 64 (1938). See *Swift v. Tyson*, 41 U.S. (16 Pet.) 1, 18-22 (1842). Cf. *Milwaukee v. Illinois*, 451 U.S. 304, 317-32 (1981) (enactment of federal statutory scheme preempted earlier judicial constitutional common law of interstate water pollution); *Erie*, 304 U.S. at 79 (noting that federal common lawmaking “invad[es] rights which in our opinion are reserved by the Constitution to the several states”); *Mistretta v. United States*, 488 U.S. 361, 378, 411 n.35 (1989) (Congress may create a commission to issue sentencing guidelines composed in part of Article III judges, because “our cases do not at all suggest that delegations of this type may not carry with them the need to exercise judgment on matters of policy,” although “an Article III judge serving on a nonadjudicatory commission is not exercising judicial power ... [vesting in the President] removal authority under these limited circumstances poses no threat to the balance of power among the Branches.”).

<sup>265</sup> Edward C. Walterscheid, *Thomas Jefferson and the Patent Act of 1793*, 40 *ESSAYS IN HISTORY* § IV & n.32 (1998), <http://etext.virginia.edu/journals/EH/EH40/walter40.html#n4.2> (citing 22 THOMAS JEFFERSON, THE PAPERS OF THOMAS JEFFERSON, at 360 (John Catanzaretti et al. eds., 1990)). Although Walterscheid suggests that the absence of language in Jefferson’s bill about negative rules of exclusion implies that the Board had not yet developed the rules in 1791, the language regarding transfers to the judiciary (as a defense) of the authority to deny (or void) patents is consistent with earlier development. See Walterscheid, *supra*, §IV at nn.37-38. Jefferson would not have needed to specify in his bill the particulars of the authority exercised, although he could have done so for the benefit of the judiciary.

<sup>266</sup> See WALTERSCHEID, *supra* note 27, at 228 (discussing remarks by Rep. William Murray during the debate on the 1793 Patent Act as “imply[ing] the existence of some inherent right,” that English “patents are derived from the grace of the Monarch .... [but h]ere, on the contrary, a citizen has a *right* in the inventions he may make, and he considers the law but as the mode by which he is to enjoy their fruits.”) (citation omitted); *id.* at 228-34 (discussing *subsequent* development of natural rights beliefs, particularly of Daniel Webster, after the 1793 Patent Act and noting that “Congress chose not to adopt such a view, for neither the Patent Act of 1790 nor that of 1793 required that a patent issue merely upon demand.”). See generally Edward C. Walterscheid, *Inherent or Created Rights: Early Views on the Intellectual Property Clause*, 19 *HAMLIN L. REV.* 81 (1995).

<sup>267</sup> Patent Act of Feb. 21, 1793, ch. 11, 1 Stat. 318, 319, § 2 (1793).

<sup>268</sup> As discussed below, the mechanical arts applying Newton’s scientific principles of motion had been well established and were clearly in mind during the Constitution and the 1790 Patent Act. But the same was not true of chemistry. It took longer for the science to develop and move to the United States, in part because it developed in France rather than in England. See Wikipedia, *History of Chemistry*, [http://en.wikipedia.org/wiki/History\\_of\\_chemistry](http://en.wikipedia.org/wiki/History_of_chemistry) (last visited Sept. 25, 2006) (“The history of chemistry

exclusivity only when a person was actually seized of physical possession, and as discussed below, the language of the bill on which the 1793 Act was based was most likely drawn from English precedents and was subsequently interpreted to follow the distinction between patentable principles of invention and unpatentable principles of science.<sup>269</sup>

Congress also codified at least one of the *negative rules* of patentability that had been generated by the Board. Specifically, Section 2 provided “that simply changing the form or the proportions of any machine, or composition of matter, in any degree, shall not be deemed a discovery.”<sup>270</sup> The origins of this language are unclear.<sup>271</sup> Although some have attributed the language to Jefferson’s influence,<sup>272</sup> Walterscheid persuasively argues that Jefferson’s work with the Patent Board was largely unknown to the Congress and instead this language may reflect language suggested by the patent law treatise and commentary on Jefferson’s bill by Joseph Barnes.<sup>273</sup> The language thus apparently was also based on the English precedent.

By treating such changes as not “discoveries,” Congress converted what the Board had treated as a lack of sufficient inventive creativity (under its delegated discretion) into a codified legal exclusion from patentable *subject matter* (as had been their basis in the earlier English precedents derived from the statutory term “manufactures”). Whether this was thought to be a constitutional requirement is unclear. However, this language in the 1793 Patent Act led the Courts in turn to restrict patentable inventions to those that involved a change in the “principle of invention,” also following the earlier English precedents regarding improvement inventions.<sup>274</sup> In 1836, Congress

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may be said to begin with the distinction of chemistry from alchemy by Robert Boyle in his work *The Sceptical Chymist* (1661)... [M]odern chemistry flourished from the time of Antoine Lavoisier’s discovery of the law of conservation of mass, and his refutation of the phlogiston theory of combustion in 1783.”). By 1793, however, important benefits to be obtained through synthetic chemistry applying scientific principles of Newton’s great contemporary Robert Boyle in regard to a number of industries, such as tanning. *See infra* notes \_\_\_-\_\_.

<sup>269</sup> *See supra* note 186 and accompanying text; *infra* notes \_\_\_-\_\_.

<sup>270</sup> Patent Act of Feb. 21, 1793, ch. 11, 1 Stat. 318, 321, § 2 (1793).

<sup>271</sup> *See* Walterscheid, *supra* note 234.

<sup>272</sup> *See, e.g.*, Kendall J. Dood, *Patent Models and the Patent Law, 1790-1880* (pt. 1), 65 J. PAT. & TRADEMARK OFF. SOC’Y 65 187, 196 (1983); PAGE SMITH, *THE SHAPING OF AMERICA: A PEOPLE’S HISTORY OF THE YOUNG REPUBLIC* 3, 345 (McGraw-Hill 1980); Levi N. Fouts, *Jefferson the Inventor, and his Relation to the Patent System*, 4 J. PAT. OFF. SOC’Y 316, 322 (1922).

<sup>273</sup> JOSEPH BARNES, *TREATISE ON THE JUSTICE, POLICY, AND UTILITY OF ESTABLISHING AN EFFECTUAL SYSTEM FOR PROMOTING THE PROGRESS OF USEFUL ARTS, BY ASSURING PROPERTY IN THE PRODUCTS OF GENIUS: TO WHICH ARE ADDED, OBSERVATIONS ON THE DEFICIENCY OF, AND EXCEPTIONS TO THE BILL REPORTED IN MARCH 1792* (Bailey 1972). *See* Walterscheid, *supra* note 257 § IV & nn.24-25. Barnes apparently was commenting on both H.R. 121 (Jefferson’s bill, introduced Feb. 7, 1791) and H.R. 166 (introduced March 1, 1792, by an unknown author). *See id.* text at nn.12-29.

<sup>274</sup> *See* *Evans v. Eaton*, 8 F. Cas. 846, 852 (C.C.D. Pa. 1816) (No. 4559) (the requirement limited patentability to changes in “principles” of invention), *rev’d on other grounds*, 16 U.S. (3 Wheat.) 454 (1818); *Evans v. Eaton*, 20 U.S. (7 Wheat.) 356, 431 (1822) (same). *See* Walterscheid, *Hotchkiss*, *supra* note 51, at 108-15 (discussing doctrinal changes resulting from this language).

eliminated this provision, but the Court continued to invalidate patents that had issued for such inventions, further suggesting that the Patent Act preserved judicial discretion.<sup>275</sup>

I have discussed elsewhere the fundamental contradiction in Section 2 of the 1793 Patent Act, which provided for blocking improvement inventions but also defined patentability by reference to principles of invention (as articulated in *Boulton and Hornblower*):

any person, who shall have discovered an improvement in the principle of any machine, or in the process of any composition of matter, which shall have been patented, and shall have obtained a patent for such improvement, he shall not be at liberty to make, use or vend the original discovery, nor shall the first inventor be at liberty to use the improvement.”<sup>276</sup>

The other language in Section 2 (regarding “simply changing the form or proportions”) had been interpreted in *Evans v. Eaton*<sup>277</sup> (particularly in light of the language regarding an “improvement in the principle of any machine”) to require more than “a mere change of form and proportions, but a combination of well known materials on *new* principles.”<sup>278</sup> This created a contradiction that improvements had to change the principles of invention to be patentable, but then could not embody the principle of the original invention and thus could not infringe it (if Section 2 was to be operative).<sup>279</sup>

In order to disengage the body patent from the horns of the dilemma on which it was impaled,<sup>280</sup> it was necessary to permit the principles of original inventions to apply at a higher level of generality, and as a result to apply to a broader range of physical embodiments.<sup>281</sup> Courts thus permitted a broader scope of application for what they

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<sup>275</sup> See Act of July 4, 1836, ch. 357, § 6, 5 Stat. 117, 119 (eliminating the relevant language from Section 2 of the 1793 Patent Act when placing patentable subject matter and disclosure and claiming requirements in Section 6); Walterscheid, *Hotchkiss*, *supra* note 58, at 116.

<sup>276</sup> See Patent Act of Feb. 21, 1793, ch. 11, 1 Stat. 318, 321, § 2 (1793).

<sup>277</sup> 20 U.S. (7 Wheat.) 356 (1822).

<sup>278</sup> *Id.* at 376 (emphasis added).

<sup>279</sup> See Sarnoff, *Claiming the Future Part I*, *supra* note 70, at 386-91. See also *id.* at 382-83 (discussing the lack of any requirements under the 1790 and 1793 Acts for any written statement regarding the limits of the scope of an invention or the level of generality of the principle on which it was based).

<sup>280</sup> See JUSTER, *supra* note 29, at 242 (“And pounding forward with a rush came the ugly Dilemma, snorting steam and looking intently for someone to catch on the ends of his long pointed horns, while his hoofs bit eagerly at the ground.”).

<sup>281</sup> Justice Story was (or would have been) clearly opposed to this broadening. See Prager, *supra* note 40, at 257-59 (“Story invoked the supposed rule against ‘mere principles’ also when confronted with a machine patent .... However, method patents were the principle targets of the supposed rule, both under Story and later on..... So much however appears, that Story contributed to a case law which tended to hold patents limited to fairly tangible things, aside from making them directly available only to inventors, not to investors or importers. We must of course keep in mind that Story’s reasoning was more conceptual than economic. He opposed vagueness of patents in the first place as legally unsound even if he also felt that the vagueness was economically unfair.... We must also keep in mind that Story’s announced opinions changed with the passage of time and that he, in many respects, developed towards a greater liberality to



viewed as pioneering inventions.<sup>282</sup> I have explained elsewhere how the level of generality thus expanded to permit patents for conceptual processes that were distinct from the specified modes through which they were embodied to produce their effects, and thus could apply to a broad range of physical embodiments not specified or contemplated by the inventor.<sup>283</sup> I do not repeat that discussion here.

But the expansion of the level of generality created a different dilemma. A limit was needed to avoid transforming the pioneering inventive principles into prohibited “mere principles,”<sup>284</sup> or “philosophical principles.”<sup>285</sup> From contradiction was born a higher synthesis,<sup>286</sup> *i.e.*, the exclusions from patentable subject matter for science, nature, and ideas. The Spirit that had informed the religious prohibition and went without saying was made manifest in and to the physical world in the Word (the *Logos*), but it did so devoid of its earlier self-perception as a religious spiritual force. To understand this transformation, it is necessary to return to the patentable subject matter limitations under the 1793 Act and the 1836 Act that resulted from the continuing understanding (originating in *Boulton* and *Hornblower*) that patented principles were limited to the inventive embodied modes of applying discovered scientific principles.

Significantly, the 1836 Patent Act changed two important things in regard to patentable subject matter from the 1793 Patent Act, although the rest remained unchanged. The first was to return the term “discovery” to the litany of statutory subject matter, in addition to the term “invention” under the 1793 Act.<sup>287</sup> Although I do not review the complete legislative history here, I note that this language was adopted in the context of also changing the novelty point to before the date of “discovery or invention” and was immediately followed by a requirement for a *distinguishing* description of the “invention or discovery.”

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patents.... [But i]n the matter of ‘mere principles,’ no transition ever came during Story’s lifetime, nor has this law been changed very radically during the years which have elapsed since his death.”).

<sup>282</sup> See *id.* at 388-91.

<sup>283</sup> See Sarnoff, *Claiming the Future Part I*, *supra* note 70, at 390-91; Sarnoff, *Claiming the Future Part II*, *supra* note 70, at 450-56. Justice Story was not opposed to improvements, as understood as implementing something different from the original principle of invention and embodied in things. Cf. Prager, *supra* note 40, at 259-60 (“According to the economic policy which limited all monopolies we might expect a holding that the patent covers only the improving feature; according to the conceptual approach aiming at tangible things we might expect the opposite holding – the holding that the patent covers the improved machine. Story gave both answers, the first in his early cases, and the second beginning at a somewhat later time.”). But because both the original invention and the improvement were still restricted from an intangible idea, there was not a logical conflict for Story, only a question of line drawing regarding whether and how much of the original invention might apply to the improvement.

<sup>284</sup> See *e.g.*, *supra* notes 79, 133 and accompanying text.

<sup>285</sup> See, *e.g.*, *supra* note 96 and accompanying text.

<sup>286</sup> See generally GEORG W.F. HEGEL, PHENOMENOLOGY OF SPIRIT (1807).

<sup>287</sup> Patent Act of July 4, 1836, ch. 357, 5 Stat. 117, 119, § 6 (1836) (“having discovered or invented 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, not known or used by others before his or their discovery or invention thereof, and not, at the time of his application in public use or on sale, with his consent or allowance as the inventor or discoverer”). The public use bar language clearly reflects codification of the decision in *Pennock v. Dialog*, 27 U.S. (2 Pet.) 1, 19-23 (1829).

But before any inventor shall receive a patent for any such new invention or discovery, he shall deliver a written description of his invention or discovery, and of the manner and process of making, constructing, using, and compounding the same, in such full, clear, and exact terms, avoiding unnecessary prolixity, as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same; and in case of any machine, he shall 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; and shall particularly specify and point out the part, improvement, or combination, which he claims as his own invention or discovery.<sup>288</sup>

This language is also significant because it adds “science” to “art.”

The relevant language of Section 6 of the 1836 Act was derived verbatim from Senate Bill 239, which is discussed in report authored by Senator Ruggles (the Bill’s sponsor) for a select Senate committee.<sup>289</sup> Ruggles first discussed the rewards to inventors in purely utilitarian terms. “All civilized nations have provided in some form for the encouragement of inventive genius.”<sup>290</sup> But because the benefits to society of “individual munificence and the patronage of wealthy associations” and other similar rewards were “limited to particular objects, if not to individuals[ t]here appears to be no better way of measuring out rewards for useful inventions, than, by a general law .... [so that the individuals] will generally derive a *just and appropriate encouragement* proportioned to the value of their respective inventions.”<sup>291</sup> Although Ruggles used the word “just” he does so in regard to encouragement, not labor; no natural rights are anywhere evident in this conception.

Second, Ruggles noted that “granting of exclusive privileges was in England originally assumed as a prerogative of the Crown, from which it derived a revenue,” that originally it was limited to imports of manufactures and later “like privileges were granted for new inventions,” but that “it was subject to abuse, and Parliament found it necessary to limit and restrain it.”<sup>292</sup> Then he noted the sources of American law in the British patent tradition:

The very brief reservation of right in the Crown contained in [the Statute of Monopolies,] and the judicial decisions in cases arising under the grants of privileges made pursuant to it, constituted the whole of the English law on the subject up to 1835, when a law was passed by Parliament giving the right to file a disclaimer in certain cases, and containing some other less material provisions.

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<sup>288</sup> Patent Act of July 4, 1836, ch. 357, 5 Stat. 117, 119, § 6 (1836).

<sup>289</sup> See S. REP. NO. 24-338 (1st Sess. 1836).

<sup>290</sup> *Id.* at 1.

<sup>291</sup> *Id.* (emphasis added).

<sup>292</sup> *Id.*

*It is from those judicial decisions that we have derived most of the principles on which our laws on the subject are founded, and which have entered into and influenced the judicial expositions given to them. But the decisions of our courts have been characterized by a more enlightened and liberal application of equitable principles to cases of this description, in a just endeavor to sustain patents of meritorious inventions, instead of seeking to find, in the technicalities of law, a pretext for setting them aside.....*

....

The first act of Congress ... [created a patent board authorized] on application, to grant patents for such new inventions and discoveries as they should deem ‘*sufficiently useful and important.*’ Under that act the board so constituted exercised the power of refusing patents for want of novelty in the invention *of sufficient utility and importance.*”...

The act of 1793, which is still in force, gives, according to the practical construction it has received no power to the Secretary to refuse a patent for want of novelty or usefulness. The only inquiry is whether the terms and forms prescribed are complied with. The granting of patents therefore is but a ministerial duty... The necessary consequence is, that patents have, under the act of 1793, been daily granted without regard to the question of novelty, or even utility in the ordinary sense; for it has been settled that the term useful, as used in this statute, is only in contradistinction to hurtful, injurious, or pernicious. This construction (that no right is conferred to refuse a patent) has been given to the law by the Department charged with the duty of granting patents, *not so much probably from any necessary and unavoidable import of the terms of it, as from a disinclination to exercise a power of such much importance, in cases where it is not clearly and distinctly granted. And it may be reasonably doubted whether it was the intention of Congress to confer such a power on the Secretary of State alone, since no provision is made for an appeal or other remedy for an incorrect decision adverse to the applicant.* Besides, any person occupying that station might be supposed as little qualified by an acquaintance with the appropriate branches of science or of the arts, to decide such questions, as any other officer fo the Government. *And if he were to undertake the task of such an examination as would be necessary to a decision in each case, he would have little time for other official duties.*<sup>293</sup>

In summary, Ruggles made clear that the Patent Act of 1793 *may* have granted discretionary power to refuse to grant patents for want of sufficient social benefit, but for good discretionary reasons the Executive chose not to exercise it. Ruggles thus *restored* to the statute the express language of legislative discretion that had been created in the 1790 and removed when prior examination had been eliminated, so that the executive would not be bound to issue patents that would burden society and the courts. Section 7 (not the patentable subject matter section) thus contained the following language:

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<sup>293</sup> *Id.* at 2 (second emphasis in original).

the Commissioner shall make or cause to be made, an examination of the alleged new invention or discovery; and if, on any such examination, it shall not appear to the Commissioner that the same had been invented or discovered by any other person in this country prior to the alleged invention or discovery thereof by the applicant, or that it had been patented or described in any printed publication in this or any foreign country, or had been in public use or on sale with the applicant's consent or allowance prior to the application, *if the Commissioner shall deem it to be sufficiently useful and important, it shall be his duty to issue a patent therefor.*<sup>294</sup>

Nevertheless, although the Commissioner did exercise that power to refuse to grant patents, there is little evidence that the Commissioner did so because inventions were insufficiently important (rather than having no utility whatsoever).<sup>295</sup>

In short, at least through 1952 and likely since, American patent law created a right to a *discretionary* government entitlement decision, but not to the entitlement itself.<sup>296</sup> Whether Congress intended for the courts to be excluded from exercising this discretionary power (as they had done as a matter of interpreting novelty under the 1793 Act, when the executive did not act to prevent issuance of clearly unpatentable subject matter) when clearly restoring discretionary power to the executive is nowhere expressed by Ruggles. The judiciary certainly did not view the 1836 Patent Act as having divested its discretionary interpretive power to define patentable inventions, as decided fifteen years later in *Hotchkiss v. Greenwood*.<sup>297</sup>

Finally, after listing the numerous social ills that had resulted from unexamined grants of patents without assessing novelty and utility (both in the sense of morality and of social worth), including cluttering of the courts and the fraud of having “purchased what the vendors had no right to sell, and which they obtain thereby no use,”<sup>298</sup> Ruggles explained the need for an examination system. “It is obvious that the power must, in the first instance, be exercised by the department charged with this branch of the public service.”<sup>299</sup> Of greater relevance, after tracing the change from a nation the “principal business” of which was “[a]griculture and commerce” to one where the nation “bec[a]me all at once a manufacturing, as well as an agricultural and commercial nation,”<sup>300</sup> Ruggles

<sup>294</sup> Patent Act of July 4, 1836, ch. 357, 5 Stat. 117, 121, § 7 (1836).

<sup>295</sup> *See, e.g.*, 1837 Annual Report of the Commissioner \_\_ (noting that grants were less in 1837 “chiefly” because of the new 1836 Act and the “sufficiently useful” clause); 1838 Annual Report of the Commissioner \_\_ (noting that the new requirement to examine applications for “merit or originality” led to delays and burdens).

<sup>296</sup> Congress retained the “sufficiently useful and important” language in the Patent Act until 1952, when it was eliminated as “ ‘unnecessary’ ” in light of the newly codified obviousness standard in Section 103. Giles S. Rich, *The Principles of Patentability*, 42 J. Pat. Off. Soc’y 75, 80-81 (1960) (quoting 35 U.S.C.A. § 131 revision note (1954)).

<sup>297</sup> 52 U.S. (11 How.) 248 (1851).

<sup>298</sup> S. REP. NO. 24-338, at 3 (1st Sess. 1836).

<sup>299</sup> *Id.* at 4.

<sup>300</sup> *Id.* at 4-5.

distinguished science from physical technology (created by human ingenuity), articulated that technology was based on principles of invention (conceptions) that needed to be adapted to practice use by experiments (reduced to practice),<sup>301</sup> treated discovery (for technology) as the transition from conception to reduction to practice, and then explained how obtaining social benefits from promoting technological ingenuity by protecting principles of invention was the object of the 1836 Patent Act:

Much as has been discovered, infinitely more remains unrevealed. The ingenuity of man is exploring a region without limits, and delving in a mine whose treasures are exhaustless....

*The first conceptions of ingenuity, like the first suggestions of science, are theories* which require something of experiment and practical exemplification to perfect. *Mechanical inventions* are at first necessarily crude and incomplete. Time is required to develop their imperfections and to make *the improvements necessary to their adaptation to practical uses*. Inventors generally obtain patents before they venture upon those experiments which only can test their inventions. They are apprehensive of being forestalled *in their discoveries*, and see no other means of protecting themselves against piracy and fraud, than by securing patents at once.

A remedy for this may be easily had in a provision authorizing caveats to be filed in the office, *giving security to the right of discovery* for a time sufficient for making the necessary experiments, inquiries, and improvements.<sup>302</sup>

Although Ruggles thus talks of various industries that produce machines which would be capable of being displayed as models in the new proposed Patent Office building, he also discusses exhibiting specimens of fabrics and “works of art,” and a “cabinet of interesting minerals ... polished specimens of its beautiful marbles ... and, also, a collection of Indian curiosities and antiquities ...”<sup>303</sup> But these additional things were not called “useful arts,” and because within the scope of “a national museum of the arts”<sup>304</sup> their inclusion in such a museum should not be seen as including with the statutory term “art” adopted in Section 6 for purposes of determining patentable subject matter. To this day, no one would consider an Indian curiosity or antiquity to comprise, without more, an invention, regardless of how much expressive creativity was involved.

Thus, the 1836 Patent Act clearly represented the *beginnings* of a change from earlier conceptions of what the Constitution prohibited and the Congress had provided

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<sup>301</sup> See Prager, *supra* note 40, at 262 (“Story held that a valid patent could be given to the [first to invent even if not made public,] and only to him, for at the time of the other invention, said he, the matter was no longer ‘new.’ Later on, [Justice Story] indicated that a valid patent could also be given to one who had first conceived but not yet completed an invention, if he had been diligent in trying to complete it.”) (citing *Woodcock v. Parker*, 30 F. Cas. 491 (C.C.D. Mass. 1813) (No. 17,971); *Bedford v. Hunt*, 3 F. Cas. 37 (C.C.D. Mass. 1817) (No. 1,217); and *Reed v. Cutter*, 20 F. Cas. 435 (C.C.D. Mass. 1841) (No. 11,645)).

<sup>302</sup> S. REP. NO. 24-338, at 5-6 (1st Sess. 1836).

<sup>303</sup> *Id.* at 8.

<sup>304</sup> *Id.*

(most likely reflecting changes to religious and philosophical conceptions that had developed during the Age of Reason, or Age of Humanism or Modern Age, and differing significantly from the deist conceptions of 1800).<sup>305</sup> The line between science and technology, and between useful arts and other arts was beginning to blur for different purposes, if not yet for patents. It was in this context that the exclusions for science, nature, and ideas *eo nomine* were formulated, emanating from their historic origins as excluded philosophical principles.

As discussed below and as I have also discussed elsewhere, as late as 1853 the statute (or the Constitution) was not understood to permit patents on scientific principles alone. The limitation was (as a result of the additional language added to Section 6 of the 1836 Patent Act regarding claiming, added in response to *Evans v. Eaton*<sup>306</sup>) now permitted to be expressed in terms of overly broad *claims* for the principle of the invention, rather than in terms of granting a patent for an unpatentable principle.<sup>307</sup> Such claims were overbroad because not limited to a range of specified – although not necessarily enumerated – physical embodiments.<sup>308</sup> Thus, following *Evans*, the question of patentable subject matter could be addressed by looking to whether the claim was too abstract and concrete, rather than at whether the claim covered science, nature, or ideas that were not permissibly included within the “useful arts” or “discoveries” (as understood in the Constitution and earlier acts, freeing up the word “discoveries” to be

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<sup>305</sup> See, e.g., JONATHAN HILL, FAITH IN THE AGE OF REASON (Lion/Intervarsity Press 2004). Wikipedia, Philosophy, [http://en.wikipedia.org/wiki/Philosophy#American\\_Pragmatism](http://en.wikipedia.org/wiki/Philosophy#American_Pragmatism) (last visited Sept. 25, 2006) (discussing the philosophical school of American Pragmatism); Wikipedia, Age of Enlightenment, [http://en.wikipedia.org/wiki/Age\\_of\\_Enlightenment](http://en.wikipedia.org/wiki/Age_of_Enlightenment) (last visited Sept. 25, 2006) (discussing the movements of liberalism, neo-classicism, and romanticism following the Enlightenment). Oren Bracha traces a similar history from “case-specific discretionary privileges” to a “full-blown, patent-rights model” from the 1790 Patent Act through the 1836 Patent Act. Bracha, *supra* note 95, Ch. IV at 404, 405. See *id.* at 403-29. But Bracha focused on the nature of the grant and the demise of the utility doctrine, and the desire of Senator Ruggles to create a general law, to conclude that the 1836 Patent Act “br[ought] about the final disappearance of the privilege framework of patents.” *Id.* at 424. See *id.* at 425. Because Bracha did not evaluate discretion in regard to what inventions would qualify for patents, both as subject matter and as sufficiently creative contributions, and did not focus on Ruggles’ other concerns about the failures of the Patent Office to exercise discretion they might have had under the 1793 Act, Bracha’s analysis fails to identify the substantial and important continuing discretion inherent in the patent system even after an enforceable right emerged to a decision on whether to grant the patent (and whether a granted patent could be invalidated). Bracha thus improperly inferred from a right of appeal in all cases of rejection to a right to a patent in those appeals when the statutory criteria were not met. See *id.* at 425-26 (citing the Patent Act of March 3, 1839, ch. 88, 5 Stat. 353, 354-55, § 11 (1839) which eliminated the three person appeal board of examiners and vested appellate jurisdiction over patent decisions in the Chief Justice of the U.S. District Court for the District of Columbia). Nevertheless, Bracha noted the conflicts over patentable subject matter and the nature of invention during the 19<sup>th</sup> Century, and the allowance over time of patents for disembodied processes and claims drawn to increasing levels of abstraction. See Bracha, *supra* note 95, Ch. IV at 430-91.

<sup>306</sup> 20 U.S. (7 Wheat.) 356, 431 (1822).

<sup>307</sup> See *O’Reilly v. Morse*, 56 U.S. (15 How.) 62, 113 (1854) (“In fine, he *claims* ...”) (emphasis added); *Corning v. Burden*, 56 U.S. (15 How.) 252, 269 (1854) (“His *claim* cannot change or nullify his previous specification.... He cannot describe a machine which will perform a certain function, and then claim the function itself, and all other machines that may be invented to perform the same function”) (emphasis added).

<sup>308</sup> See *infra* notes \_\_-\_\_ and accompanying text; Sarnoff, *Claiming the Future Part I*, *supra* note 70, at 388-91.

reinserted in the statute without concern that it would cover “mere principles”).<sup>309</sup> Patents on scientific principles would not permit a clear description of and claim to the things to which the principle would apply. (Although it would fall into disuetude in civil contexts and penal contexts not involving expressive speech, one can understand this as a constitutional “void-for-vagueness” approach.<sup>310</sup>) A patent applicant could no longer file a petition clearly describing his machine invention and hoping to patent not just the principle of its implementation of science but the science itself. Instead, the applicant was required to “explain” the “principle” for machines and the “several modes, in which he has contemplated the application of that principle,” and for all inventions to “specify and point out” (*i.e.*, describe) the “invention or discovery” for which the applicant “claim[ed] exclusive rights.<sup>311</sup> Patents on physical nature or living things that lacked a clear description of how nature had been transformed would run afoul both of clarity and of novelty requirements (novelty by potentially applying – through the vague understanding – to previously existing applications of scientific principles). In sum, the description had to identify what was the tangible and concrete application of the invented scientific principle, which were the “several modes” that the inventor “ha[d] contemplated” for their application and not the mere application of the principle itself to a new technological context.<sup>312</sup> But, as will be described presently, the requirement of specification of the principle in language freed methods or processes from their restriction to the contemplated physically embodied modes of application and perversely allowed them (particularly given that the 1870 Patent Act had required *greater* particularity in claiming the scope of the inventive principle) to identify an inventive principle that would apply to all physical embodiments and all tangible and concrete applications, including those modes and applications not contemplated by the inventor.

b. In the Courts

In one of the earliest reported patent cases following the 1793 and 1800 Patent Acts, *Whitney v. Carter*,<sup>313</sup> a federal court clearly confronted the difficulty of specifying the principle of a mechanical invention (here the famous cotton gin), as it had been alleged that the principle of the machine invention patented was anticipated by machines in England and Ireland.<sup>314</sup> The plaintiff thus argued both that the inventive principle of operation of the machine was not in fact new and that “if the principle be the same, yet

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<sup>309</sup> See Sarnoff, *Claiming the Future Part I*, *supra* note 70, at 392-408 (discussing doctrinal restrictions on the breadth of claiming language); Sarnoff, *Claiming the Future Part II*, *supra* note 70, at 451-91 (discussing such restrictions under the 1872 Patent Act and why the 1952 Patent Act was not meant to change them).

<sup>310</sup> *Cf.*, *e.g.*, *Village of Hoffman Estates v. The Flipside, Hoffman Estates, Inc.*, 455 U.S. 489, 498 (1982) (“[T]he degree of vagueness that the Constitution tolerates — as well as the relative importance of fair notice and fair enforcement — depends in part on the nature of the enactment.”).

<sup>311</sup> See Patent Act of July 4, 1836, c. 357, 5 Stat. 117, 119, § 6 (1836) (“and in case of any machine, he shall 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; and shall particularly specify and point out the part, improvement, or combination, which he claims as his own invention or discovery.”) (emphasis added).

<sup>312</sup> *Id.*

<sup>313</sup> 29 F. Cas. 1070 (C.C.D. Ga. 1810) (No. 17,583).

<sup>314</sup> See *id.* at 1071.

the plaintiff's *application of the principle, being new*, and for a distinct purpose, has all the merit of an original invention."<sup>315</sup> The Court responded by holding that this machine itself (and its principle of operation) was original, as a form of *res ipsa loquitur*:

The machine, of which Mr. Whitney claims the invention, so facilitates the preparation of [cotton] for use, that the cultivation of it has suddenly become an object of infinitely greater importance than that of the other species ever can be. It is then to be imagined that if this machine had been before discovered, the use of it would ever have been lost, or could have been confined to any tract of country left unexplored by commercial enterprise? But it is unnecessary to remark further on this subject.

The Court thus did not reach whether a patented principle could be based on the new use of an existing machine.

However, the Court also addressed the second objection, that the invention constitutes "[a]n improvement, not in the principle, nor in the operation of a machine, but in making one of its component parts, merely in forming the same thing to produce the same effect by means somewhat different. The Court noted that "counsel for Mr. Whitney admitted that an improvement in a particular part of the machine would entitle the inventor to a patent for a specific part, but not for the whole machine, as was the case of *Boulton v. Bull* [2 H. Bl. 463]."<sup>316</sup> The Court rejected the argument that the same principle was applied, notwithstanding the concerns raised by Judge Stevens that "the plaintiff must have received his first impressions from a machine previously in use on a similar principle; and that an improvement had been made as to the teeth, *by which the merit of Mr. Whitney's invention was diminished*."<sup>317</sup> In contrast, Judge Johnson believed that the evidence did not demonstrate a prior art machine based on the same inventive principle, and thus Whitney was entitled to a broad claim to the principle on which the machine, and not the improvement, operated.<sup>318</sup> Thus, the Court began to confront the difficulties of determining the principle of invention, given the constraints that prior art placed on the principle of an invention that could have been patented, and the consequent difficulty of determining whether the alleged infringer operated on the basis of a broad original principle or a narrow improvement principle.

In 1810, Thomas Fessenden published the first American patent law treatise.<sup>319</sup> Fessenden's treatise arguably suggests that he believed in natural law rights in inventions, and that the American Patent law recognized such natural rights.<sup>320</sup> But it also suggests,

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<sup>315</sup> *Id.* (emphasis added).

<sup>316</sup> *Id.* at 1072.

<sup>317</sup> *Id.* (citing *Whitney v. Fort*, 29 F. Cas. 1089 (C.C.D. Ga. 1807) (No. 17,587) (emphasis added). *Fort* held that "the [junior] patent was valid for the improvement, but that it gave [the junior patentee] no title to the machine itself." 29 F. Cas. at 1090.

<sup>318</sup> See *Whitney*, 29 F. Cas. at 1072-73.

<sup>319</sup> THOMAS G. FESSENDEN, AN ESSAY ON THE LAW OF PATENTS FOR NEW INVENTIONS xxxvii (D. Mallory 1810).

<sup>320</sup> The language of the treatise focuses on not depriving the inventor of the (inchoate) statutory right to seek a patent, by someone else having invented earlier. But it does not clearly state that that the inchoate



in discussing English law as persuasive precedent for United States law that inventions were limited to tangible embodiments and not to the intellectual discoveries they produced them, and later suggests that patents reward only disclosure and not any natural or common law right in the invention itself (treating the word “secure” as relating only to the profits from the grant and not the right).

In a moral, as well as a political point of view, the author of a new and useful invention, has the best of all possible titles to a monopoly of the first fruits of his ingenuity. *The invention is the work of his hands, and the offspring of his intellect*, and after he is allowed a temporary monopoly, becomes, at the expiration of the patent, a valuable donation to society.

....

But the patent must not be more extensive than the invention, therefore if the invention consists in an addition, or improvement only, and the patent is for the whole machine, or manufacture, it is void.

It will not impeach the validity of a patent that another first made the discovery, which is the subject of it, if in truth the patentee were the first to make it public; for it was the disclosure of new inventions which the statute meant to encourage.... The specification is the price which the patentee is to pay for his monopoly.

....

If a patent be granted in case of a new invention, the King cannot grant a second patent, for the charter is granted as an encouragement to invention and industry, and to secure the patentee in the profits for a reasonable time; but when that is expired, the public is to have the benefit of the discovery.

....

The law of the United States is variant from that of Great Britain, as respects the granting of patents for manufactures newly brought from beyond the sea. And it has been determined ... “that the right to the patent belongs to him who is the first inventor, even before the patent is granted.”<sup>321</sup>

Further, after quoting in full the decisions in *Boulton v. Watt* and *Hornblower v. Boulton*, and noting that the opinions of Judges Heath and Buller were later contradicted and of Judges Rooke and Eyre were later confirmed in *Hornblower*, Fessenden also quoted in full *Whitney v. Carter*, including the language from Judge Johnson that “the legal title to a patent consists not in a principle merely, but in an application of a principle, whether previously in existence or not, to some new and useful purpose.”<sup>322</sup> Significantly,

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right required a grant of a patent. And it also notes that a sufficient degree of publicity (from the statutory language “known or used”) will defeat that inchoate right. *See id.* at 51-52.

<sup>321</sup> *See id.* at xxxvii, 48-49 (citing *Whitney v. Carter*, 29 F. Cas. 1070 (C.C.D. Ga. 1810) (No. 17,583)) (emphasis added). *But cf. id.* at 162 (quoting arguments of counsel in *Tyler v. Tuel*, 10 U.S. (6 Cranch.) 324 (1810) that “[t]he patent not being a common law instrument, can only be assigned in the manner authorized by statute.”).

<sup>322</sup> *Id.* at 131-32 (emphasis added).

Fessenden then recited the text of Section 2 of the 1793 Patent Act, which conclude that “simply changing the form or proportions of any machine or composition of matter in any degree, shall not be deemed a discovery,” and then concluded that “[s]imilar principles have been recognized and sanctioned in the British Courts.”<sup>323</sup> Thus, Fessenden believed that improvements were not patentable, not so much because they were not useful arts, but on the same grounds as in *Boulton and Hornblower* that “discovery” was meant in the limited fashion of not applying to scientific principles but rather to technology.<sup>324</sup>

In the next significant case, *Whittemore v. Cutter*,<sup>325</sup> Justice Story held in 1813 that:

[i]t is difficult to define the exact cases, when the whole machine may be deemed a new invention, and when only an improvement of an old machine; the cases often approach very near to each other.... [if] *a mere addition is made to such machine, to produce the same effects in a better manner, a patent cannot be taken for the whole machine, but for the improvement only.*<sup>326</sup>

Of greater significance, Justice Story noted that “if to an old machine, some new combinations be added, *to produce new effects*, the right to a patent is limited to the new combinations. *A patent can, in no case, be for an effect only, but for an effect produced in a given manner, or by a peculiar operation.*”<sup>327</sup> Although Justice Story also did not answer the question pending from *Whitney*, he did foreclose patents based on methods of accomplishing an effect, limiting patents (like in *Boulton v. Bull*) to the embodied mode of accomplishing the effect (*i.e.*, a principle of a machine that might apply to many physical embodiments, even those which constituted patentable improvements on the principle). Thus the jury was to decide whether the “principles of Mr. Whittemore’s machine invention ... be an improvement only .... [and Justice Story had] before observed, that the principles are the mode of operation.”<sup>328</sup>

Also in 1813, in *Woodcock v. Parker*,<sup>329</sup> Justice Story elaborated on what kind of improvement could constitute a patentable invention:

It is not necessary, to defeat the plaintiff’s patent, that a machine should have previously existed in every respect similar to his own; for a mere

<sup>323</sup> *Id.* at 137 (citing *Boulton and Hornblower*) (emphasis added).

<sup>324</sup> Walterscheid rejects this argument, previously made by Robert Kriess, in part based on admission that the meaning of “discovery” at the time of the Constitution “included the finding of natural phenomena,” and thus rejects the exclusion as based on linguistic or policy grounds. WALTERSCHEID, *supra* note 27, at 365 & n.235 (citing Robert A. Kreis, *Patent Protection for Computer Programs and Mathematical Algorithms: The Constitutional Limitations on Patentable Subject Matter*, 29 N.M.L. REV. 31, 74-75 (1999)). I concur. Rather, the exclusion was based limiting patentability of a broader understanding of the term “discoveries” on theological grounds that went without saying, literally and metaphorically.

<sup>325</sup> 29 F. Cas. 1123 (C.C.D. Mass. 1813) (No. 17,601).

<sup>326</sup> *Id.* at 1123-24 (emphasis added).

<sup>327</sup> *Id.* at 1124 (emphasis added).

<sup>328</sup> *Id.* (citation omitted).

<sup>329</sup> 30 F. Cas. 491 (C.C.D. Mass. 1813) (No. 17,971).

change of former proportions will not entitle a party to a patent. If he claim a patent for a whole machine, it must in substance be a new machine; that is, it must be a new mode, method, or application of mechanism, to produce some new effect, or to produce an old effect in a new way. In the present case, if all parts of the machine, except the spring plate, (which the plaintiff claims as emphatically his own invention,) existed before, and were applied to produce the same effects in the same manner; and the plaintiff has established the spring plate to be the exclusive invention, still his patent ought to have been confined to such improvement and ought not to have comprehended the whole machine.<sup>330</sup>

One year later, in *Odiorne v. Winkley*,<sup>331</sup> Justice Story would reiterate these points, charging the jury that a patent could issue either for the original principle of a machine or for an improvement, and that it was a “point of intrinsic difficulty to decide, whether one machine operates upon the same principles as another.... The material question, therefore is ... whether the given effect is produced substantially by the same mode of operation, and the same combination of powers, in both machines.”<sup>332</sup>

In 1816, Oliver Evans (whose own invention and patent would become the basis for a celebrated and foundational patent case requiring a sufficiently distinguishing description of the invention in the specification<sup>333</sup>) published a treatise that recognized the exclusion for principles of nature as “something existing in the mind without *tangibility*, for which a patent cannot be good.”<sup>334</sup> Significantly, Evans understood the religious origins of this exclusion, a point to which we will return later.

A simple mechanist understands *intuitively*; he defines the word principles to mean, *The eternal immutable laws of nature, or nature's God*; viz. gravity, attractions, ...eternity, truth, falsehood, right, wrong, &c. &c. &c.; of some of which we can form distinct ideas, but of most of the principles in nature, art, and science our ideas are very confused. Er conceive them to be too numerous to be mentioned, yet the *fundamental* principles may be few. We know that they cannot be invented or created by man; they have co-existed with eternity; and are *common stock*, but may be *discovered* by study and ingenuity, and variously applied to useful purposes, by labour and expense, which constitutes *inherent*, exclusive right. The mechanist knows in the application of which of them, he has discovered an improvement, to improve any art machine, or manufacture, either to produce equal beneficial effects, at *a less expense*, or a greater *beneficial effect in a given time*, or a more perfect and more *beneficial result*. In either of these cases he knows that he has made *an improvement*

<sup>330</sup> *Id.* at 492. This limitation, to the actual improvement, may be relevant to apportioning damages for combination inventions, a point currently in hot contention in regard to legislative reform.

<sup>331</sup> 18 F. Cas. 581 (C.C.D. Mass. 1814) (No. 10,432).

<sup>332</sup> *Id.* at 582.

<sup>333</sup> *Evans v. Eaton*, 20 U.S. (7 Wheat.) 356 (1822).

<sup>334</sup> OLIVER EVANS, EXPOSITION OF PART OF THE PATENT LAW BY A NATIVE BORN CITIZEN OF THE UNITED STATES TO WHICH IS ADDED REFLECTIONS ON THE PATENT LAW 12 (1816).

*in the principle*, within the meaning of the 2d section of the act; and he knows what it has cost him, and claims a remuneration.<sup>335</sup>

Evans distinction between the “eternal, immutable laws of nature” and applied principles of invention was not lost on Justice Story. One year later, in *Lowell v. Lewis*,<sup>336</sup> Justice Story first articulated the exclusions for scientific principles and abstract ideas in American case law, while focusing on the requirements for a distinguishing description of the invention made in the specification:

It has been often decided, that a patent *cannot be legally obtained for a mere philosophical or abstract theory*; it can only be for such a theory reduced to practice in a particular structure or combination of parts. In short, the patent must be for a *specific* machine, substantially new *in its structure and mode of operation, and not merely changed in form, or in the proportion of its parts.*

....

A patent is grantable only for new and useful invention; and unless it be distinctly stated, in what that invention specifically consists, it is impossible to say, whether it ought to be patented or not; and it is equally difficult to know, whether the public infringe upon or violate the exclusive right secured by the patent. The patentee is clearly not entitled to include in his patent the exclusive use of any machinery already known; and if he does, his patent will be broader than his invention, and consequently void.

.... [Section 3 of the 1793 Patent Act] is decisive on this point[ as i]t requires .... That the inventor shall deliver a written description of his invention ... as to distinguish the same from all other things before known; and in the case of any machine, he shall fully explain the principle, *and the several modes*, in which he has contemplated the application of that principle.<sup>337</sup>

Thus, not only were inventions distinguished by their technological character, the patentable invention (if there was one) was to lie in the application of the scientific principle through a particular *new* structural mode of accomplishing an effect, and the principle was required to be stated to avoid fraud on the public of suggesting a right to a

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<sup>335</sup> *Id.* at 12-13 (emphasis added). *See also id.* at 9-10 (describing the requirements in Section 2 of the 1793 Patent Act for a “written description of the invention, *and manner of using it*” as applied to: old machines, in which case the patent is for “the *principle* applied to improve the art, &c. by means of the improved machines” by “*new machines*,” in which case the patent may be taken separately for them as well; and by “several machines, *invented* and patented by several different persons,” in which case the patent will be for “the *application* of the *principles*, to produce the improvement ... for it cannot be for the machines patented by others, nor can it be for the combination unconnected with the improvement, or useful result, for the combination is one of his *manners* of using the improvement, or *modes* of application of the principle.”); *id.* at 12 (“*the application of the principle* is the invention, and the machine is the *mode of application* or the manner of using the invention; and here it appears evident, that all patents are for *principles, applied by modes, or machines*, to produce useful results; That under our law no patent can be granted or held, even for any machine, unless a *principle* be described.”).

<sup>336</sup> 15 F. Cas. 1018 (C.C.D. Mass. 1817) (No. 8,568).

<sup>337</sup> *Id.* at 1019-20 (emphasis added).

broader principle (which in no event could have included the scientific principle on which the machine operated).<sup>338</sup> If the claimed principle of the original or improvement structure were not new, there was no patentable invention. *Lowell* thus implicitly answered in the negative the question pending in *Whitney v. Carter*, *i.e.*, that there could be no patentable invention in the mere application of an existing structure (operating according to physical principles) to a new use. *Lowell* also restricted the claim to the modes of application of the inventive principle *actually contemplated by the inventor and reduced to writing in the specification*, a point that has been lost in the law of written description and enablement, and which was the focus of my prior writing on the expansion of claim scope doctrines.<sup>339</sup>

In 1816, in *Evans v. Eaton*,<sup>340</sup> Justice Washington riding circuit addressed Oliver Evans elevator and hopperboy (grain spreading) patent which was an improvement to the method of manufacturing flour. Prior to his decision, after noting that Congress had granted a patent term extension by special legislation,<sup>341</sup> and that a motion was pending to non-suit the plaintiff based on an implied contract with the government that the public would receive the benefit of the invention after the expiration of the first term (which could not constitutionally be abrogated), the Court held that “the state has a perfect right to renew the grant at the end of the period or refuse to do so.... But even if the premises were true, still there is nothing in the constitution of the United States which forbids congress to pass laws violating the obligation of contracts, although such a power is denied to the states individually.”<sup>342</sup> Justice Washington then instructed the jury that:

It would certainly seem that congress intended [that Evans be capable of obtaining a patent in the] entire improvement, and the several machines... But be this as it may, it is certain that the patent contains no grant of a right to the several machines, but is confined to the improvement in the art of manufacturing flour by the use of those machines, and therefore the plaintiff can claim no right which is not included in the patent.

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<sup>338</sup> Justice Story thus clarified even further the distinction between the different meanings of the term “principle” in *Barrett v. Hall*, 2 F. Cas. 914, 923 (C.C.D. Mass. 1818) (No. 1,047) (“In the minds of some men, a principle means an elementary truth, or power; so that in the view of such men, all machines, which perform their appropriate functions by motion, in whatever way produced, are alike in principle, since motion is the element employed. No one, however, in the least acquainted with the law, *would for a moment contend, that a principle in this sense is the subject of a patent*; and if it were otherwise, it would put an end to all patents for all machines, which employed motion, for this has been known as a principle, or elementary power, from the beginning of time. The true legal meaning of the principle of a machine, with reference to the patent act, *is the peculiar structure or constituent parts of such machine.*”) (emphasis added).

<sup>339</sup> See generally Joshua D. Sarnoff, *Abolishing the Doctrine of Equivalents and Claiming the Future After Festo*, 19 BERKELEY TECH. L.J. 1159 (2004).

<sup>340</sup> 8 F. Cas. 846 (C.C.D. Pa. 1816) (No. 4,559).

<sup>341</sup> *Id.* at 846 (Syllabus) (citing Patent Act of Jan. 21, 1808, ch. 6, 6 Stat. 70 (1808)).

<sup>342</sup> This is important for those for whom the prior discussion of legislative discretion in the grant would be insufficient to preclude a taking when the grant was revoked. See *supra* notes \_\_\_-\_\_\_ and accompanying text.

As to what constitutes an improvement it is declared that it must be in the principle of the machine, and that a mere change in the form or proportions of any machine, shall not be deemed a discovery.... [And the applicant] must also deliver a written description of his invention and of the manner of using it, so clear and exact as to distinguish the same from all other things before known, and to enable others, skilled in the art, to construct and use the same.

From this short analysis of the law, the following rules may be deduced:

First. That a patent may be for a new and useful art; *but it must be practical, it must be applicable and referrible to something which may prove it to be useful. A mere abstract principle is unsusceptible of appropriation by a patent.* The intention of congress is very obvious, from the language of this law. The applicant for a patent must show how the principle is to be used and applied to some useful purpose. The granting words of the patent are still more explicit; they are, “to make, construct, use, and vend to be used.”

Second. The discovery must be not only useful, but new.... The first section, referring to the allegations of the applicant for a patent, speaks of the discovery as something not known or used before the application... Now, if original does not mean first, the preceding expressions in the first and sixth sections, most certainly do.

Third. If the discovery be of an improvement only, it must be an improvement in the principle of a machine, art, or manufacture, before known or in use. If only in the form or proportions, *it has not the merit of a discovery which can entitle the party to a patent.*<sup>343</sup>

Justice Washington held that the claimed invention was for an entire method of using parts to manufacture flour (as recited under oath), that the patentee could not have sworn to have invented a new hopperboy, and that no infringement could occur.<sup>344</sup>

The Supreme Court (in an opinion written by Chief Justice Marshall) initially reversed Justice Washington,<sup>345</sup> holding that Justice Washington had improperly excluded evidence to show that the prior art uses of the hopperboy that had been admitted into evidence through testimony were performed under license and thus should not evidence prior invention before the application.<sup>346</sup> The Court then addressed the

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<sup>343</sup> *Evans*, 8 F. Cas. at 851-53 (emphasis added).

<sup>344</sup> *See id.* at 854-55 (“But has he, or could he have taken such an oath in this case? Most assuredly not; because ... he knew at the time he was not the true inventor of the hopperboy [but by swearing an oath to the use in the process] he would indirectly obtain the full benefit of a patent right to this machine, which he could not have directly obtained, without doing what it must be admitted in this case has not been done.... But, it has been asked by the plaintiff’s counsel, can it be right that the plaintiff should be deprived of the benefit of his discovery by the mere omission of the defendant to use one or more of the machines which compose the entirety of his discovery? To this question the answer is obvious. If the plaintiff is not the inventor of the parts, he has no right to complain that they are used, if not in a way to infringe his right to their combined use.”).

<sup>345</sup> *Evans v. Eaton*, 16 U.S. (3 Wheat.) 454 (1818).

<sup>346</sup> *See id.* at 504-05.

construction of the patent as for the combination of all the machinery, holding that the special act of Congress obviated any objection to having granted a patent on both the combination and the underlying improvements, including the hopperboy (if it were new). The Court thus held that, although it might have limited the patent to the combination if the recital and allegation of what Evans had invented contained in the patent, on inspection of the petition for a broader scope that included the invention it would construe the grant more broadly.<sup>347</sup> The Court thus reversed the judgment.<sup>348</sup> But the Court also rejected the challenge to the jury instruction that the grant could have been for the hopperboy and not limited to the improvement in hopperboys actually invented (if hopperboys had been known and used before). “The court is not of that opinion.... The words of this act do not require this construction. They do not grant to Oliver Evans the exclusive right to use certain specified machines; but the exclusive right to use his invention, discovery, and improvements; leaving the question of invention open to investigation, under the general patent law.”<sup>349</sup>

The Supreme Court reports included, in the volume containing *Evans v. Eaton*, an Appendix to the case on patent law, which has been attributed to Justice Story. Justice Story’s appendix was likely intended “as a kind of dissent,” and Story had his revenge four years later by invalidating the patent that the reversal of Justice Washington’s decision had accomplished.<sup>350</sup> In the Appendix, Justice Story “favored” the holding in *Boulton* over that in *Hornblower*, “and while not reducing the statutory word ‘art’ all the way to zero, he certainly suggested a minimizing interpretation of the word. He indicated that a method patent can be good only ‘under certain circumstances’ ... [meaning] that the method covered a new way of making an old substance. In effect he proposed invalidity of all patents for manipulative methods and the like.”<sup>351</sup> Justice Story also noted that the term manufacture was to be understood both in regard to things made and to “the practice of making,” which included methods of producing “effects useful to the public,” which could be a “new substance, or composition” or “can only be for the mechanism ... or for the process... with or without old mechanism, by which the effect is produced.”<sup>352</sup> Thus, Justice Story concluded that a patent for a process of making lace that was not limited to “any particular mode of making it” was invalid because it was “more extensive than the invention.”<sup>353</sup>

On remand in *Evans v. Eaton*, Justice Washington first instructed the jury (which ruled in Eaton’s favor) to decide if Evans’ hopperboy operated on the same principles as another hopperboy in prior use (according to testimony), and if so whether Evans was the first inventor thereof.<sup>354</sup> Justice Washington continued to believe that the patent was for

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<sup>347</sup> See *id.* at 507-12.

<sup>348</sup> See *id.* at 518.

<sup>349</sup> *Id.* at 513.

<sup>350</sup> See Prager, *supra* note 40, at 256.

<sup>351</sup> *Id.* (citation omitted).

<sup>352</sup> *Evans v. Eaton*, 16 U.S. (3 Wheat.) 454, 519 (1818) (Story, J., app. Note II, *On the Patent Laws*) (citing *Boulton v. Bull*, 2 H. Bl. 463, 492 (1797) (Opinion of Lord Eyre, C.J.)).

<sup>353</sup> *Id.* at 17 (citing *King v. Else*, 11 East 109, note (K.B.)).

<sup>354</sup> *Evans v. Eaton*, 8 F. Cas. 856, 858 (C.C.D. Pa. 1818) (No. 4,560). It was admitted that the defendant used the same hopperboy as contemplated by Evans. See *id.*

the entire hopperboy, and that if Evans was a second inventor he could at most have invented an improvement of the principle of hopperboys. The patent would then be invalid if it was for the entire hopperboy, as Evans would not have invented the principle of the hopperboy. “In th[at] ... case, the patent would be too broad; and therefore void, where the patent is single.”<sup>355</sup> Although the Court had remanded to evaluate whether the patent properly included the hopperboy (as well as the process of using it) and whether the defendant infringed, Justice Washington would not play ball. He balked at instructing the jury to find infringement of the principle of an entire machine, and instructed them instead that if Evans was not the first to invent the machine (and thus had invented only an improvement that he had failed to identify), the patent could not be valid (and might be unconstitutional) and therefore could not be infringed.<sup>356</sup> Having disposed of the argument for a patent on the hopperboy, Justice Washington then instructed the jury that the patent for the improvement also would be invalid, “because the nature and extent of [Evan’s] improvement are not stated in the specification.”<sup>357</sup> The problem with such a patent was the lack of notice it would provide, so that the public might know what the improvement consisted of and thus be capable of avoiding infringement.<sup>358</sup> The patent must be invalid, because in order to understand the improvement, one must understand the original that it improves, which was nowhere discussed in the patent specification and noting in the special act suggested that the demonstration could be supplied by parol evidence rather than by the patent and specification itself.<sup>359</sup>

Four years later, Justice Story upheld the verdict, and provided yet further clarification regarding patentable subject matter, and the need for a clear and distinctive claim as to what had been invented and was intended to be patented:

The plaintiff does not state it to be a specific improvement upon an existing machine, confining his claim to that improvement, but as an invention substantially original. In short, he claims the machine as substantially new in its properties and principles, that is to say, in the *modus operandi*.... The Patent Act of the 21st of February, 1793, ch. 11. upon which the validity of our patents generally depends, 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. It also gives to any inventor of an improvement in the principle of any machine, or in the process of any

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<sup>355</sup> *Id.*

<sup>356</sup> *See id.* at 859 (noting that the Supreme Court had earlier rejected the argument that Congress had decided priority of invention and suggesting a constitutional violation if Evans had only invented the improvement and Congress had given a patent for the entire hopperboy). *See also id.* (“Now, if he did not invent the hopperboy, he has no claim to it; and if so, could the court mean to say, that he was nevertheless entitled to recover under that claim? Such a decision was certainly not called for, by the terms of ‘The act for the relief of Oliver Evans,’ but would seem to be in direct violation of it.”).

<sup>357</sup> *Id.*

<sup>358</sup> *See id.* at 860 (the requirements for a distinctive and enabling description “are to guard the public against unintentional infringements of the patent, during its continuance, and to enable an artist to make the improvement, by a reference to some known and certain authority, to be found amongst the records in the office of the secretary of state, after the patent has run out.”).

<sup>359</sup> *See id.* at 860.



composition of matter which has been patented, an exclusive right to a patent for his improvement; but he is not to be at liberty to use the original discovery, not is the first inventor at liberty to use the improvement. It also declares that simply changing the form or the proportion of any machine or composition of matter, in any degree, shall not be deemed a discovery....

From this enumeration of the provisions of the act, it is clear that the party cannot entitled 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, 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. If the same combinations existed before in machines of the same nature, up to a certain point, and the party's invention consists in adding some new machinery, or some improved mode of operation, to the old, the patent should be limited to such improvement, for if it includes the whole machinery, it includes more than his invention, and therefore cannot be supported.<sup>360</sup>

Although Justice Story was clear about what constituted a patentable principle of invention, he did not then require that the invention reflect the exercise of creative knowledge. (For this reason, it is important to reiterate that the exclusions from patentable subject matter under the 1793 Patent Act were based on the constitutional limitation of discoveries or the statutory limitation to inventions, and not on the sufficient creativity language that had been temporarily removed from the statute). Thus, Justice Story next held in *Earle v. Sawyer*<sup>361</sup> that patentable subject matter did not depend on the degree of inventive creativity involved, and that the Section 2 exclusions from discoveries for changes of form or proportions were to be understood as limitations in kind, and not of degree (even if they had originated that way under the Board):

By his present patent, he claims to be the inventor of the application of a circular saw, as a substitution for the perpendicular saw. He does not claim (which is very material) to be the inventor of the circular saw, or of any mode or machinery, by which it may be applied to sawing generally, or to sawing logs, or to sawing shingles. He claims to be the inventor of a combination of it in a particular manner with his old machine, for the purpose of sawing shingles. In what manner is the claim met?

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The whole argument, upon which this doctrine is attempted to be sustained, is, if I rightly comprehend it, to this effect. It is not sufficient, that a thing is new and useful, to entitle the author of it to a patent. He must do more. He must find it out by mental labor and intellectual creation. If the result of accident, it must be what would not occur to all persons skilled in the art, who wished to produce the same result. There

<sup>360</sup> *Evans v. Eaton*, 20 U.S. (7 Wheat.) 356, 429-31 (1822).

<sup>361</sup> 8 F. Cas. 254 (C.C.D. Mass. 1825) (No. 4,247).

must be some addition to the common stock of knowledge, and not merely the first use of what was known before. The patent act gives a reward for the communication of that, which might be otherwise withholden. An invention is the finding out by some effort of the understanding. The mere putting of two things together, although never done before, is no invention.

It did not appear to me at the trial, and does not appear to me now, that this mode of reasoning upon the metaphysical nature, or the abstract definition of an invention, can justly be applied to cases under the patent act.<sup>362</sup>

In 1829, in *Pennock v. Dialog*,<sup>363</sup> Justice Story further noted for the Supreme Court (in the context of explaining what “before the grant” meant under the Statute of Monopolies) that a patent must be for a *physical* embodiment of some *new* invented principle:

In the case of *Wood vs. Zimmer*, 1 Holt's N. P. Rep. 58, this doctrine was fully recognised by lord chief justice Gibbs. There the inventor had suffered the thing invented to be sold, and go into public use for four months before the grant of his patent; and it was held by the court, that on this account the patent was utterly void. Lord chief justice Gibbs said, “To 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 a patent, *though sold by the inventor only*, makes the patent void.” By “invention,” the learned judge undoubtedly meant, as the context abundantly shows, not the abstract discovery, but the *thing* invented; not the new secret principle, but the manufacture resulting from it.<sup>364</sup>

The 1836 Patent Act created new law for the Court to interpret. Congress not only codified the requirement for a particularized description that the Court had articulated in *Evans v. Eaton*, but also required applicants to specify (for machines) the particular modes by which the inventive principle was to be distinguished from a scientific principle. “In case of any machine, he shall 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; and shall particularly specify and point out the part, improvement, or combination, which he claims as his own invention or discovery.”<sup>365</sup>

Following the new enactment, Willard Phillips published his 1837 patent law treatise, which articulated the revised limitations on patentable subject matter by comparing the statutory terms “art, machine, manufacture, or composition of matter” to the English term “manufacture” and the French terms “every invention or discovery in

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<sup>362</sup> *Id.* at 255.

<sup>363</sup> 27 U.S. (2 Pet.) 1 (1829).

<sup>364</sup> *Id.* at 20 (emphasis added).

<sup>365</sup> Patent Act of July 4, 1836, ch. 357, 5 Stat. 117, 119, § 6 (1836).

any kind of industry.”<sup>366</sup> After noting that the French had granted some financial patents that “were declared not to be within the class of inventions comprehended under the law,”<sup>367</sup> the Phillips stated that:

not *every* invention or discovery in industry is patentable ... we must accept the expressions *art*, and *composition of matter* ... with large restrictions, since the word *art* is applied to mere skill, and yet it will appear very obviously that any discovery in the mode of managing the hands or limbs, or the instrument used ... cannot be made the subject of monopoly, and if it could be, that any such monopoly would be most pernicious. We must then resort to *manufacture*, and in the English law, and our own, to limit the construction to be put upon the other expressions used in our law.<sup>368</sup>

The distinction between scientific principles and their technological applications also was understood by reference to French law.<sup>369</sup>

In 1840, in *Wyeth v. Stone*,<sup>370</sup> Justice Story rejected the argument that patent could be for “any mode whatsoever of cutting ice by means of an apparatus, worked by power, not human, in the abstract, whatever it may be.”<sup>371</sup> Further, if the patent were not limited to a particular mode of cutting ice, the patent was “for an abstract principle, and broader than the invention, which is only cutting ice by one particular mode.”<sup>372</sup> Again, patents were limited to principles of invention understood as particular modes of accomplishing through contemplated machinery or structures a concrete and tangible end.

In 1841, in England, Thomas Webster published his patent law treatise.<sup>373</sup> After acknowledging that the discovery of a scientific principle was not patentable,<sup>374</sup> Webster

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<sup>366</sup> WILLARD PHILLIPS, *THE LAW OF PATENTS FOR INVENTIONS; INCLUDING THE REMEDIES AND LEGAL PROCEEDINGS IN RELATION TO PATENT RIGHTS* 74-75 (American Stationers’ Co. 1837).

<sup>367</sup> *Id.* at 74. *See also id.* at 82 (also discussing the views of M. Renouard under French law that “it is necessary that the “invention or discovery should be of a nature to afford products that may be fabricated by the hands of man”) (citation omitted).

<sup>368</sup> *Id.* at 75-76.

<sup>369</sup> *Id.* at 82 (quoting Renouard that if “a philosopher discovers and makes know a property ... and yet draws from his discovery no special and positive application to specific fabrications, his discovery is merely scientific, and not patentable.”) (citations omitted). In contrast, application of the scientific principle may be patentable, when it results in “the production or combination of a new substance, for the formation of an instrument or machine, [or] if he employs it to obtain a result that is new and of a vendible description.” *Id.* (citation omitted).

<sup>370</sup> 30 F. Cas. 723 (C.C.D. Mass. 1840) (No. 18,107).

<sup>371</sup> *Id.* at 727.

<sup>372</sup> *Id.*

<sup>373</sup> *See* THOMAS WEBSTER, *ON THE SUBJECT MATTER OF LETTERS PATENT FOR INVENTIONS BEING A SUPPLEMENT TO THE LAW AND PRACTICE OF LETTERS PATENT FOR INVENTIONS* (Crofts and Blenkarn 1841).

<sup>374</sup> *See id.* at 6 (“announcement of any axiom or proposition of abstract science, of anhy law of nature or principle of physical science, of any property of matter, is not an invention in the sense which the term is used here, or such a discovery as can be the subject matter of letters patetn. Such an invention or discovery

argued that all patentable inventions took one of two forms: physical objects or modes of production:

all inventions may be viewed in one of the two classes, the one where the particular arrangement of matter is the substance of the invention, so that the result or effect produced is the real subject matter; the other where the particular application of some principle or property of matter is the substance of the invention, so that the real subject matter is the particular mode of production.<sup>375</sup>

Webster's analysis is helpful, as it explains the transition in U.S. law to recognizing processes disembodied from specified physical structure as patentable subject matter.<sup>376</sup> Nevertheless, Webster provided an understanding that modes of production were modes for producing *physical* objects, and thus did not extend to modes of producing intangible objects (even if the physical objects might extend beyond literal manufactures, *i.e.* hand-works).

The word in its etymological sense would refer to some object of skill or industry executed by the hands of man, and the manufactures of a country are all those objects viewed collectively; but inasmuch as the perfection of manufacture consists in the substituting other agents for human labour, this term manufacture now includes every object upon which art or skill can be exercised, *so as to afford products fabricated by the hand of man, or by the labour which he directs.*<sup>377</sup>

In 1842, in *Howe v. Abbott*,<sup>378</sup> Justice Story finally gave an explicit answer to the question remaining from *Whitney v. Carter* that applying existing machinery to a new use was not a patentable inventive principle. The patent at issue was for “a new and useful improvement in the application of a material called ‘palm leaf,’ or ‘brub grass,’ to the stuffing of beds, mattresses, sofas, cushions, and all other uses for which hair, feathers, moss, or other soft and elastic substances are used.”<sup>379</sup> Justice Story then explained that there was no patentable invention because there was no additional inventive principle that the applicant had discovered.

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is an addition to our knowledge only; it must be applied, so that some results or effects must be produced, whereby the arts and manufactures or trade and commerce of the country may be benefited”).

<sup>375</sup> *Id.* at 7.

<sup>376</sup> *See id.* at 22-23 (discussing cases of “simple application” that physically transformed objects not through the use of machinery but through “an application, requiring no composition of matter to put it into practice,” such as the application “of a known agent, as heat, water, & c., for effecting great improvements in manufactures”).

<sup>377</sup> *Id.* at 8. *See also id.* at 9 (“conducting or executing the series of processes upon which the character of the manufacture depends, is expressed in the statute by the words ‘making or working,’ either of which are equally applicable ... and it is unnecessary to attempt distinctions when the general import of the words is clearly expressed”).

<sup>378</sup> 12 F. Cas. 656 (C.C.D. Mass. 1842) (No. 6,766).

<sup>379</sup> *Id.*

At the trial it appeared in evidence, that the mode stated in the specification for spinning and curling the palm leaf, after it was reduced to filaments or fibres, was precisely the same process, by the same machinery, as had long before been, and now was used to spin, and twist, and curl, hair stuffing for beds, mattresses [sic], sofas, cushions, &c. But it did not appear, that the palm leaf was ever actually spun or curled in this way, for the purpose of stuffing beds, &c., until about the time when the original patent to Smith was granted.

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The same process of twisting, and curling, and baking, and steadming [sic], has been long known and used in respect to hair used for beds, mattresses, sofas, and cushions. It is, therefore, the mere application of an old process and old machinery to a new use. It is precisely the same, as if a coffee-mill were now, for the first time, used to grind corn. *The application of an old process to manufacture an article, to which it had never before been applied, is not a patentable invention.* There must be some new process, or some new machinery used, to produce the result.... *But he cannot have a patent for a result merely, without using some new mode or process to produce it.*<sup>380</sup>

With *Howe v. Abbott* firmly in mind, the Supreme Court in 1853 for the first time clearly articulated the exclusion of scientific principles. In *Le Roy v. Tatham*,<sup>381</sup> the Court addressed a patent for improved machines for making pipes from metals without molding, based on the newly discovered scientific principle that heated and pressurized lead pieces would reunite. More specifically, the claim was to “the combination of the following parts above described, to wit: the core and bridge, or guide-piece, with the cylinder, the piston, the chamber and the die, when used to form pipes of metal, under heat and pressure, in the manner set forth, or in any other manner substantially the same.”<sup>382</sup> The defendant (Plaintiff in Error) had argued that the patent was invalid because, *inter alia*, “[a]pplying an old machine to a new use, or to produce a new result, is not the subject of a lawful patent.”<sup>383</sup> The defendant introduced evidence to show that the same combination of machinery had been used before to make clay pipes and macaroni.<sup>384</sup> The trial judge had instructed the jury that the invention was the new use of an existing combination of machinery, which resulted in an improved manufacture, the issue not resolved in *Whitney v. Carter*.

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<sup>380</sup> *Id.* at 657-58 (emphasis added).

<sup>381</sup> 55 U.S. (14 How.) 156 (1853).

<sup>382</sup> *Id.* at 172.

<sup>383</sup> *Id.* at 166 (citing, *inter alia*, *Boulton v. Bull*, 2 H. Bl. 487 (1795); *Crane v. Price*, 4 Mann. & Grang. 580; *Howe v. Abbott*, 2 Story 190, 193 (C.C.D. Mass. 1842); *Bean v. Smallwood*, 2 Story 408, 410 (C.C.D. Mass. 1843); and *Hovey v. Stevens*, 1 Wood. & M. R. 290, 297, 298). The defendant also argued that a patent for an entire machine and not just for the improved principle of invention was also overbroad and invalid. *See id.* at 166-67 (citing, *inter alia*, *Whittemore v. Cutter*, 1 Gall. 478; *Evans v. Eaton*, 1 Pet. C. C. R. 322).

<sup>384</sup> *See id.* at 173-74.

“And even if the mere combination of machinery in the abstract is not new, still, if used and applied in connection with the practical development of a principle, newly discovered, producing a new and useful result, the subject is patentable. In this view, the improvement of the plaintiffs is the application of a combination of machinery to a new end; to the development and application of a new principle, resulting in a new and useful manufacture. And even if the mere combination of machinery in the abstract is not new, still, if used and applied in connection with the practical development of a principle, newly discovered, producing a new and useful result, the subject is patentable. In this view, the improvement of the plaintiffs is the application of a combination of machinery to a new end; to the development and application of a new principle, resulting in a new and useful manufacture.

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[T]he originality did not consist in the novelty of the machinery, but in bringing a newly discovered principle into practical application, by which a useful article of manufacture is produced....<sup>385</sup>

The Court (in an opinion authored by Justice McLean from which Justice Nelson joined by two other Justices dissented) Specifically, the Court held that:

[t]he 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 be discovered in addition to those already known.* Through the agency of machinery a new steam power may be said to have been generated. But no one can appropriate this power exclusively to himself, under the patent laws. The same may be said of electricity, and of any other power in nature, which is alike open to all, and may be applied to useful purposes by the use of machinery.

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.* Whether *the machinery used be novel, or consist of a new combination of parts known,* the right of the inventor is secured against all who use the same mechanical power, or one that shall be substantially the same.

*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. This, by creating monopolies, would discourage arts and manufactures, against the avowed policy of the patent laws.*

A new property discovered in matter, *when practically applied, in the*

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<sup>385</sup> *Id.* at 174.

*construction of a useful article of commerce or manufacture, is patentable; but the process through which the new property is developed and applied, must be stated, with such precision as to enable an ordinary mechanic to construct and apply the necessary process. This is required by the patent laws of England and of the United States, in order that when the patent shall run out, the public may know how to profit by the invention. It is said, in the case of the Househill Company v. Neilson, Webster's Patent Cases, 683, "A patent will be good, though the subject of the patent consists in the discovery of a great, general, and most comprehensive 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." In that case, Mr. Justice Clerk, in his charge to the jury, said, "the specification does not claim any thing as to the form, nature, shape, materials, numbers, or mathematical character of the vessel or vessels in which the air is to be heated, or as to the mode of heating such vessels," &c. The patent was for "the improved application of air to produce heat in fires, forges and furnaces, where bellows or other blowing apparatus are required."*

....

A patent for leaden pipes would not be good, as it would be for an effect, and would, consequently, prohibit all other persons from using the same article, however manufactured. Leaden pipes are the same, the metal being in no respect different. Any difference in form and strength must arise from the mode of manufacturing the pipes. The new property in the metal claimed to have been discovered by the patentees, belongs to the process of manufacture, and not to the thing made.

In the case of *Bean v. Smallwood*, [2 F. Cas. 1142 (C.C.D. Mass. 1843) (No. 1,173)], Mr. Justice Story said, "He (the patentee) says that the same apparatus, stated in this last claim, has been long in use, and applied, if not to chairs, at least in other machines, to purposes of a similar nature. If this be so, then the invention is not new, but at most is an old invention, or apparatus, or machinery applied to a new purpose. Now I take it to be clear, that a machine, or apparatus, or other mechanical contrivance, in order to give the party a claim to a patent therefor, must in itself be substantially new. If it is old and well known, and applied only to a new purpose, that does not make it patentable."<sup>386</sup>

Given the limitation of the patent to the process of making pipe using existing combinations of equipment, the Court in *Le Roy* found the jury instruction to be error and reversed the judgment.<sup>387</sup>

*Le Roy* is significant for at least three reasons. First, the Court articulated the exclusion from patentable subject matter for abstract principles based on an incompatibility of such principles and exclusive rights, deriving this understanding from

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<sup>386</sup> *Id.* at 174-77 (emphasis added)

<sup>387</sup> *See id.* at 177.

English precedent. Second, as had been decided ten years earlier by Justice Story, the application of existing machines to a new use does not constitute a patentable invention; even if it might reflect a new principle of “invention,” based on the newly discovered idea of a different use to create different outputs for existing combinations of equipment, a new invention applying newly discovered scientific principles requires to be patentable some new mechanical mode of operation. The dissent in *Le Roy* thus probably had the better argument on the facts of the case (although Justice Nelson argued based on claim construction in light of the specification rather than that the jury instruction was merely harmless error), because the prior art apparatuses had been materially changed *and* the patentee had invented a new physical mode of *employing* existing equipment (*i.e.*, the patentee had invented an important new method even if they had claimed only apparatuses used in a particular manner).<sup>388</sup> Third, although patents must not be granted for scientific principles based on their nature, limiting patents to particular mechanical constructions that implement the scientific discoveries *would also* (*i.e.*, as a result not as a cause) avoid interfering with the progress of useful arts.

One year later, the Court would again rely on English law to decide what is perhaps the most famous American patent law case, *O’Reilly v. Morse*.<sup>389</sup> Because *O’Reilly* is so well known, I summarize here only the very basics of its holdings regarding patentable subject matter. Specifically, the Court reaffirmed *LeRoy* and quoted from *Neilson v. Harford* the point that the scientific discovery was to be treated as prior art. “We think the case must be considered as if the principle being well known, the plaintiff had first invented a mode of applying it.”<sup>390</sup> This language is significant because it again treats the *novel* scientific discovery as part of the public domain free for all to use, even though the inventor did not give the information to the public (except through the application, which was later than the date of invention which under the 1836 Patent Act was then basis for determining novelty, so long as there had been no public

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<sup>388</sup> See *id.* at 177-79 (Nelson, J., dissenting) (“The patent in this case, according to the general description given by the patentees, is, for improvements upon, and additions to, the machinery or apparatus of Thomas Burr, for manufacturing pipes and tubes from metallic substances. They declare, that the nature of their invention, *and the manner in which the same is to operate*, are particularly described and set forth in their specification.... The patentees, by their discovery, were enabled to dispense with the long core of Burr, and to fix firmly a bridge or cross bars at the end of the cylinder near the die, to which bridge they fastened a short core extending into and through the die.... The patentees state, that they do not intend to confine themselves to the arrangement of the apparatus thus particularly specified, and point out several other modes by which the same result may be produced, all of which variations would readily suggest themselves, as they observe, to any practical engineer.... It is supposed that the patentees claim, as the novelty of their invention, the arrangement and combination of the machinery which they have described, disconnected from the employment of the new property of lead, which they have discovered, and by the practical application and use of which they have succeeded in producing the new manufacture.... But every patent, whatever may be the general heading or title by which the invention is designated, refers to the specification annexed for a more particular description; and hence this court has heretofore determined, that the specification constitutes a part of the patent, and that they must be construed together when seeking to ascertain the discovery claimed. But every patent, whatever may be the general heading or title by which the invention is designated, refers to the specification annexed for a more particular description; and hence this court has heretofore determined, that the specification constitutes a part of the patent, and that they must be construed together when seeking to ascertain the discovery claimed.”) (emphasis added).

<sup>389</sup> 56 U.S. (15 How.) 62 (1853).

<sup>390</sup> 56 U.S. (15 How.) at 115 (quoting *Neilson v. Harford*, Web. Pat. Cases 295, 371 (1844)).



use or sale bar from the inventor's own activity).<sup>391</sup> Further, the Court noted, as it had earlier in *Le Roy*, that the prohibition made good utilitarian sense, as "some future inventor, in the onward march of science, may discover a mode ... without using any part of the process or combination set forth.... while he shuts the door against inventions of other persons ... he may vary it with every new discovery and development of the science."<sup>392</sup>

Almost immediately following *O'Reilly*, the Court in *Corning v. Burden*<sup>393</sup> *in dicta* put to rest the question of whether a patent could issue for a disembodied method.

A process, *eo nomine*, is not made the subject of a patent in our act of Congress. It is included under the general term "useful art." An art may require one or more processes or machines *in order to produce a certain result or manufacture*. The term machine includes every mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result. But where the result or effect is produced by chemical action, by the operation or application of some element or power of nature, or of one substance to another, such modes, methods, or operations, are called processes. A new process is usually the result of discovery; a machine, of invention.... One may discover a new and useful improvement in the process of tanning, dyeing, &c., irrespective of any particular form of machinery or mechanical device. And another may invent a labor-saving machine by which this operation or process may be performed, and each may be entitled to his patent.... he is entitled to a patent for his discovery, as a process or improvement in the art, irrespective of any machine or mechanical device.<sup>394</sup>

Thus, *Corning* freed patentable subject matter to cover disembodied methods having application to particular tangible and concrete ends without restriction to the particular modes of application to those ends contemplated by the inventor.

Whether or not this was a valid interpretation of the 1836 Patent Act (and as indicated below it was certainly *dicta* because the Court held that no discovered process or claim for a process was involved), the Court did *not* say that one could patent a process distinct from the particular tangible and concrete ends to be accomplished by applying the process. Thus, what is significant is what the Court in its holding nevertheless

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<sup>391</sup> *See id.* at 116 ("the discovery of a principle in natural philosophy or physical science, is not patentable.... this principle must be regarded as well known, and that the plaintiff had invented a mechanical mode of applying it.... Whoever, therefore, used this method ... used the process ... although the form of receptacle or the mechanical arrangements for heating it, might be different from those described.... [T]he patent was not supported because this principle was embodied in it.... [H]is patent was supported, because he had invented a mechanical apparatus.... And this new method was protected by his patent").

<sup>392</sup> *Id.* at 113

<sup>393</sup> 56 U.S. (15 How.) 252 (1854).

<sup>394</sup> *Id.* at 267-68.

retained as a limit on patentable subject matter. The Court reiterated that one could not patent the *function of a machine* and claim that function as applied to an end, and thus held that patent invalid for seeking to do so. In any event, the Court could not have meant to eliminate the restriction just articulated in *O'Reilly* that patents for methods had to be limited to an inventive and not a scientific principle, even if methods were patentable when disembodied from the particular modes contemplated by the inventor for accomplishing a *particular* effect.

[Methods as processes were patentable a]s, for instance, A has discovered that by exposing India rubber to a certain degree of heat, in mixture or connection with certain metallic salts, he can produce a valuable product, or manufacture; he is entitled to a patent for his discovery, as a process or improvement in the art, irrespective of any machine or mechanical device. B, on the contrary, may invent a new furnace or stove, or steam... Yet A could not have a patent for a machine, or B for a process; but each would have a patent for the means or method of producing a certain result, or effect, and not for the result or effect produced. It is for the discovery or invention of some practicable method or means of producing a beneficial result or effect, that a patent is granted, and not for the result or effect itself. It is when the term process is used to represent the means or method *of producing a result* that it is patentable, and it will include all methods or means which are not effected by mechanism or mechanical connations. But the term process is often used in a more vague sense, in which it cannot be the subject of a patent. Here the term is used subjectively or passively as applied to the material operated on, and not to the method or mode of producing that operation, which is by mechanical means, or the use of a machine, as distinguished from a process. Thus we say that a board is undergoing the process of being planed, grain of being ground, iron of being hammered, or rolled. Here the term is used subjectively or passively as applied to the material operated on, and not to the method or mode of producing that operation, which is by mechanical means, or the use of a machine, as distinguished from a process.

In this use of the term it represents *the function of a machine, or the effect produced by it on the material subjected to the action of the machine. But it is well settled that a man cannot have a patent for the function or abstract effect of a machine, but only for the machine which produces it.* It is by not distinguishing between the primary and secondary sense of the term "process," that the learned judge below appears to have fallen into an error. *It is clear that Burden does not pretend to have discovered any new process by which cast iron is converted into malleable iron, but a new machine or combination of mechanical devices.*

....

It is true that the patentee, after describing his machine, has set forth his claim in rather ambiguous and equivocal terms, which might be construed to mean either a process or machine. In such case the construction should be that which is most favorable to the patentee, "*ut res magis valeat quam*

*pereat.*” His patent having a title which claims a machine, and his specification describing a machine, *to construe his claim as for the function, effect, or result of his machine, would certainly endanger, if not destroy, its validity.* His claim cannot change or nullify his previous specification with safety to his patent. He cannot describe a machine which will perform a certain function, and then claim the function itself, and all other machines that may be invented to perform the same function.<sup>395</sup>

Just after *O’Reilly* and *Corning* were decided, George Curtis published his second edition of his patent law treatise.<sup>396</sup> Significantly, Curtis was very clear regarding the limitation of patents from scientific principles and abstract ideas, and his understanding of this distinction reflects the holding in *Corning* that a broader concept of a principle put into practice was patentable, which conception blurred the previously understood line between science and technology as requiring some *additional* principle of invention that was not the mere application of a scientific principle to some localized context of material operation.

The cardinal principal, which lies at the foundation of the Patent Law of England, as well as in this and most other countries, is, that whatever be the character of the subject-matter, or the way in which it is described, the result must be an effect produced in manufactured, as distinguished from elementary matter. The subject-matter of a patent may be either a thing produced or the mode of producing a thing, but it must be the one or the other, and can never be a new discovery of an elementary principle, without practical application to the production of some particular effect in matter. This fundamental rule is deducible not only from the meaning of the term “manufacture” ... but also from the general scope and spirit of the Patent Law, which was not designed to create monopolies in abstract principles or theoretical discoveries, but to promote the arts and manufactures of the country.

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These cases show that the term *manufacture* has been extended to include every object upon which art or skill can be exercised, so as to afford products fabricated by the hand of man, or by the labor he directs. *In this sense*, it includes a process, so that a patent may, it is said, be taken for a process, method, or practical application of a principle, that will cover every means or apparatus by which that process or method can be carried on, or by which that principle can be applied, provided the patentee has not only discovered the principle, but also has invented *some* mode of carrying it into effect.

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<sup>395</sup> *Id.* at 268-69.

<sup>396</sup> GEORGE T. CURTIS, A TREATISE ON THE LAW OF PATENTS FOR USEFUL INVENTIONS IN THE UNITED STATES OF AMERICA (Little Brown 2d ed. 1854).

It is constantly to be borne in mind, in considering what may be the subject of a valid patent, that it cannot be a mere elementary principle, or intellectual discovery, *but if a principle constitutes an important part of the discovery, it must be a principle put in practice and applied to some art.* A science, therefore, or an elementary principle or discovery in science, cannot be the subject of a patent. So, too, there cannot be a patent for an effect, but it must be for the mode or means by which the effect is produced, or the practical mode of operating, by means of certain agencies or properties of matter, or laws of physics, so as to produce a given effect.

The consequences of allowing a patent for an abstract art or a principle, instead of allowing it only for a principle as applied to the production of a particular thing, or a particular result in matter, are apparent, when it is considered that principles are the elements of science, and if a patent could be taken for a newly discovered principle in science, it would cover every object to which that principle could be applied, and the whole field of the arts would thus be at once occupied by a few monopolists.<sup>397</sup>

Although Curtis recognized that the application of a scientific principle must be limited to production of particular things, Curtis eliminated the requirement for a technological (not scientific) principle to be applied.<sup>398</sup> Stated differently, so long as the scientific principle is simply applied to create a new tangible result, a patent may be obtained for the application of the scientific principle to produce particular things, rather than for some additional principle beyond the mere application.

This point is most readily illustrated by reference to the famous patent to Glen Seaborg for the “invention” of Americum, a newly identified transuranic “element.”<sup>399</sup> Seaborg had in one sense created something entirely new, which had existed in nature

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<sup>397</sup> *Id.* at 84-85, 90-91 (citing, *inter alia*, *Whittemore v. Cutter*, (1 Gall.) 478, 480) (emphasis in original and added).

<sup>398</sup> Nevertheless, Curtis recognized that patents could not be obtained simply for applying an existing inventive embodied principle to a new and analogous use, and that an entirely new effect (not just a new use of a thing to produce a similar effect) was needed for patentability. “In order to escape the objection of a double use, it is necessary that the new occasion or purpose, to which the use of a known thing is applied, should not be merely analogous to the former occasions or purposes to which the same thing has been applied. There is a very material difference between applying a new contrivance to an old object, and applying an old contrivance to a new object. The former may be patentable, but the latter cannot be, when the new object is merely one of a class possessing a common analogy.... When, therefore, the principle is well known, or the application consists in the use of a known thing to produce a particular effect, the question will arise whether the effect is of itself entirely new, or whether the occasion only upon which the particular effect is produced, is new. If the occasion only is new, then the use to which the thing is applied is simply analogous to what had been done before. But if the effect is new, then there are no known analogous uses of the same thing, and the process may constitute such an art as will be the subject of a patent.... Great discrimination, however, is to be used in determining whether the analogy is such as to justify the inference, that the occasion only is new, and that the effect is not new.” *Id.* at 120, 122-23 (citing *Boulton* for the prohibition on double uses). The irony is that the aptness of analogy depends both on viewpoint and purpose, and therein lies the genesis for the historic unraveling of the distinction of science from technology.

<sup>399</sup> *See In re Seaborg*, 328 F.2d 996 (C.C.P.A. 1964).

only in minute amounts that were not readily capable of isolation (as produced in the Fermi reactor).<sup>400</sup> But the Court upheld his claim to the “natural” element itself, focusing entirely on the inability to call an earlier incidental production of Americum prior art or an inherent anticipation of the claim to Americum, given that before Seaborg the manner of making Americum was not known or taught in the art.<sup>401</sup> “[I]n view of the unpredictability both as to the character of the product elements and of the processes by which they might be achieved, it is particularly reasonable to hold ... that conception and reduction to practice are necessarily concurrent for an invention of this kind.”<sup>402</sup> This simply does away with the distinction between science and technology, by treating the production of a new element as a new and non-analogous effect to what God had created and was in the prior art.<sup>403</sup> It thus did away with patentable subject matter as a significant limit on invention (and it is nowhere mentioned in the opinion). The decision ignores the earlier requirement to place the new scientific discovery itself in the prior art and to determine if a *new* inventive principle is being applied. Such a principle might be found in the method of producing Americum (understood as the arrangement and operation of the equipment used to achieve the physical result), but it could not extend to Americum itself. However creative was Seaborg’s effort to understand how to produce Americum, Americum cannot be called anything other than nature itself, and its creation anything more than the mere application of a scientific principle. Thus, Curtis’s failure to recognize the difference between science and technology also blurs the line between subject matter and novelty as a restriction on patentability. The Supreme Court has not followed Curtis’ articulation (even though the Court of Claims and Patent Appeals and the Federal Circuit have done so in Seaborg and subsequent cases, and even though other circuits started the trend a half-century earlier in cases permitting patents for isolated and purified naturally occurring chemicals).<sup>404</sup>

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<sup>400</sup> See *id.* at 997-98.

<sup>401</sup> See *id.* at 998-99.

<sup>402</sup> *Id.* at 999. See also *In re Seaborg*, 328 F.2d 993 (C.C.P.A. 1964) (upholding claims for curium and a process of producing it).

<sup>403</sup> The irony is rich, as this treats humans as unlike and as not analogous to God in the manner of creating nature (avoiding hubris), but localizes the creative act to the individual human will and not his (or her) human nature (restoring hubris even more strongly by failing to recognize historic influences on individual will and creativity).

<sup>404</sup> See, e.g., *Kuehmsted v. Farbenfabriken of Elberfeld Co.*, 179 F. 701, 705 (7th Cir. 1910) (the aspirin patent); *Parke-Davis & Co. v. H.K. Mulford & Co.*, 189 F. 95, 103 (C.C.S.D.N.Y 1911) (the adrenalin patent). See generally Richard S. Gipstein, *The Isolation and Purification Exception to the General Unpatentability of Products of Nature*, 4 COLUM. SCI. & TECH. L. REV. 2 (2002-03). What is significant about those cases is not their outcomes, but rather their denials of the import of relevant precedents and their willingness to construct hypotheticals in order to focus on utilitarian promotion of technology by patent incentives. See e.g., *Kuehmsted*, 179 F. at 705 (“it makes no difference, so far as patentability is concerned, that the medicine thus produced is lifted out of a mass that contained, chemically, the compound; for though the difference between [the prior art and the claim] be one of purification only ... patentability would follow. In the one case the mass is made to yield something to the useful arts; in the other case what is yielded is chiefly interesting as a fact in chemical learning.”) (citing, *inter alia*, *Merrill v. Yeomans*, 94 U.S. (4 Otto) 568, 569 (1876)); *Parke Davis & Co.*, 189 F. at 103 (“Indeed, [the prior art] supposes [adrenaline] to exist as a natural salt, and that the base was an original production of [the patentee’s]. That was a distinction not in degree, but in kind. But even if it were merely an extracted product without change, there is *no rule that such products are not patentable*. [The patentee] was the first to make it available for any use by removing it from the other gland-tissue in which it was found, and, while it is of course possible logically to call this a purification of the principle, it became *for every*

In 1862, Justice Nelson (who wrote the dissent in *Le Roy*) made clear in *Morton v. New York Eye Infirmary*,<sup>405</sup> that no matter how valuable a new “discovery” was to society, to become a patentable technological invention required a *new and additional* principle of “invention” that produced a physical effect.

At common law an inventor has no exclusive right to his invention or discovery.... Very little light can be shed on our path by attempting to draw a practical distinction between the legal purport of the words 'discovery' and 'invention.' In its naked ordinary sense, a discovery is not patentable. A discovery of a new principle, force, or law operating, or which can be made to operate, on matter, will not entitle the discoverer to a patent. It is only where the explorer has gone beyond the mere domain of discovery, *and has laid hold of the new principle, force, or law, and connected it with some particular medium or mechanical contrivance by which, or through which, it acts on the material world*, that he can secure the exclusive control of it under the patent laws. He then controls his discovery through the means by which he has brought it into practical action, or their equivalent, and only through them. *It is then an invention, although it embraces a discovery. Sever the force or principle discovered from the means or mechanism through which he has brought it into the domain of invention, and it immediately falls out of that domain and eludes his grasp.* It is then a naked discovery, and not an invention.

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Now, that this patent contains the record of a discovery, there can be no doubt. And it is equally clear that, in a certain sense, it was new at or about the date of the patent. It is important here to ascertain precisely what that discovery was. It is described in general terms, in the first paragraph of the specification, to be “a new and useful improvement in surgical operations on animals....”

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*practical purpose a new thing* commercially and therapeutically. That was a good ground for a patent.”) (citing *Kuehsted*, 179 F. at 701) (emphasis added). See also Gipstein, *supra*, at § IV (discussing the anomaly that *Parke-Davis* “did not cite case law denying patents for purified natural products,” specifically *Ex parte Latimer*, 1889 Dec. Comm’r Pat. 123 (1889), and the subsequent case of *General Electric Co. v. De Forest Radio Co.*, 28 F.2d 641 (3d Cir. 1928)). Significantly, *Merrill* addressed a claim to distilled (isolated and purified) hydrocarbons, but the Court held *only* that the claim was ambiguous and the specification made clear that the patentee did not think of the invention as the purified oils but rather the manner of and apparatus for purification. See 94 U.S. (4 Otto) at 571-73. Thus, although the Court used infelicitous dicta, it cannot be treated as a holding that isolated and purified naturally occurring organisms were patentable. See *id.* at 571 (“We can see no reason why the applicant for the patent, if he had in his mind a claim for the article produced, should have intended so to limit his claim. If the article was the discovery which he sought the exclusive right to make, use, and sell, he was entitled to that monopoly, however produced.”). What is missing from the dicta is the understanding that the patentee obviously had believed that such a discovery was a patentable invention, having claimed it distinctly from the method and the apparatus. The Court thus curiously went out of its way to avoid deciding that issue, and treated the claim as overbroad relative to the invention, subject to correction by reissue; it is this principle for which the decision in *Merrill* remains known. See Sarnoff, *Claiming the Future Part II*, *supra* note 70, at 457-458.

<sup>405</sup> 17 F. Cas. 879 (C.C.S.D.N.Y. 1862) (No. 9,865).

The next paragraph distinctly sets forth the real discovery that was made, namely, that this well-known inhalation of well-known agents (in increased quantities) would produce a state of the animal analogous to complete intoxication accompanied with total insensibility to pain. It appropriately adds: “This is our discovery.” It is not important to inquire here whether this was the discovery of an increased and more perfect effect, the same in kind with that already well known, or whether it was the discovery of an entirely new effect. The effect discovered was produced by old agents, operating by old means upon old subjects. The effect alone was new, and to that only can the term “discovery” apply. That this mere discovery, however novel and important, is not patentable, needs neither argument nor authority to prove.<sup>406</sup>

In 1873, in *Hailes v. Van Wormer*,<sup>407</sup> the Supreme Court made clear that the mere aggregation of pieces of equipment was not patentable, because patentability required an invention (here a combination) that reflected a new inventive principle.

It must be conceded that a new combination, if it produces new and useful results, is patentable, though all the constituents of the combination were well known and in common use before the combination was made. But the results must be a product of the combination, and not a mere aggregate of several results each the complete product of one of the combined elements. Combined results are not necessarily a novel result, nor are they an old result obtained in a new and improved manner. Merely bringing old devices into juxtaposition, and there allowing each to work out its own effect without the production of something novel, is not invention. No one by bringing together several old devices without producing a new and useful result the joint product of the elements of the combination and something more than an aggregate of old results, can acquire a right to prevent others from using the same devices, either singly or in other combinations, or, even if a new and useful result is obtained, can prevent others from using some of the devices, omitting others, in combination.<sup>408</sup>

In 1874, in *Rubber-Tip Pencil Co. v. Howard*,<sup>409</sup> the Court again held on the basis of patentable subject matter<sup>410</sup> that the invention was “not for the combination of the [rubber eraser] head with the pencil, but for a head to be attached to a pencil or something else of like character.... Rubber had long been known.... [I]t is very evidence that the essential element of the invention as understood by the patentee was the facility provided

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<sup>406</sup> *Id.* at 881-82.

<sup>407</sup> 87 U.S. 353 (1874).

<sup>408</sup> *Id.* at 368. *See also* Reckendorfer v. Faber, 92 U.S. 347, 357 (1876) (“In the case we are considering, the parts claimed to make a combination are distinct and disconnected. Not only is there no new result, but no joint operation.”).

<sup>409</sup> 87 U.S. 498 (1874).

<sup>410</sup> *Id.* at 504-05 (“The question which naturally presents itself for consideration at the outset of this inquiry is whether the new article of manufacture, claimed as an invention, was patentable as such.”).

for attaching the head to the pencil.”<sup>411</sup> Given that this was the claimed invention, it was not patentable.

What, therefore, is left for this patentee but the idea that if a pencil is inserted into a cavity in a piece of rubber smaller than itself the rubber will attach itself to the pencil, and when so attached become convenient for use as an eraser?

An idea of itself is not patentable, but a new device by which it may be made practically useful is. The idea of this patentee was a good one, but his device to give it effect, though useful, was not new. Consequently he took nothing by his patent.<sup>412</sup>

What is significant here is that a combination was not by itself an invention, unless the combination reflected more than the mere application of the scientific principle of which it provided a physical embodiment, *i.e.*, that placing a pencil in rubber would attach the rubber.

The same year, in *American Wood-Paper Co. v. The Fibre Disintegrating Co.*,<sup>413</sup> the Supreme Court addressed a reissued patent for paper pulp produced from wood. Historically, pulp was produced by mechanically beating straw, wood, cotton, and other substances to create cellulose fibers of suitable composition for making paper. This was because cellulose “in its natural state ... is combined with other substances called ‘intercellular matter,’ which must be removed to render the cellulose fit for being made into paper.”<sup>414</sup> The paper pulp produced by mechanical beating “was not in the first instance of the proper consistency and dimensions ... for immediate felting. However, by chemical and mechanical treatment, subsequently applied, it could be made so....”<sup>415</sup> The original 1853 patent (to Charles Watt and Hugh Burgess) had been granted for pulp produced by a three-step chemical process of producing pulp ready for washing and bleaching by

“reduc[ing wood or vegetable substances] to very fine shavings or cuttings.... then ... boiling in a solution of caustic alkali, the strength of which, being dependent on the nature of the vegetable substances operated on, can only be learned by experience... [with boiling] under pressure of considerable service... [then t]he shavings are to be well washed and pressed ... [and] the damp shavings are now to be exposed to the action of chlorine, or the compounds of chlorine and oxygen....”<sup>416</sup>

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<sup>411</sup> *Id.* at 505-06.

<sup>412</sup> *Id.* at 507.

<sup>413</sup> 90 U.S. 566 (1874).

<sup>414</sup> *Id.* at 567.

<sup>415</sup> *Id.* at 568.

<sup>416</sup> *Id.* at 570-71 (citation omitted).



The claim was to the process of “pulping and disintegrating of shavings of wood... by treating them with caustic alkali, chlorine simple, or its compounds with oxygen and alkali, in the order substantially as described.”<sup>417</sup>

The two reissued patents were to the product of the process and the process. The first reissue claimed “as a new article of manufacture, is a pulp suitable for the manufacturing of paper, made from wood or other vegetable substances, by boiling the wood or other vegetable substance in an alkali under pressure, substantially as described.”<sup>418</sup> The second was to the “process of treating wood or other vegetable substance, by boiling it in an alkali under pressure, as a process, or preparatory process, for making pulp...”<sup>419</sup> Thus, although the original specification had described the product of the three-step process, it had claimed only the process itself (given that similar pulp had previously been produced from a wide variety of cellulose sources by mechanical means) but the reissue claimed both the product and a single-step of the process.

Given this understanding of the prior art, the Court held that the patent for the product was invalid, as it was not novel.<sup>420</sup> But the Court’s dicta are highly significant, because the Court made clear (without distinguishing between naturally occurring and non-naturally occurring but pre-existing things) that simply increasing the purity of pre-existing pulp (by isolating the naturally occurring cellulose from more of the “impurities” of naturally occurring wood) did not thereby create a new *thing* (a new manufacture), even if wood pulp was a distinct thing from the cellulose that comprised it. Specifically, the Court stated that:

It is quite obvious that a manufacture, or a product of a process, may be no novelty, while, at the same time, the process or agency by which it is produced may be both new and useful--a great improvement on any previously known process, and, therefore, patentable as such. And it is equally clear, in cases of chemical inventions, that *when*, as in the present case, *the manufacture* claimed as novel *is not a new composition of matter, but an extract* obtained by the decomposition or disintegration of material substances, *it cannot be of importance from what it has been extracted.*

There are many things well known and valuable in medicine or in the arts which may be extracted from divers substances. But the extract is the same, no matter from what it has been taken. *A process to obtain it from a subject from which it has never been taken may be the creature of invention, but the thing itself when obtained cannot be called a new manufacture.* It may have been in existence and in common use before the new means of obtaining it was invented, and possibly before it was known

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<sup>417</sup> *Id.* (citation omitted).

<sup>418</sup> *Id.* at 577 (citation omitted).

<sup>419</sup> *Id.* at 580 (citation omitted).

<sup>420</sup> *See id.* at 596.

that it could be extracted from the subject to which the new process is applied. Thus, if one should discover a mode or contrive a process by which prussic acid could be obtained from a subject in which it is not now known to exist, he might have a patent for his process, but not for prussic acid. If, then, the Watt & Burgess patent for a product is sustainable it must be because the product claimed, namely, “a pulp suitable for the manufacture of paper, made from wood or other vegetable substances,” was unknown prior to their alleged invention. But we think it is shown satisfactorily that it had been produced and used in the manufacture of paper long before 1853, the year in which the original patent of Watt & Burgess was dated.

It is insisted, however, that the paper-pulp which had been produced before the invention of Watt & Burgess was not pure cellulose, *that it was only approximately pure, and from this it is argued that the pure article obtained from wood by their process is a different and new product, or manufacture. Whether a slight difference in the degree of purity of an article produced by several processes justifies denominating the products different manufactures, so that different patents may be obtained for each, may well be doubted, and it is not necessary to decide.* The product of the complainants’ patent is a pulp suitable for the manufacture of paper, and, confessedly, to make white paper it requires bleaching. *The pulp which had been obtained by others from rags in large quantities, and from straw, wood, and other vegetable substances to a lesser extent, was undeniably also cellulose, suitable for manufacturing paper, and, so far as appears, equally suitable. The substance of the products, therefore, was the same, and so were their uses.* The design and the end of their production was the same, no matter how or from what they were produced.<sup>421</sup>

The Court also invalidated the reissued process patent, because it “found no satisfactory evidence that the idea of a single-stage process was ever conceived by Watt & Burgess until after a patent disclosing it was granted” to another inventor four years after the original Watt and Burgess patent issued.<sup>422</sup>

In 1876, in *Cochrane v. Deener*,<sup>423</sup> after disposing of jurisdictional objections to reaching the question of infringement as an assertion of equity power to grant injunctions without the aid of a jury on the question of infringement,<sup>424</sup> the Supreme Court *assumed without reaching* the issue of whether a claim for a process of manufacturing high-quality

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<sup>421</sup> *Id.* at 593-94 (citation omitted and emphasis added). The Court also noted the potential under English law to patent new products that had only been discovered by scientists in laboratories but had not been introduced to the public as practical products, stating that “[i]t may be that ... the product might have been patented as a new manufacture. Such appears to be the doctrine asserted in some English cases.... But this is no such case.” *Id.* at 596 (citing *Young v. Fernie*, 66 E.R. 836, 10 Law Times Rep. 861 (1864 Ch.)).

<sup>422</sup> *Id.* at 599.

<sup>423</sup> 94 U.S. (4 Otto) 780 (1877).

<sup>424</sup> *See id.* at 783-84.

flour “that is not limited to any special arrangement of machinery” was patentable.<sup>425</sup> In this context, after noting that the processes used by the defendant might have been improvements but still applied the principle of invention that Cochrane had discovered, the Court stated:

That a process may be patentable, irrespective of the particular form of the instrumentalities used, cannot be disputed. If one of the steps of a process be that a certain substance is to be reduced to a powder, it may not be at all material what instrument or machinery is used to effect that object.... [B]ut if the patent is not confined to that particular tool or machine, the use of the others would be an infringement, the general process being the same. 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 machinery. In the language of the patent law, it is an art.... The process requires that certain things *should be done with certain substances*, and in a certain order; but the tools to be used in doing this may be of secondary consequence.<sup>426</sup>

Two things are significant about this formulation. First, and obviously, the decision builds on *Corning* to free patents from any restriction to a specified range of *physical* embodiments. But second, and significantly, it remains a limitation that the process operates on physical (concrete and tangible) things, *i.e.*, that “things should be done with certain substances,” and is not a claim for applying processes to generate information. Having intimated that the process was patentable subject matter, the Court then affirmed that the process and the machines also claimed in the patent were novel and Cochrane was the first and original inventor.<sup>427</sup>

In *Cochrane v. Badische Anilin & Soda Fabrik*,<sup>428</sup> the Supreme Court addressed claims to a new method of artificially producing an aniline dye derivative (alizarene) from anthracene and to the product produced by the method “or by any other method which will produce a like result.”<sup>429</sup> The Court understandably intimated that the claim would be overbroad (like the earlier *American Wood-Paper Co.* reissued process patent), by extending beyond the actual invention of a particular method of producing alizarene to methods that the patent holder had neither invented nor described.<sup>430</sup> More significantly, the Court noted that the fact of an artificial production (much less a natural extraction) that merely created a (presumably) purer or better result did not by itself constitute a patentable invention.

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<sup>425</sup> *Id.* at 785.

<sup>426</sup> *Id.* at 787-88.

<sup>427</sup> *Id.* at 788-91. *Cf. id.* at 792 (Clifford, J., dissenting) (arguing only that no infringement had occurred because the principle invented by the patentee and claimed as a process was not employed by the defendant, in part because a process includes all of its steps, and the defendants omitted at least one).

<sup>428</sup> 111 U.S. 293, 294 (1884).

<sup>429</sup> *Id.* at 296.

<sup>430</sup> *See id.* at 308-09, 312-13.

While a new process for producing it was patentable, the product itself could not be patented, even though it was a product *made artificially for the first time*, in contradistinction to being eliminated from the madder root. *Calling it artificial alizarine did not make it a new composition of matter, and patentable as such, by reason of its having been prepared artificially*, for the first time, from anthracine, if it was set forth as alizarine, a well-known substance.<sup>431</sup>

Similarly, although a patent had somehow issued to Louis Pasteur that contained a claim to an isolated and purified strain of yeast,<sup>432</sup> the Commissioner of Patents ruled in 1889<sup>433</sup> when rejecting an application for a patent on a fiber identified from the needles of pine trees that such naturally occurring products were “not a patentable invention, recognized by statute, any more than to find a new gem or jewel in the earth would entitle the discoverer to patent all gems which should be subsequently found.”<sup>434</sup> In other words, physical occupancy was required for patentability, and although one could occupy the particular embodiment one could not occupy a “principle of” isolated and purified nature, regardless of how much labor went into identifying that principle.

In 1888, in *Dolbear v. American Bell Telephone Co.*,<sup>435</sup> the Supreme Court upheld a patent for a very broad process claim.

In the present case the claim is not for the use of a current of electricity in its natural state as it comes from the battery, but for putting a continuous current, in a closed circuit, into a certain specified condition, suited to the transmission of vocal and other sounds, and using it in that condition for that purpose. So far as at present known, without this peculiar change in its condition it will not serve as a medium for the transmission of speech, but with the change it will. Bell was the first to discover this fact, and how to put such a current in such a condition; and what he claims is its use in that condition for that purpose, just as Morse claimed his current in his condition for his purpose. We see nothing in Morse's case to defeat Bell's claim; on the contrary, it is in all respects sustained by that authority. It may be that electricity cannot be used at all for the transmission of speech, except in the way Bell has discovered, and that therefore, practically, his patent gives him its exclusive use for that purpose; but that does not make his claim one for the use of electricity distinct from the particular process with which it is connected in his patent. It will, if true, show more clearly

<sup>431</sup> *Id.* at 464-65 (citing *American Wood Paper*, 90 U.S. (23 Wall.) 566, 593) (emphasis added).

<sup>432</sup> U.S. Patent No. 141,072 claim 2 (filed May 9, 1873) (reciting “Yeast, free from organic germs of disease, as an article of manufacture”).

<sup>433</sup> *Ex parte Latimer*, 1889 Dec. Comm’r Pat. 123 (1889). See generally John M. Conley & Robert Makowski, *Back to the Future: Rethinking the Product of Nature Doctrine as a Barrier to Biotechnology Patents* (pt. 1) 85 J. PAT. & TRADEMARK OFF. SOC’Y 301, 319-34 (2003) (discussing *Latimer* and subsequent cases prior to *Diamond v. Chakrabarty*, 447 U.S. 303 (1980)).

<sup>434</sup> Daniel J. Kevles, *Ananda Chakrabarty Wins a Patent: Biotechnology, Law, and Society, 1972-1980* (pt. 1) 25 HISTORICAL STUDIES IN THE PHYSICAL AND BIOLOGICAL SCIENCES 1, 111 (1994) (citation omitted).

<sup>435</sup> 126 U.S. 1 (1888).

the great importance of his discovery, but it will not invalidate his patent.<sup>436</sup>

Thus, anticipating the Court's later language in *Gottschalk v. Benson*,<sup>437</sup> a patent might preempt all uses of the invented process and all means of accomplishing a particular end that the invented process achieves, so long as it did not preempt all uses of the natural phenomenon itself on which the invented process was grounded. Again, the distinction was made between science and technology, although the line drawn was exceptionally blurry – because closed circuits do not exist in nature (although they might spontaneously arise), they are synthetic creations of humans and thus their principles of operation and the technology that may be derived thereby are all inventions that may be patented.

In 1890, William Robinson in his celebrated patent treatise would concur in the limitation of patentable subject matter to methods of producing tangible objects.

No mental operation, however definite and valuable may be its result, is a complete inventive act. That which rests in thought only, as a mere theory or intellectual conception, can never be a means of producing physical effects. It is not “a manufacture,” in any sense in which that word has been applied in the industrial arts. It is neither “a thing made,” nor “a manner of making....” The spirit that has been created must be clothed with a body by which it is brought into contact with the exterior world, and through which its energies can act upon material substance.<sup>438</sup>

Because patents were limited to tangible objects, or to improved methods of producing them, there also could be no patent granted on a new use of patented invention. In cases of “‘double use’... there may be in the new application some degree of novelty, something may have been discovered, or found out, that was not known before, but unless the new occasion on which the principle is applied leads to some kind of new manufacture, or to some new result,” it is unpatentable.<sup>439</sup>

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<sup>436</sup> *Id.* at 534-35.

<sup>437</sup> 409 U.S. 63 (1972).

<sup>438</sup> 1 ROBINSON, *supra* note 26, at 178-79. *See also id.* at 85 & n.1 (distinguishing the effect produced “in manufactured, as distinguished from elementary matter,” because elementary matter “is endowed with certain properties, and subject to certain laws, man cannot alter these properties or impose other laws” but through exercise of will “he has the power of applying those properties and of giving occasion for the exercise of those laws”) (citing WEBSTER, *supra* note 199, at 7); *id.* at 106 (noting that manufactures had been interpreted in England to include “not merely a vendible product of inventive skill, but also a method of applying *physical forces* to the production of *physical effects*” and stating that Congress “adopted the same ideas in its description of the inventions for which patents might be granted.”) (emphasis added); *id.* at 161 (“In the concrete invention, the idea of means is made practically operative by embodiment in tangible materials”); *id.* at 190 (“Every effect in the material world is produced by some force which, being applied through certain *corporeal* agents or in a certain method, accomplishes the end desired.... A concrete invention is thus either a mode of practically applying force, or an instrument through which force is practically applied; and must therefore be distinguished alike from the principle or force which it employs, *from the function which it performs*, and from the effect which it produces.”).

<sup>439</sup> *Id.* at 119-20. *See id.* at 120 & n.1 (explaining that use of medicines to treat a new disease is not patentable); *id.* at 120-23 (explaining that for patentability, the new use “should not be merely analogous to the former occasions or purposes to which the same thing had been applied” but rather must produce an

Further, Robinson would explain very clearly both the basis for the lack of natural rights to appropriate the discoveries of nature (and thus the limitation of patentable subject matter from intangible inventions following their unrestricted disclosure) and the reason why newly discovered information was to be treated as prior art knowledge in the public domain (thereby highlighting the pernicious consequences of granting patents on scientific principles). The source was moral obligations owed by humans to their fellow humans, which as discussed in Part II had its origins in theology. The discussion is worth quoting in depth.

In its earliest stage [an] invention is a mere addition to the stock of ideas possessed by the inventor. He has imagined or discovered something which to himself, and presumably all the world, is new, *and has conceived a method* by which his idea *may be so applied* as to produce *a tangible and valuable result*. In this stage, he has a natural exclusive right to his invention. No one can compel him to disclose his secret.... If, however, he endeavors to avail himself of this idea in his exterior life, his position in regard to it is somewhat changed. The material forms in which he then embodies it are his, but the idea itself is not to be imprisoned within their narrow bounds. Everyone who examines and can understand them immediately conceives the same idea, whether he will or not, and thenceforward that idea remains as much a part of the observer's fund of knowledge as it ever was that of the inventor. *In order, therefore, to retain exclusive ownership of his idea, he must withhold its material embodiment from observation.... [b]ut with his submission of the tangible result of his idea to the inspection of others, in such a manner that the idea itself becomes apparent, his control over it is gone.* An idea once communicated can no longer be exclusively appropriated and enjoyed. Every one who receives it possess it in the same degree as if he alone had apprehended it, and its inventor has not power to restrain him from its practical and useful application. *Under the laws of nature* the exclusive public use of an invention is thus impossible, and hence there is no natural right to such a use. The inventor, who voluntarily discloses his invention to the public, necessarily and freely dedicates it to the public; and that which formerly was his alone by virtue of his sole possession becomes by universal possession the common property of all mankind.

*[T]hat men should profit by the discoveries and inventions of each other. This is the law which binds society together, and in obedience to which lies all the possibility of moral, intellectual, and material advancement.*

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“entirely new effect”). Although Robinson tracks the cases here, it appears that they (and he) confused the creation of a physical thing with the identification of the effects that such things may produce. Given the line drawing problems based on distinguishing things from their effects, it is unsurprising that this distinction ultimately was rejected and blocking patents for new uses of known substances were allowed. *See, e.g.,* Boyden Power Brake Co. v. Westinghouse, 170 U.S. 537, 574 (1898) (Shiras, J., dissenting); Hildras v. Mastoras, 257 U.S. 27, 36 (1921). *See generally* Merges & Nelson, *supra* note 49, at 909-11 (discussing blocking patents).

No man lives, or can live, for himself alone.... To benefit by the discoveries of his fellow-men is thus not only a natural right, *it is also the natural duty which every man owes to himself and to society; and the mutual universal progress thence resulting is the fulfillment of the earthly destiny of the human race.*

....

The consequences of allowing a patent for an abstract art or principle, instead of allowing it only for a principle as applied to the production of a particular thing, or a particular result in matter, are apparent, when it is considered that principles are the elements of science, and if a patent could be taken for a newly discovered principle in science, it would cover every object to which that patent could be applied, and the whole field of the arts would thus at once be occupied by a few monopolists. “Indeed, it seems impossible to specify a principle, and its application to all cases, which furnishes an argument that it cannot be the subject of a patent.”<sup>440</sup>

Given this exposition, Robinson explained that scientific principles are not patentable because they are not human inventions (or inventions at all).

Firstly, a principle, considered as a natural physical force, is not the product of inventive skill. It exists in nature independently of human effort.... Man can discover and employ it, but his employment of it in the modes or through the instruments by which it is applied in nature are mere imitations of what every man is able to perceive and reproduce as well as he. Not until some new instrument or method is contrived for its direction towards ends which it cannot naturally accomplish, does his creative genius manifest itself....

Secondly, a principle, considered as a natural force, is the common property of all mankind. It lacks the one essential attribute of private property, – the capability of exclusive appropriation by an individual to his own use.... He must take it as he finds it, and having studied its phenomena and ascertained its laws, he must accommodate himself to its requirements.... But all endeavors to confine it to himself are at once futile and unjust. It exists for all men, as well after his discovery as before; and if their artificial methods of employing it are unlike his, their use takes from him nothing which he can in any manner call his own....

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<sup>440</sup> 1 ROBINSON, *supra* note 26, at 38-39, 91 & n.1 (quoting *Boulton v. Bull*, 2 H. Bl. 483 (1795) (Heath, J.)) (emphasis added). *See id.* at 92 n.1 (discussing *Wyeth v. Stone*, 30 F. Cas. 723 (C.C.D. Mass. 1840) (No. 18,107)). In contrast, James Madison clearly had a different view of social duty, in the right to withhold publication of an idea. “Monopolies ... ought to be granted with caution, and guarded with strictness against abuse. The Constitution has limited them in two cases ... in both [of] which they are considered compensation for a benefit actually gained to the community *as a purchase of the property which the owner might otherwise withhold from public use.*” James Madison, *Aspects of Monopoly One Hundred Years Ago*, 128 HARPERS MAG. 489, 490 (1914) (posthumous essay) (emphasis added).

Thirdly, a principle, considered as a natural physical force, is not a complete and operative means. Before it can produce effects it must be brought in contact with its object, either through some substance which thereby becomes its instrument, or through some mode of operation in which its object is subjected to its influence....

In its second sense, the word ‘principle’ denotes the spirit of the invention ... which is embodied in the operative means devised by the inventor.... A principle, in this sense, thus differs *toto cælo* from a principle considered as a force. The latter is the operative energy; the former is the means in which the latter operates. One is created by the author of the universe; the other owes its origin to human ingenuity. One belongs equally to all mankind; the other is the exclusive property of him who has devised it, until it pleases him to give it to the world.<sup>441</sup>

Robinson’s understanding was clearly recognized and applied by the courts at the time.<sup>442</sup>

In 1900, the Second Circuit in *Badische Anilin & Soda Fabric v. Kalle & Co.*<sup>443</sup> confronted the difficulties of distinguishing synthetic from analytic chemistry, and thus questions of novelty from questions regarding patentable subject matter. The patentee had

“discovered and recognized that a certain class of substances (safranine a20 naphthol bodies), known as ‘insoluble precipitates,’ and regarded as worthless bodies, can be rendered soluble, and then constitute a most valuable dye, and ... proved this discovery by rendering them soluble.... The said insolubility of these safranine azo naphthol bodies, as hitherto obtained, was due to the presence of alkali and salts therein. These admixed impurities constitute a hindrance or obstacle preventing the solution of the bodies.... I have *further* discovered these phenolic azo dyes (the said safranine azo naphthol bodies) possess the character of bases, an exceptional characteristic possessed by no phenolic azo compound hitherto known. I have applied or used this surprising basic nature of these insoluble precipitates in two ways.... First, I have taken

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<sup>441</sup> 1 ROBINSON, *supra* note 26, at 195-200.

<sup>442</sup> *See, e.g.*, Wall v. Leck, 66 F. 552, 557 (9th Cir. 1895) (“A principle, considered as a natural physical force, is not the product of inventive skill. It is the common property of all mankind. It exists in nature independently of human effort, and can neither be diminished nor increased by human power. Man can discover and employ it, but his employment of it in the modes or through the instrumentalities by which it is applied in nature is a mere limitation of what every man is able to perceive and reproduce as well as he. All endeavors to confine it to himself are at once futile and unjust. It exists for all men, as well after his discovery as before. The laws necessarily recognize and protect this right, and do not permit any man to exclusively use the conditions which are the gifts of nature, simply because he was the first one to discover its value. Not until some new instrument or method is contrived for its direction towards ends which it cannot naturally accomplish does his creative genius manifest itself.”) (citing, *inter alia*, 1 ROBINSON, *supra* note 26, at § 186).

<sup>443</sup> 104 F. 802 (2d Cir. 1900).



advantage thereof to produce acid compounds or salts... where by I destroyed the influence of the impurities hereinbefore referred to, to prevent the solution of the said bodies.... [S]econd, I have taken advantage of the aforementioned basic nature of the bodies to cause them to combine, when in soluble form, with tannic acid, and a metal such as antimony and iron, whereby I produced the valuable indigo-like lake.”<sup>444</sup>

In other words, the patentee had newly identified the scientific cause of why a previously known property of existing natural chemicals was inhibited by the presence of other chemicals. But the patentee had also discovered that by *changing the chemical composition* of the pre-existing diazo compounds from bases to acids or salts, he could accomplish the purification. (Note the unintended pun on exploiting the “basic nature” of the scientific discovery). The pre-existing chemicals in their natural state were not practically useful as a technology, unless separated from other pre-existing chemicals also in their natural state. What was unclear was whether purification from impurities that did not require synthesis of new acids or salts would accomplish the same result of allowing the dyeing property to be employed.<sup>445</sup> The patent clearly would have covered such purified but not synthesized compounds. Two of the claims for the patent on which infringement was found were to articles of manufacture that comprised:

“the *herein-described* blue dyestuff, which can be obtained from a safranine azo naphthol, and which may be recognizable by the following characteristics... [and t]he specific blue coloring matter (obtainable by rendering the safranine azo beta naphthol hereinbefore mentioned soluble in water), which possess the following characteristics....”<sup>446</sup>

The Second Circuit never addressed these issues or the propriety of the patent as patentable subject matter (much less whether the claimed invention exceeded the actual discovery, by claiming without limitation the product of a particular process even though other processes might produce it<sup>447</sup>) and did not discuss *American Wood Paper*. Instead,

<sup>444</sup> *Id.* at 803 (quoting U.S. Patent No. 524,254 (issued Aug. 7, 1984)).

<sup>445</sup> The later case of *Badische Anilin & Soda Fabrik v. A. Klipstein & Co.*, 125 F. 543, 554 (C.C.S.D.N.Y. 1903), applying the same patent, describes how Paul Julius had discovered two processes for making the dye, an acid process and what appeared to be a later “‘washing-out’ process,” to include which in his patents he substituted a new specification after his initial application. The washing-out process may suggest that no chemical synthesis was required to accomplish the result. The court also noted Julius’ other patents for generic and specific dyes, suggesting that he had invented the species of combining *Id.* But the court also suggested that the principle of invention was merely the recognition that the previously existing compound could be made soluble, not the synthesis of the acids or salts that would accomplish that result. “Julius was the first to give to the public a safranine azo naphthol, which, although unsulphonated, was soluble in water. That record contained prior patents and publications *which disclosed unsulphonated safranine azo naphthol*, and set forth formulas for producing it. The literature of the art, however, whenever it made a statement as to such characteristic, referred to it as insoluble in water.” *Id.* at 546 (emphasis added).

<sup>446</sup> *Badische Anilin*, 104 F. at 804-05 (citation omitted).

<sup>447</sup> *See supra* note 435. Another claim of the patent was to the process of manufacturing the claimed “dyestuff” and “coloring matter,” but was “not here in controversy; no charge of infringement is based upon it.” *Badische Anilin*, 104 F. at 805.

it analyzed the issue in regard to whether the modified dye “product in suit” was itself a newly produced chemical (and thus reviewed the prior art patents for descriptions of its earlier production than the patentee’s “earliest date of invention”).<sup>448</sup> The court thereby either changed or raised the level of generality of the invention patented (eliminating the distinction between discovered science and created technology) from the diazo chemicals themselves and the properties they inherently possessed to either the synthetic diazo acids and salts or to the *combinations* of chemicals as found in nature and the properties they collectively display. The court accomplished this transition for self-consciously utilitarian purposes, although it may have been unconscious of the implications of the different principles of invention. It rejected as “a fundamental misapprehension” the defendant’s argument that the trial judge “(must have) supposed that the color in suit was the first and only coal tar derived substitute for vegetable indigo, to say nothing of the supposition that safranine azo beta naphthol of the prior art was a worthless body. Both suppositions were completely contrary to the fact.”<sup>449</sup>

The evidence in this case abundantly shows that the water-insoluble safranine azo beta naphthol of the prior art ... was ... “a *comparatively* worthless and neglected body.” There is no warrant for the supposition that the judge supposed that the “color in suit was the first and only coal tar derived substitute for vegetable indigo.” What he said in the opinion [wa]s this:

“To produce a cheap, *artificial* soluble substitute for indigo, possessing many of its advantages, and in some respects superior to indigo, was surely no mean achievement. Learned chemists in Germany and England ... had long been experimenting to produce a result the importance of which was universally recognized, but [the patentee] was the first to succeed.”<sup>450</sup>

By failing to distinguish between the synthetic and analytic chemical bases for the patent, the Second Circuit paved the way for other circuits to uphold patents for purified and isolated chemicals that had not been chemically transformed.<sup>451</sup>

In 1939, in *Mackay Radio & Telegraph Co. v. Radio Corporation of America*,<sup>452</sup> the Supreme Court again reiterated that patents could not issue for scientific principles, although it chose not to decide whether the patent at issue adequately converted unpatentable science into patentable technology. Instead, the Court focused on the narrow nature of the patented invention given that the scientific knowledge was already in the prior art (by its discovery by someone other than the patentee).

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<sup>448</sup> *Id.* at 805.

<sup>449</sup> *Id.* at 813 (citation omitted).

<sup>450</sup> *Id.* (citations omitted and emphasis added).

<sup>451</sup> See *Badische Anilin v. A. Klipstein & Co.*, 125 F. 543, 545-54 (C.C.S.D.N.Y. 1903) (discussing *Badische Anilin v. Kalle*, 94 F. 163 (C.C.S.D.N.Y. 1899)); *Kuehmsted v. Farbenfabriken of Elberfeld Co.*, 179 F. 701, 705 (7th Cir. 1910) (citing *Kalle and A. Klipstein & Co.*). See also *Parke-Davis & Co. v. H.K. Mulford & Co.*, 189 F. 95, 103 (C.C.S.D.N.Y. 1911) (citing *Kuehmsted*); *supra* note \_\_.

<sup>452</sup> 306 U.S. 86 (1939).

The patent at issue addressed radio antennae, which employed the principle of “standing waves” of electric current that formed along wires where the energy of the current was not dissipated by the time it reached the end of the wire (and thus reflected back along the wire and create interference patterns generating standing waves).<sup>453</sup> The prior art science had explained that by varying the wave length of the current and the number of half wave lengths of the wire according to a trigonometric formula, one could predict the direction of maximum strength of the radio wave produced (“the direction of greatest radio activity”).<sup>454</sup> Further, prior art technology had created multiple-wire antennas that generated (using standing waves or traveling waves of electric current, where the energy dissipated before reaching the end and thus was not reflected) radiation “substantially in the direction of the bisector of the angle [between multiple wires] and that the preferred angle was dependent upon an indicated relationship between wire length and wave length.”<sup>455</sup> In this context, the patentees invention was found lacking.

It is plain, therefore, that the Carter invention, *if it was invention*, consisted in taking the angle of the Abraham formula as the angle between each wire of the V antenna and its bisector. By so doing he brought the cones of principal radio activity, each having one of the wires of the antenna as its axis, into conjunction at their periphery and along the bisector of the angle between the wires, and thus established there the greatest directional radio activity.

*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.* But we do not stop to solve the problem whether it was more than the skill of the art to combine the teaching of Abraham with that of Lindenblad and others who had pointed out that the arrangement of the wires at an angle enhanced directional radio activity along their bisector. *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, consisting of a structure conforming to the teachings of the Abraham formula as to angle and wire length relative to wave length, and is to be strictly construed with regard both to prior art and to alleged infringing devices.... Carter's structure was a V antenna having an angle double the Abraham angle and wires containing a multiple of half wave lengths. Carter, using the Abraham formula, calculated the value of the angle in that formula for wires up to fourteen wave lengths long. He plotted the result ... which indicated the results of his computation by use of the Abraham formula. From this calculation he derived a formula in empirical form for determining the desired angle when wave length and length of

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<sup>453</sup> See *id.* at 91 & n.1.

<sup>454</sup> *Id.* at 93. See *id.* at 92-93.

<sup>455</sup> *Id.* at 93.

wire are known, in which the angle between the wires is described as twice  $a$ , which is the equivalent of the angle of the Abraham formula.<sup>456</sup>

The Court thus could have decided whether this tangible post-solution activity was sufficient to grant a patent. But it did not then do so.<sup>457</sup>

Significantly, in 1942, Giles Rich, later one of the principal authors of the 1952 Patent Act and (as noted earlier) the author of the Court of Claims and Custom Appeals's (and later the Federal Circuit's) expansions of patentable subject matter, clearly recognized that the Patent Act reflected the distinction between patentable principles of invention (that were capable of being physically embodied) and scientific principles (on which such physically embodied principles operated).

*Invention* [is] not capable of exact definition, but is an incorporeal, intangible abstraction in the nature of a product of the mind. To be patentable it must be capable of being embodied in a tangible form as an

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<sup>456</sup> *Id.* at 94-95 (citations omitted).

<sup>457</sup> Nor did it do so in *Marconi Wireless Telegraph Co. of America v. United States*, 320 U.S. 1 (1943). Marconi had made as his original invention a two-circuit system for generating radio waves, and the patent at issue was for an improved apparatus for generating radio waves using "two high frequency circuits in the transmitter and two in the receiver, all four so adjusted as to be resonant to the same frequency or multiples of it." *Id.* at 5-6. The Court held that the principle of this "invention" was anticipated by James Clerk Maxwell ("the scientific theory of wireless communication through the transmission of electrical energy by ether waves"), Nicolai Tesla ("the use of adjustable high frequency oscillations for wireless transmission of signals" and "a four-circuit system, having two circuits each at transmitter and receiver, and recommended that all four circuits be tuned to the same frequency"), Oliver Lodge ("tuning, by means of a variable inductance, of the antenna circuits in a system of radio communication"), and John Stone ("adjustable tuning, by means of a variable inductance, of the closed circuits of both transmitter and receiver" and the difference between "'natural' and 'forced' oscillations, the frequency of latter of which 'is 'independent of the constraints of the circuit' on which they are impressed and 'depends only upon the period (frequency) of the impressed force.'" In other words, Stone found that it was possible not only to originate high-frequency oscillations in a circuit, and to determine their frequency by proper distribution of the capacity and self-inductance in the circuit, but also to transfer those oscillations to another circuit and retain their original frequency."). *Id.* at 10, 13-14, 16, 17-19. As a result, the Court held that Marconi had not been the first to make then invention. *See id.* at 23, 30 ("To say that by this reference to the tuning of sending and receiving apparatus [Stone meant] to confine his invention ... is to read the specifications, which taken in their entirety are merely descriptive or illustrative of his invention ... as though they were claims whose function is to exclude from the patent all that is not specifically claimed.... [W]e think it clear that Stone showed tuning of the antenna circuits before Marconi, and *if this involved invention* Stone was the first inventor.") (emphasis added). *Cf. id.* at 68, 72-73 (Rutledge, J., dissenting) ("Petitioner does not claim the general principles of tuning.... Mr. Justice Parker found Marconi's invention in something more than merely the application of the 'principle of resonance,' or 'sympathetic resonance,' or its use to 'tune' together the transmitting and receiving circuits.... That principle is inherent in the idea of wireless communication by Hertzian waves.... Mr. Justice Parker found the gist of Marconi's invention, not in the mere application of the general principle or principles of resonance to a four-circuit system, or in the use of four circuits or the substitution of two for one ... but ... in recognition of the principle that ... attainment of the maximum resonance required that means for tuning the closed to the open circuit be inserted in both. That recognized, the method of accomplishing the adjustment was obvious, and different methods, as by using variable inductance, or a condenser, were available.").

article of manufacture, machine, device or composition of matter or as a method or process which can be carried out by physical means.<sup>458</sup>

In 1948, in *Funk Bros. Seed Co. v. Kalo Inoculant Co.*,<sup>459</sup> the Supreme Court *did* distinguish between God's work in nature and human handiwork, and the distinction between mere application of science and transformation into technology is therefore critical to our understanding of the patent law. The patent addressed an aggregation of bacterial species that would fix nitrogen in root nodules, "because no one species will infect the roots of all species of leguminous plants," and was not limited to the process of selecting and combining the different species.<sup>460</sup>

Repeating the implications from *Le Roy v. Tatham* and citing to *Mackay Radio & Telegraph Co. v. Radio Corporation of America* for the need to have a technological application of science, the Court held that

Bond [did] not create a state of inhibition or of non-inhibition in the bacteria. Their qualities are the work of nature. Those qualities are of course not patentable. *For patents cannot issue for the discovery of the phenomena of nature....* The qualities of these bacteria, like the heat of the sun, electricity, or the qualities of metals, are part of the storehouse of knowledge of all men. *They are manifestations of laws of nature, free to all men and reserved exclusively to none.* He who discovers a hitherto unknown phenomenon of nature has no claim to a monopoly of it which the law recognizes. If there is to be *invention* from such a discovery, it must come *from the application of the law of nature to a new and useful end.* The Circuit Court of Appeals thought that Bond did much more than discover a law of nature, since he made a new and different composition of non-inhibitive strains which contributed utility and economy to the manufacture and distribution of commercial inoculants. But we think that that aggregation of species *fell short of invention within the meaning of the patent statutes.*<sup>461</sup>

Thus, the Court held that aggregated bacterium, although they accomplished a useful and different physical result (assuring infection) through aggregation and even though the aggregation had not previously existed in nature, were not patentable subject matter because the infectious properties were not synthesized.

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<sup>458</sup> Giles S. Rich, *The Relation between Patent Practices and the Anti-Monopoly Laws*, 24 J. PAT. & TRADEMARK OFF. SOC'Y 159, 171 (1942).

<sup>459</sup> 333 U.S. 127 (1948).

<sup>460</sup> *Id.* at 129. *See id.* at 130.

<sup>461</sup> *See id.* at 130-31 (citations omitted and emphasis added). *See also* Conley & Macowski, *supra* note 423, at 330-34 (discussing both the patentable subject matter holding and an alternative holding of obviousness, using the then-statutory term lack of "invention," based on the failure to take an inventive step beyond the prior art knowledge of the discovery that "particular strains of bacteria, when combined, did not have the usual mutually inhibiting effect").

Stated differently, the “inventor” had not physically transformed the bacteria nor produced the properties that the aggregated bacteria exhibited, and thus the invention was the mere application of the discovered properties of nature. What is also significant is that the patent was denied even though the combination most likely *did not occur in nature*, any more than an isolated and purified chemical would occur in nature. The fact that the “inventor” had created a previously non-existing combination did not transform the science to technology any more than isolating and purifying what nature had supplied would. In *Funk Brothers Seed Co.*, there was also only a change in character of isolation and purity of nature’s handiwork, but that change (by adding other active species rather than by removing inactive compounds as in *Badische* and *American Wood Products*) did not create a patentable technological discovery, only the mere application of the discovered science.

Justice Frankfurter in dissent clearly understood this, and therefore argued that the discovery of the particular species that did not mutually inhibit their invasive properties was a technological invention qualifying for patent protection.<sup>462</sup> Nevertheless, Justice Frankfurter would have limited patentability to the particular combinations (modes) of applying the principle contemplated and disclosed by the “inventor.”

[Bond] appears to claim that since he was the originator of the idea that there might be mutually compatible strains and had practically demonstrated that some that some such strains exist, everyone else is forbidden to use a combination of strains whether they are or are not identical with the combinations that Bond selected and packaged together. It was this claim that, as I understand it, the District Court found not to be patentable, but which, if valid, had been infringed.

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The consequences of such a conclusion call for its rejection. Its acceptance would require, for instance in the field of alloys, that if one discovered a particular mixture of metals, which when alloyed had some particular desirable properties, he could patent not merely this particular mixture but the idea of alloying metals for this purpose, and thus exclude everyone else from contriving some other combination of metals which, when alloyed, had the same desirable properties....

It confuses the issue, however, to introduce such terms as “the work of nature” and the “laws of nature.” For these are too vague and malleable terms infected with too much ambiguity and equivocation. Everything that happens may be deemed “the work of nature,” and any patentable composite exemplifies in its properties the “laws of nature.” Arguments drawn from such terms for ascertaining patentability could fairly be

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<sup>462</sup> See *Funk Brothers Seed Co.*, 333 U.S. at 133 (Frankfurter, J., dissenting) (“two different claims of originality are involved: (1) the idea that there are compatible strains, and (2) the experimental demonstration that there were in fact some compatible strains. Insofar as the court below concluded that the packaging of a particular mixture of compatible strains is an invention and as such patentable, I agree.”). Cf. *id.* (arguing that Bond’s disclosure did not adequately identify the strains and thus the patent was invalid for lack of written description and inadequate enablement: “The strains by which Bond secured compatibility are not identified and are identifiable only by their compatibility”).

employed to challenge every patent. On the other hand, the suggestion that “if there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end” may readily validate Bond’s claim. Nor can it be contended that there was no invention because the composite has no new properties other than its ingredients in isolation. Bond’s mixture *does in fact have the new property of multi-service applicability*.<sup>463</sup>

What is significant about Justice Frankfurter’s dissent is its parallelism to *Boulton v. Bull*, and the need to confine the claim to the particular concrete and tangible mode actually invented. Unlike for the majority, technology could be distinguish from science in the inventive application of combinations of existing properties (without physical change to the atomistic parts), but could then be an invention only of the particular combination and not the principle of making all such combinations (which was the science itself).

In 1972, in *Gottschalk v. Benson*,<sup>464</sup> the Supreme Court elaborated this point under the 1952 Patent Act (which as I have argued elsewhere did not change the standards for patentability of processes<sup>465</sup>), although it did so with infelicitous language about “preemption” that is wholly circular and unhelpful. The invention was for a method of converting binary coded decimal numerals into pure binary numerals by using any form of general purpose computer.<sup>466</sup> Citing to *Mackay Co., Le Roy, Rubber-Tip Pencil Co., Le Roy, and Funk Brothers Seed Co.*, the Court reiterated the exclusions for science, nature, and ideas, and further held that the claimed invention at issue was unpatentable because it was in essence an abstract idea and not a principle of invention:

“[W]hile 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 the scientific truth may be.” That statement followed the longstanding rule that “[a]n idea of itself is not patentable.”... “A principle in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as non one can claim in either of them an exclusive right.”.... Phenomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work.... “He who discovers a hitherto unknown phenomenon of nature has no claim to a

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<sup>463</sup> *Id.* at 133-35. Justice Burton wrote a separate dissent agreeing with Justice Jackson on the patentability of combinations but disagreeing that the patent was invalid for lack of clarity of the written description. *See id.* at 135-37 (Burton, J., dissenting).

<sup>464</sup> 409 U.S. 63 (1972).

<sup>465</sup> *See Sarnoff, Claiming the Future Part II, supra* note 70, at 487-88 (citing Patent Act of July 19, 1952, ch. 950, 66 Stat. 797; Title 35, United States Code B Patents, Pub. L. No. 82-593; S. REP. NO. 82-1979, at 1, 4, 6 (1952)).

<sup>466</sup> *See Benson*, 409 U.S. at 66 (“The patent sought is on a method of programming a general-purpose digital computer to convert signals from binary-coded decimal form into pure binary form. A procedure for solving a given type of mathematical problem is known as an ‘algorithm.’ The procedures set forth in the present claims are of that kind; that is to say, they are a generalized formulation for programs to solve mathematical problems of converting one form of numerical representation to another. From the generic formulation, programs may be developed as specific applications.”).

monopoly of it which the law recognizes. If there is to be invention from such a discovery, it must come from the application of the law of nature to a new and useful end.” We dealt [in *Funk Brothers Seed Co.*] with a “product” claim, while the present case deals with a “process” claim. But we think the same principle applies.

Here the “process” claim is so abstract and sweeping as to cover both *known and unknown uses* of the BCD to pure binary conversion. The end use may (1) vary from the operation of a train to verification of drivers’ licenses to researching the law books for precedents and (2) be performed *through any existing machinery or future-devised machinery or without any apparatus.*

....

*It is conceded that one may not patent an idea.* But in practical effect that would be the result if the formula for converting BCD numerals to pure binary numerals were patented in this case. The mathematical formula involved here *has no substantial practical application except in connection with a digital computer*, which means that if the judgment below is affirmed, the patent *would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself.*<sup>467</sup>

Although the Court did not explain what it meant by “wholly preempt the mathematical formula,” it can be understood (from *Funk Brothers Seed Co.*) either as failing to identify a technological principle of invention that transformed nature by doing something more than merely applying the discovered scientific principle to a technological context or (from Justice Frankfurter’s dissent thereto) as not being limited to the actual physical embodiments of the application (through a particular computer or for a particular identified purpose) and thereby claiming all applications of the scientific principle.

This formulation of preemption has caused much trouble (and should be therefore be abandoned). It provides no basis for distinguishing an unpatentable scientific principle from the patentable principle of invention. Any patented principle would wholly preempt all uses of the principle, because the patent grant conveys the right to exclude from all uses of that principle and not just those contemplated and discussed by the inventor.<sup>468</sup> The question is what is the scope of a scientific discovery and whether it is patentable. Although we may now patent disembodied modes of accomplishing results suggested by the application of science to nature, the principle must be limited to accomplishing tangible and concrete results that are not the “mere application” of the scientific principle to a particular technological context. This understanding of *Benson*’s (failed) effort to articulate the line to be drawn was clearly understood by the Court in *Parker v. Flook*, discussed below, and was similarly understood by contemporaneous commentators.

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<sup>467</sup> *Id.* at 67-68, 71-78 (emphasis added).

<sup>468</sup> *See supra* note \_\_\_. Again, this unreflective scope of exclusion should be revisited.



In 1972, Anthony Deller (who would later take responsibility for Walker's patent law treatise) wrote a short description of the U.S. patent law, which also made clear that to be patentable, an invention had to result in a concrete and tangible result.

Every invention may, in a certain sense, embrace more or less of a discovery, for it must always include something that is new; but it by no means follows that every discovery is an invention. It may be the *soul* of the invention, but it cannot be the subject of the exclusive control of the patentee under the patent law, until it inhabits a *body*, any more than a disembodied spirit can be subjected to the control of human laws.

As instances of the non-patentability of ideas, mention may also be made of the various systems for doing business .... [which] like all things in the nature of ideas do not come within any of the classes of inventions specified in the patent statutes and, consequently, are not patentable....

Just as an idea or principle is not patentable, so a result or purpose cannot be the subject of a patent.... The invention covered must consist of a new and useful means of accomplishing a purpose, not of the purpose itself. In other words, the subject of a patent is the device or mechanical means by which the desired result is secured.

In many instances, attempts have been made to patent the function or principle of the machine. Such attempts have always been rejected by the Patent Office and courts because a function or a principle is not within the purview of the patent statutes.... It might be remarked that the function or principle of a machine is in the same class as abstract ideas, principles, effects, or results, none of which may be patented.<sup>469</sup>

Although the Supreme Court in *Bensen* had not adequately explained what was meant by "wholly preempt[ing] the ... formula," it subsequently held in 1978 in *Parker v. Flook*<sup>470</sup> that preemption occurs in regard to all applications of a mathematical formula (a scientific principle) that do not involve a separate inventive principle, and that in order to distinguish the scientific from the technological principle more is required than merely applying the scientific discovery to a new technological context. *Flook* addressed a patent for a method of calculating alarm limits in catalytic chemical conversion of hydrocarbons.<sup>471</sup> The Court held there was no patentable *invention*, because the patent claimed the mere application of the scientific principle in a particular technological context, and the application of the calculated value to accomplish a useful, concrete, and tangible physical result *was not enough to distinguish science from technology*.

The notion that post-solution activity, no matter how conventional or obvious in itself, can transform an unpatentable principle into a patentable

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<sup>469</sup> Deller, *supra* note 47, at 50-52.

<sup>470</sup> 437 U.S. 584 (1978).

<sup>471</sup> *See id.* at 585-86.

process exalts form over substance.... 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, the application, considered as a whole, contains no patentable invention....* [T]he discovery of such a phenomenon cannot support a patent *unless there is some other inventive concept in its application.*<sup>472</sup>

By “in its application,” the Court was referring the *application* of the scientific discovery, and thus held that more was needed for “invention” than merely applying the scientific discovery to accomplish a functional result.

The Court was very clear about this point in describing the question presented: “The question in this case is whether the identification of a limited category of useful, though conventional, post-solution applications of such a formula makes respondent's method eligible for patent protection.”<sup>473</sup> One way to understand this is to focus on the word “conventional.” What the Court was saying was that once the scientific knowledge was made free for all to use and treated as prior art, there was no additional *inventive* principle involved in using that principle to accomplish a patentably *obvious* useful result. So understood, there would be no *patentable* invention. But this view would mistake the history. The claim was unpatentable because the invention (which would be reviewed for obviousness) did not adequately distinguish science from technology. There was no inventive *principle* involved in simply taking the known mathematical calculation and using it to accomplish a function. *Flook* thus went father than *Benson*, and returned to the holding in *Funk Brothers* that required more than simply bringing a result into existence that had not previously existed in nature. It required a synthetic change to nature that created new characteristics for the physical manifestations accomplished.

The Court made this point even more clear three years later in *Diamond v. Diehr*, that the unpatentability of a mathematical formula “*cannot be circumvented by attempting to limit the use of the formula to a particular technological environment....*” Similarly, insignificant post-solution activity will not transform an unpatentable principle into a patentable process.”<sup>474</sup> Although *Diehr* was thought to undermine *Flook*, its own language prevents that understanding. Whether the application of that understanding was consistent with the facts of the cases may have been critically important to signaling that the Supreme Court would no longer (then) police patentable subject matter limitations, it was a stunning reaffirmation of the underlying premises of the patent system, stated even more clearly than had been done when the Court had been willing to invalidate claims on

<sup>472</sup> *Id.* at 590, 593-94 (emphasis added).

<sup>473</sup> *Id.* at 585.

<sup>474</sup> *Diehr*, 450 U.S. 175, 191-92 (citing *Flook*). *Cf.* Samuelson, *supra* note 29, at 343 (discussing limitations of patentable subject matter to the “technological arts,” as distinguished from the “liberal arts,” (citing 1 DONALD CHISUM, CHISUM ON PATENTS § 1.01 (1990)); *id.* at n.115 (discussing early post-*Benson* views that the decision precluded patentability of all computer programs, citing Stanislaw Soltysinski, *Computer Programs and Patent Law: A Comparative Study*, 3 RUTGERS J. COMPUTERS & L. 1, 2-3 (1973-74), and H. Dwane Evans, Comment, *Computer Program Classification: A Limitation on Program Patentability as a Process*, 53 OR. L. REV. 501, 504 (1974)).

this basis. However, the difficulty in formulating an appropriate linguistic test for applying the distinctions between science and technology in part reflects the Court's failure to address the historical sources of these exclusions and their constitutional implications. Given their explicitly religious origins, this failure is understandable, particularly if the Court could not come up with an egalitarian moral theory to replace the duty of scientists to society. The opinion might have read like an embarrassing paeon to religious originalism. But even without an understanding of the origins of the doctrine, so long as science, nature and ideas are excluded from patentable subject matter, line-drawing remains required and the Court's decisions provide precious little guidance about the "principles" on which such line-drawing is to be based.<sup>475</sup>

In *Diamond v. Chakrabarty*, the Supreme Court upheld the patentability of living organisms. Significantly, although the Court had granted certiorari to review the holdings in *In re Bergy* and *In re Chakrabarty*,<sup>476</sup> the petitioner in *Bergy* cancelled its claim to a "'biologically pure culture' of the microorganism *Streptomyces vellosus*, having the identified characteristics'" of producing lincomycin without lincomycin B and moving to dismiss just before the U.S. Government filed its brief.<sup>477</sup> That decision is unremarkable, given that the Court had earlier granted certiorari, vacated the judgment of the Court of Claims and Custom Appeals reversing the Patent Office, and remanded for consideration in light of *Parker v. Flook*.<sup>478</sup>

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<sup>475</sup> See Samuleson, *supra* note 29, at 1038 n.38 (discussing *McNabb* and line drawing required to exclude technological applications from mental steps or mental processes).

<sup>476</sup> 596 F.2d 952 (C.C.P.A. 1979).

<sup>477</sup> 596 F.2d at 967. See Brief for the Respondent at \*2, *Diamond v. Chakrabarty*, No. No. 79-136 (S. Ct. 1980).

<sup>478</sup> Judge Rich, writing for a split Court of Claims and Custom Appeals, had suggested that "the product-of-nature issue [was] abandoned and [is] no longer in the case," because the Board of Patent Appeals had switched its ruling from the examiner's reliance on the product of nature defense to a broader rationale that living organisms are not patentable. See *In re Bergy*, 563 F.2d 1031, 1035 (C.C.P.A. 1977). But Judge Rich went on to state that "we find [that reasoning] wholly lacking in merit. The biologically pure culture of claim 5 clearly does not exist in, is not found in, and is not a product of, 'nature.' It is man-made and can be produced only under carefully controlled laboratory conditions." *Id.* This was the basis for the remand to reconsider the decision in light of *Flook*. When Judge Rich did so, he cited to *In re Mancy*, 499 F.2d 1289, 1294 (C.C.P.A. 1974), stating that *Mancy* was determined by *In re Kuehl*, 475 F.2d 658 (C.C.P.A. 1973), which held that "the new *Streptomyces bifurcus* strain Discovered by Mancy himself as part of the invention being claimed *could not be used as prior art in determining the obviousness under §103 of his claims to a process of using it to produce the old antibiotic.*" *In re Bergy* and *In re Chakrabarty*, 596 F.2d at 976 (emphasis added). See *id.* (discussing the earlier dicta in *Mancy*, stating that "we were not expressing any view, even by way of dictum, on the patentability of living organisms as such, we now make it explicit that the thought underlying our presumption that *Mancy* could not have obtained a claim to the strain of microorganism he had described was simply that it Lacked novelty. We were thinking of something preexisting and merely plucked from the earth and claimed as such, a far cry from a biologically pure culture produced by great labor in a laboratory and so claimed."). As *O'Reilly* (based on *Neilson*) had made clear that such newly discovered knowledge was to be treated as prior art known to all (regardless of the labor involved), Judge Rich was both ahistorical and wrong. Having prepared for the Supreme Court, the counsel for *Bergy* likely recognized this error and chose not to pursue the matter.

*The Supreme Court has therefore never approved of a claim to isolated and purified naturally occurring chemicals or biological organisms.*<sup>479</sup> In contrast, as Chakrabarty had argued, “the two inventions are quite different.... [Chakrabarty’s] engineered bacterium, not previously existing in nature, functions to solve one of man’s practical needs, getting rid of oil spills.”<sup>480</sup> The argument thus focused solely on whether the Government was correct that the statutory categories precluded patents on living organisms, and not on whether there was a sufficient inventive principle beyond the discovered nature that had been isolated by science. Thus, Chakrabarty’s first argument was that *Funk Brothers* had been decided without regard to the living or dead status, but rather whether the claimed invention “was of a natural phenomenon.... ‘It is no more than the discovery of some of the handiwork of nature and hence it is not patentable.’... Beyond that discovery, [the Court] held that Bond had done no more than mix the bacteria together. That ‘simple step’ was found not to be the ‘product of invention.’”<sup>481</sup> The Court agreed, and distinguished the man-made bacterium at issue in *Chakrabarty* from:

a new mineral discovered in the earth or a new plant found in the wild.... His claim is to a nonnaturally occurring manufacture or composition of matter – a product of human ingenuity “having a distinctive name, character [and] use.”... Here, by contrast [to *Funk Brothers Seed Co.*] the patentee has produced a new bacterium with *markedly* different characteristics from any found in nature and one having the potential for significant utility. His discovery is not nature’s handiwork, but his own; accordingly it is patentable subject matter under § 101.<sup>482</sup>

In sum, although the Supreme Court in *Chakrabarty* permitted patents on living organisms (here bacteria), it did so only on the basis of the man-made, not naturally occurring, character of the organisms at issue. And the Court explicitly recognized the importance of synthetic production rather than the mere isolation of the bacteria at issue from their natural state which might then be applied to a new use.<sup>483</sup>

One year later, the Supreme Court held in *Diamond v. Diehr*<sup>484</sup> that not every “new and useful process” that someone “invents or discovers”<sup>485</sup> qualifies as patentable subject matter for which examination for novelty<sup>486</sup> and nonobviousness<sup>487</sup> is warranted.

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<sup>479</sup> See John M. Conley & Roberte Makowski, *Back to the Future: Rethinking the Product of Nature Doctrine as a Barrier to Biotechnology Patents* (pt. 2), 85 J. Pat. & Trademark Off. Soc’y 371, 372-77 (2003) (discussing *Chakrabarty*, *Bergy*, and *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred International, Inc.*, 534 U.S. 124 (2001)).

<sup>480</sup> Brief for the Respondent at \*2, *Diamond v. Chakrabarty*, No. No. 79-136 (S. Ct. 1980).

<sup>481</sup> *Id.* at \*13-\*14 (quoting *Funk Bros. Seed Co. v. Kalo Co.*, 333 U.S. 127, 131-32 (1948)).

<sup>482</sup> 447 U.S. 303, 309 (1980) (quoting *Hartranft v. Wiegmann*, 121 U.S. 609, 615 (1887)).

<sup>483</sup> For this reason, I do not address here the potential unconstitutional application of utility patents, or plant patents or plant variety protection certificates, to plants that are merely isolated from nature without further synthetic production. See *J.E.M. Ag Supply, Inc. v. Pioneer Hi-Bred International, Inc.*, 534 U.S. 124 (2001).

<sup>484</sup> 450 U.S. 175 (1981).

<sup>485</sup> 35 U.S.C. § 101 (2000).

<sup>486</sup> See 35 U.S.C. § 102 (2000).

In construing Section 101 of the Patent Act, the Court noted that “every discovery is not embraced within the statutory terms. Excluded from such patent protection are laws of nature, natural phenomena, and abstract ideas.”<sup>488</sup> In discussing these long-standing exclusions from patentable subject matter,<sup>489</sup> the Court neither explained its statutory construction<sup>490</sup> nor discussed whether the exclusions derive from limits on the Constitutional power “To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”<sup>491</sup>

Rather, the Court simply recited its mid-19<sup>th</sup> and 20<sup>th</sup> Century decisions stating categorically that 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,” and that such “discoveries are ‘manifestations of ... nature, free to all men and reserved exclusively to none.’”<sup>492</sup> Nine years earlier, in *Gottschalk v. Benson*,<sup>493</sup> the Court had quoted other cases for the “longstanding rule that ‘(a)n idea of itself is not patentable,’” before stating that “[p]henomena of nature, though just discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work.”<sup>494</sup> Unlike the British cases discussed earlier, which focus on the language and meaning of the scope of the statutory grant, the Supreme Court’s earlier statements quoted in *Diehr* suggest a fundamental deontological inconsistency between private ownership of science, nature, and ideas and basic public rights of access to scientific knowledge, nature, and mental processes.

In *Diehr*, as in earlier cases, the Court also struggled to formulate a linguistic test to distinguish patentable inventions from unpatentable processes that reflected only “laws of nature, natural phenomena, and abstract ideas.”<sup>495</sup> The Court circularly held in *Diehr* that “when a claim containing a mathematical formula implements or applies that formula

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<sup>487</sup> See 35 U.S.C. § 103 (2000).

<sup>488</sup> See *Diehr*, 450 U.S. at 185.

<sup>489</sup> See *id.* at 185-88 (citing, *inter alia*, *Le Roy v. Tatham*, 55 U.S. (14 How.) 156 (1853), and *O’Reilly v. Morse*, 56 U.S. (15 How.) 62 (1854)).

<sup>490</sup> No explicit language of exclusion appears in the statute. See 35 U.S.C. § 101 (2000) (“Whoever 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 therefore, subject to the conditions and requirements of this title.”).

<sup>491</sup> U.S. CONST., art. I, § 8, cl. 8.

<sup>492</sup> *Id.* at 185 (quoting *Le Roy*, 55 U.S. (14 How.) at 175. and *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (quoting *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948)) (internal cites omitted).

<sup>493</sup> 409 U.S. 63 (1972).

<sup>494</sup> *Id.* at 67 (quoting *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. (20 Wall.) 498, 507 (1874)).

<sup>495</sup> See, e.g., *Diehr*, 450 U.S. at 188 (“a novel and useful structure created with the aid of knowledge of scientific truth may be” patentable) (quoting *Mackay Radio & Telegraph Co. v. Radio Corp. of Am.*, 306 U.S. 86, 94 (1939)); *id.* at 189 (“but when a process for curing rubber is devised which incorporates in it a more efficient solution of the equation, that process is at the very least not barred at the threshold by § 101”); *id.* (“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.... The ‘novelty’ of any element or steps in a process, or even of the process itself, is of no relevance in determining whether the subject matter of a claim falls within the § 101 categories....”).

in a structure or process which, when considered as a whole, is performing a function *which the patent laws were designed to protect*, (e. g., transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101.”<sup>496</sup> The Court in *Benson*, although recognizing that “[t]ransformation and reduction of an article ‘to a different state or thing’ is the clue to the patentability of a process claim that does not include particular machines,” it refused to hold categorically that to be patentable processes must “either be tied to a particular machine or apparatus or must operate to change articles or materials to a ‘different state or thing,’” and did not hold that a program servicing a computer is never patentable.<sup>497</sup> Accordingly, the relevant language in *Diehr* (transforming or reducing) is exemplary rather than declaratory of the limits of patentable subject matter.

Since *Diehr*, the subject matter of patents has expanded dramatically. The year after *Diehr* was decided, Congress vested nearly exclusive federal appellate jurisdiction over patent law issues in the newly created U.S. Court of Appeals for the Federal Circuit (Federal Circuit).<sup>498</sup> Patents now routinely issue for software, software-implemented machines, and computer programs embodied in tangible medium (*i.e.*, storage structures containing software and other functional data),<sup>499</sup> for methods of doing business,<sup>500</sup> and for many other information or other processes in all aspects of everyday life that do not by themselves physically transform any tangible object.<sup>501</sup> The U.S. Patent and Trademark Office (PTO) has proposed interpretive guidelines based on the Federal Circuit decisions and the decision of the PTO’s Board of Patent Appeals and Interferences (BPAI) in *Lundgren* that disputed the existence of either a technological arts test<sup>502</sup> or a requirement for physical transformation.

<sup>496</sup> 450 U.S. at 192 (emphasis added).

<sup>497</sup> 409 U.S. at 70-71 (quoting *Cochrane v. Deener*, 94 U.S. 780, 788 (1877)). See Samuelson, *supra* note 29, at 1038 & nn.37, 1057 n.105 (discussing exclusions from patentability for mental processes, based on the definition of “process” articulated in *Cochrane*, and noting that although computer software may cause computers to change their “state” most patents at issue addressed only the idea on which programs are based and not the programs themselves) (citing 1 ROBINSON, *supra* note 26, at § 166, and Gary Dukarich, *Patentability of Dedicated Information Processors and Infringement Protection of Inventions that Use Them*, 29 JURIMETRICS J. 135 (1989)).

<sup>498</sup> See 28 U.S.C. § 1295 (2000); *Holmes Group, Inc. v. Vornado Air Circulation Systems, Inc.*, 535 U.S. 826 (2002).

<sup>499</sup> See, e.g., *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352, 1358 (Fed. Cir. 1999); *In re Beauregard*, 53 F.3d 1583 (Fed. Cir. 1995). Cf. *In re Warmerdam*, 33 F.3d 1354, 1361-62 (Fed. Cir. 1994) (holding that a “data structure” is not a machine or any other statutory category of patentable subject matter); *In re Benson*, 441 F.2d 682, 682 (C.C.P.A. 1971) (noting, before holding it invalid, that one of the claims was to mathematical “conversion of ‘binary coded decimal (BCD) numerical information in the form of ‘signals’”); *In re Foster*, 438 F.2d 1011, 1006 (C.C.P.A. 1971) (upholding claims drawn to “electric signals” (and invalidating claims to “signals”) because commensurate (and not) with what the inventor regarded as the invention under 35 U.S.C. § 112, ¶ 2).

<sup>500</sup> See, e.g., *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368, 1373-74 (Fed. Cir. 1998).

<sup>501</sup> See, e.g., Robert P. Merges, *As Many as Six Impossible Patents Before Breakfast: Property Rights for Business Concepts and Patent System Reform*, 14 BERKELEY TECH. L.J. 577, 578-79 (1999); John R. Thomas, *The Patenting of the Liberal Professions*, 40 B.C. L. REV. 1139, 1139-43 (1999).

<sup>502</sup> See, e.g., *In re Waldbaum*, 457 F.2d 997, 1003 (C.C.P.A. 1972) (Rich, J., concurring) (noting that the “technological arts” test coined in *In re Musgrave*, 431 F.2d 882, 893 (C.C.P.A. 1970), was to convey the same idea as “useful arts in the Constitution and to “occupy whatever ground the Constitution permits”).

The burdens that such patents impose on society are widely recognized to be widespread and increasing. Further, Section 101 of the Patent Act, or any constitutional limitation that it may reflect, has a gatekeeping role, “barr[ing] at the threshold” claims that need not be evaluated for utility, novelty, and nonobviousness under Sections 101, 102, and 103 of the Patent Act.<sup>503</sup> This gatekeeping role is even more important in light of the widely acknowledged burdens on the PTO to timely and effectively examine applications, leading to routine improper issuance of patents that are invalid for lack of novelty or obviousness.

This year, in *Laboratory Corporation of America Holdings, Inc. v. Metabolite Laboratories, Inc.*,<sup>504</sup> three Justices of the Supreme Court clearly implied that these exclusions are mandated by the Constitution, but suggesting very different utilitarian grounds (perhaps suggested in *Benson*) for the exclusions. Specifically, Justices Breyer, joined by Justice Stevens and Justice Souter, stated in dissenting from a dismissal of the case as being improvidently granted that:

the reason for the exclusion [for “laws of nature”] is that sometimes too much patent protection can impede rather than ‘promote the Progress of Science and useful Arts,’ the constitutional objective of patent and copyright protection. U. S. Const., Art. I, § 8, cl. 8.... Patent law seeks to avoid the dangers of overprotection just as surely as it seeks to avoid the diminished incentive to invent that underprotection can threaten. One way in which patent law seeks to sail between these opposing and risky shoals is through rules that bring certain types of invention and discovery within the scope of patentability while excluding others.<sup>505</sup>

The three Justices focused on the lack of promotion of Progress that would result. Further, and significantly, the three Justices implied that the preamble to the Progress Clause imposes a limitation on the exercise of the power vested in Congress to grant patents. The Court had previously ruled to this effect in *Graham v. John Deere Co.*,<sup>506</sup> but had more recently expressed ambivalence on this point in *Eldred v. Ashcroft*.<sup>507</sup> In any event, the dissenting Justices (much less the Court) did not express any concern that

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<sup>503</sup> *Diamond v. Diehr*, 450 U.S. 175, 189 (1981). See generally Olson, *supra* note 63.

<sup>504</sup> 126 S.Ct. 2921 (2006) (dismissing the writ of certiorari as improvidently granted).

<sup>505</sup> *Id.* at 2922 (Breyer, J., dissenting from the dismissal).

<sup>506</sup> 383 U.S. 1, 5-6 (1966) (Congress may not “enlarge the patent monopoly without regard to the innovation, advancement or social benefit gained thereby” nor “authorize the issuance of patents whose effects are to remove existent knowledge from the public domain, or to restrict free access to materials already available.”). Cf. *Brown v. Piper*, 91 U.S. (1 Otto) 37, 41 (1875) (“The thing was within the circle of what was well known before, and belonged to the public. No one could lawfully appropriate it to himself, and exclude others from using it in any usual way for any purpose to which it may be desired to apply it.”).

<sup>507</sup> 537 U.S. 186, 211-12 (2003) (noting that “petitioners do not argue that the Clause's preamble is an independently enforceable limit on Congress' power,” but reciting that *Graham* had held that the Clause imposes a “‘limitation’” and had recognized a “‘constitutional command’” to “create a ‘system’ that ‘promote[s] the Progress of Science.’”) (quoting *Graham*, 383 U.S. at 506). See also *id.* at 213 (suggesting that the exercise of the copyright power is subject only to “rational basis” means-end review).

such patents would fail to promote “useful Arts” (the analogous limitation to the Statute of Monopolies addressed in *Boulton and Watt v. Bull*) or that such new knowledge is not a “Discover[y]” of “Inventors.”



## II. Theological and Philosophical Origins of the Exclusions for Science, Nature, and Ideas

Although the legal history is highly edifying, it does not ultimately explain why the American Congress and Supreme Court have chosen to follow the English precedent. Nor does it fully explain why scientific discoveries and nature are not properly the subject of patents (or private rights of exclusive property) and should be treated as prior art already in the public's possession and thus free for all to use. To do so, one must look behind the exposition provided by William Robinson, and trace the religious and philosophical origins of American patent law.

### A. Religion

#### 1. Relations Between God, Humans, Nature, and Technology

##### a. Greek and Early Judeo-Christian Conceptions of Nature and Technology

From the beginning, religions and mythology have sought to explain the physical universe and to provide security for humans by identifying their relation to it.<sup>508</sup> Perhaps the most prominent theme of mythology and religion has been that the world was created by some God<sup>509</sup> and that nature is to be used by humans with recognition of its moral significance as both a holy object and as a reflection of God. Thus, the very first business of the Bible states the “good” of the physical creation<sup>510</sup> and human's place in it as the stewards of nature:

In the beginning, God created the heavens and the earth.... God said, ‘Now we will make humans, and they will be like us. We will let them rule the fish, the birds, and all other living creatures.... Rule over the fish in the ocean, the birds in the sky, and every animal on the earth. I have

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<sup>508</sup> See, e.g., ARMSTRONG, *supra* note 28, at 6, 16 (noting that mythology helps “to explain current attitudes about our environment, neighbours and customs” and provided a bridge over the “metaphysical gulf between the sacred and the profane” providing “an absolute mode of being that was quite different from the vulnerable human state”); 1 NIEBUHR, *supra* note 28, at 131 (“the sense of dependence upon a reality greater and more ultimate than ourselves, gains the support of another form of ‘general’ revelation, the content of which is expressed in the concept of the Creator and the creation”). See generally PETER L. BERGER, *THE SACRED CANOPY: ELEMENTS OF A SOCIOLOGICAL THEORY OF RELIGION* (Anchor 1990) (discussing the *nomos* of socially constructed meaning underlying religions, which provides humans with emotional security).

<sup>509</sup> See ARMSTRONG, *supra* note 28, at 20-22 (describing origins of this myth in contemplation of the sky).

<sup>510</sup> Genesis 1:18, 1:21, 1:25, 1:31. See 1 NIEBUHR, *supra* note 28, at 134 (“Biblical religion consistently maintains the goodness of creation precisely on the ground that it is created by God. In this doctrine of the goodness of creation the foundation is laid for the Biblical emphasis on the meaningfulness of human history. History is not regarded as evil or meaningless because it is involved in the flux of nature, and man is not regarded as evil because he is dependent upon a physical organism. The doctrine of creation escapes the error of the naturalists who, by regarding causality as the principle of meaning, can find no place for human freedom and are forced to reduce man to the level of nature.”).

provided all kinds of fruit and grain for you to eat. And I have given the green plants as food for everything else that breathes.<sup>511</sup>

Significantly, nature itself has moral significance. Human morality derives from nature as God's creation, as the knowledge of right and wrong is acquired from nature by eating the fruit of the tree of Knowledge in the Garden of Eden.<sup>512</sup> But knowledge of morality came at a high price, as God made "enemies" of some of nature and humans, and placed the "ground ... under a curse" and made human's "struggle ... sweat" and die ("turn to soil") for having aspired to the same station of moral knowledge as God.<sup>513</sup> Nature created for humans to glorify God. When humans cease to do so, the result is arrogance,<sup>514</sup> a sin against God (the sin of Pride) which God punishes through nature.<sup>515</sup>

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<sup>511</sup> See *Genesis* 1:1, 1:26, 1:28. See also *Genesis* 2:15 ("The LORD God put the man in the Garden of Eden to take care of it and to look after it."); *Genesis* 5:1 ("God created men and women to be like himself."); *Genesis* 9:1-4 (placing the animal kingdom under human control and giving animals to humans for food).

<sup>512</sup> See *Genesis* 3:3-4 ("If we [even touch the fruit,] we will die.' 'No you won't!' the snake replied.... 'You will see what you have done, and you will know the difference between right and wrong, just as God does.'").

<sup>513</sup> *Genesis*, 3:15, 3:17-19. See ARMSTRONG, *supra* note 28, at 47 (explaining the origins of the "falling into agriculture" myth in Neolithic agricultural practices, reflecting both the dangers of human reproduction and the "backbreaking labour" of tilling the fields). This myth was reinterpreted by St. Augustine when the Roman Empire fell into a myth of original sin, that imposed inherited guilt and resulted in a "vision of reason dragged down by a chaos of sensations and lawless passion...." *Id.* at 112-13. See generally ELAINE PAGELS, ADAM, EVE, AND THE SERPENT 98-126 (Vintage Books 1998) (discussing Augustine's reinterpretation); *id.* at 129-31 (discussing how Augustine prevented the adoption of the views on the Fall myth of Pelagius and others, who were influence by Greek science and philosophy and argued that humans had not brought death on themselves but rather that death "was in the nature of things, despite the clear statement to the contrary in Genesis," because God would not have punished all humanity for Adam's sin).

<sup>514</sup> See *Deuteronomy* 8:10-14, 17-18 ("Moses said to Israel: After you eat and are full, give praise to the LORD your God for the good land he gave you. Make sure that you never forget the LORD or disobey his laws and teachings that I am giving you today. If you always obey them, you will have plenty to eat and you will build good houses to live in. You will get more and more cattle, sheep, silver, gold, and other possessions. But when this happens, don't be proud! Don't forget that you were once slaves in Egypt and that it was the LORD who set you free.... When you become successful, don't say, 'I'm rich and I've earned it all myself.' Instead, remember that the LORD your God gives you the strength to make a living. That's how he keeps the promise he made to your ancestors."); Rabbi Noah Weinberg, Don't Believe In Any Other Power, [http://www.aish.com/spirituality/foundations/2\\_-\\_Dont\\_Believe\\_In\\_Any\\_Other\\_Power.asp](http://www.aish.com/spirituality/foundations/2_-_Dont_Believe_In_Any_Other_Power.asp) (last visited Sept. 25, 2006) ("As ludicrous as it is, people often take credit for the natural abilities they are born with.... Don't ever let your natural abilities become a source of arrogance. Instead, thank God for the gift.... The strongest arrogance of all is 'Look how good I am. I'm doing the right thing.'"). Thus, in perhaps the most fundamental statement regarding human morality, God ultimately restores Job to well-being after having allowed Satan (the originator of sin in pride) to take away all that Job had, when (after God has recounted his omnipotent power) Job renounces his claim to morality by admitting his relative lack of power. See *Job* 42:1- ("Job said: No one can oppose you, because you have the power to do what you want. You asked why I talk so much when I know so little. I have talked about things that are far beyond my understanding. You told me to listen and answer your questions. I heard about you from others; now I have seen you with my own eyes. That's why I hate myself and sit here in dust and ashes to show my sorrow."); *id.* 42:10, 12 ("the LORD made Job twice as rich as he had been before.... The LORD now blessed Job more than ever"). See generally JOHN T. WILCOX, THE BITTERNESS OF JOB: A PHILOSOPHIC READING (U. Mich. Press 1989).

<sup>515</sup> See *Genesis* 6:5-7, 6:12-13, 7:17-23, 8:21, 9:9-17 (describing the reasons for the Flood, its effects, and God's promises of security from extinction); 1 NIEBUHR, *supra* note 28, at 179 ("Man is insecure and involved in natural contingency; he seeks to overcome his insecurity by a will-to-power which overreaches

“In Mesopotamian myth, the Flood marks the beginning of the gods’ withdrawal from the world.... But the story also celebrates the *divinely inspired* technology that had saved the human race from extinction.”<sup>516</sup> In contrast, God remained present in Judeo-Christian culture, even if otherwise during the Axial Age “the gods had begun their retreat from the human world.”<sup>517</sup> The Israelite confidence in the superior power and presence of Yahweh thus led Second Isaiah to “link[] the primordial actions of his god with current events.”<sup>518</sup>

Another prominent theme of mythology and religion has been that humans should not employ technology to aspire above their station to the prerogatives of the Gods. Thus, in Greek mythology, one finds the story of Daedalus and his son Icarus, who flew “too high”<sup>519</sup> using the wing technology developed by his father. Daedalus was recognized as a master architect and inventor. Having disregarded his father’s warning that the sun might melt the glue on the wings, “the delight of this new and wonderful power went to the boy’s head. He soared exultingly up and up, paying no heed to his father’s anguished commands. Then he fell.”<sup>520</sup>

Similarly, Prometheus, a Titan who had helped the God Zeus to conquer the Titans led by Zeus’ father Chronos, and Prometheus’ brother Epimetheus were responsible for making humans. After Epimetheus had given all the good natural properties to other animals, Prometheus “fashioned them in a nobler shape” than the other animals (making humans walk “upright like the gods”) and gave humans fire (*i.e.*, technology) for security, “and therefrom Learns many crafts.” Prometheus cared so much for humans (then men) that he fooled Zeus by cutting up a sacrificial ox, hiding the

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the limits of human creatureliness.... He assumes that he can gradually transcend finite limitations until his mind becomes identical with universal mind. All of his intellectual and cultural pursuits, therefore, become infected with the sin of pride.”). In contrast to the Augustinian vision of the Fall, Julian of Eclanum, an Italian Bishop, wrote a point-by-point refutation of Augustine’s Confessions to support Pelagius. Significantly, Julian differed from Augustine in seeing God’s punishment as specific to Adam and Eve, and the adverse consequences described in Genesis as either inherent in nature or augmented only for Adam and Eve. See PAGELS, *supra* note 503, at 129-40. Anticipating Nietzsche, Julian treated the bad of nature as simply an existing fact, arguing that Augustine “defends natural evil ... against the truth of the Catholic faith.” *Id.* at 136 (citation omitted). See FRIEDRICH NIETZSCHE, BEYOND GOOD AND EVIL (1885). God’s curse on nature was thus the projection of “anger, grief, and terror” of a person – Adam – who was spiritually dying from his immoral choices, and that transforms the sinner’s relation to nature so that he “actually experiences life as unremitting misery.” *Id.* at 138 (citing Genesis 4:11 for the placement of Cain “into an antagonistic relationship with the earth”). Because Augustine’s vision prevailed, the flood “became a metaphor for political and social dissolution,” required because the “maintenance of civilization seemed to require a heroic effort against the willful and destructive powers of nature.... The new urban mythology saw the Flood as marking a crisis in divine-human relations.” ARMSTRONG, *supra* note 28, at 62-63.

<sup>516</sup> ARMSTRONG, *supra* note 28, at 64.

<sup>517</sup> *Id.* at 76.

<sup>518</sup> ARMSTRONG, *supra* note 28, at 97 (citing *Isaiah* 43:11-12).

<sup>519</sup> Cf. ARMSTRONG, *supra* note 28, at 22-23, 27 (“Height has remained a mythical symbol of the divine.... Myths about flight and ascent have appeared in all cultures, expressing a universal desire for transcendence and liberation from the constraints of the human condition.... [O]ne of the essential yearnings of humanity is the desire to get ‘above’ the human state.”).

<sup>520</sup> EDITH HAMILTON, MYTHOLOGY: TIMELESS TALES OF GODS AND HEROES 139-40 (NAL Penguin 1969) (1940) (citing Ovid and Apollodorus).

meat, and getting Zeus to choose a pile of bones covered with fat, assuring that humans would get the best of nature. Zeus was so angered by the trick that he punished humans by creating the first woman, Pandora, who through Epimetheus' failure to follow Prometheus' warning released the plagues from the box where they had been stored (but saved "Hope ... the only good the casket had held among the many evils, and it remains to this day mankind's sole comfort in misfortune"). Zeus then punished Prometheus for both the trick and for having given "to mortals honor not their due," having his servants Force and Violence bind Prometheus to a rock. Zeus subsequently sent Hermes to threaten Prometheus with having his body continuously torn "to rags" by an eagle unless Prometheus disclosed (with his foresight) who the son of Zeus would be that fate had declared would "dethrone [Zeus] and drive the gods from their throne in heaven." Prometheus, knowing that "he had served Zeus well and that he had done right to pity mortals in their helplessness" refused to submit his morality to Zeus' power, as there was "no force which can compel [his] speech." Although Prometheus suffered for generations, he was eventually released when the Centaur Chiron accepted the suffering of Prometheus by dying for him, after which Hercules slew the eagle and freed Prometheus from his bonds, and Zeus was willing to have this done. Although it was not known what caused Zeus to repent the punishment, "[o]ne thing, however, is certain: in whatever way the two were reconciled, it was not Prometheus who yielded."<sup>521</sup>

The problem with excessive reliance on technology was that it caused humans to aspire to divinity and usurp the prerogatives of the gods. Hubris thus was punished by the gods. Hubris, however, also applied in the human sphere, when people did not show sufficient concern for their neighbors. Thus, Narcissis focused on his own beauty and refused the love of Echo and others, causing one whom he scorned to pray to the Gods that "he who loves not others love himself," which punishment was granted by Nemesis ("Righteous Anger"), the Muse of divine order who became associated with punishment for hubris against the Gods.<sup>522</sup>

Although the Greeks ultimately developed philosophical systems based on *logos* (or rational thought) in opposition to mythological explanations, they continued to employ myths "as indispensable to religious discourse" regarding the "Good ... [as] the source of both Being and Knowledge."<sup>523</sup> In the Greek rational thought of the *logos* developed by Aristotle, "[t]he order and intelligibility of the world were due to the eternal

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<sup>521</sup> *Id.* at 66-73. Cf. PERCY B. SHELLEY, *PROMETHEUS UNBOUND* (1820) (treating Jupiter – Zeus – as a creation of Prometheus' mind and will); GLOVER, *supra* note 34, at 147 (Shelley metaphysically unbound Prometheus in reflection of the modern secular humanism of the age). Prometheus' "sin" was thus the elevation of humans above their station, or being the cause of hubris. The descent of a God – Chiron – into death to free (here the benefactor of) humans from punishment resulting from hubris has obvious parallels to Christian theology of the Fall and the resurrection. See, e.g., *Luke* 23:39 to 24:27; *John* 12:44-50; 1 *Peter* 3:18.

<sup>522</sup> HAMILTON, *supra* note 510, at 87-88. See Wikipedia, *Nemesis (Mythology)*, [http://en.wikipedia.org/wiki/Nemesis\\_\(mythology\)](http://en.wikipedia.org/wiki/Nemesis_(mythology)) (last visited Sept. 25, 2006) (Nemesis "is the spirit of divine retribution against those who succumb to hubris, vengeful fate personified as a remorseless goddess.... The word *Nemesis* originally meant the distributor of fortune, neither good nor bad, simply in due proportion to each according to his deserts; then, *nemesis* came to suggest the resentment caused by any disturbance of this right proportion, the sense of justice which could not allow it to pass unpunished.").

<sup>523</sup> ARMSTRONG, *supra* note 28, at 102-03.

forms that existed in its objects and made them definable. Knowledge was the perception of these forms by the mind.”<sup>524</sup> Greek scientific knowledge was empirical in that it was based on observation to grasp intelligible essences, but such essences were not subject to challenge by empirical verification. As a result, Greek science (and subsequently Moslem science which appropriated Aristotle’s understanding) stagnated.<sup>525</sup>

In the late middle-ages, Christian theology based on the Biblical account of God’s creation began to afford a very different account of nature and thus of science. The 1277 Council of Paris called by Étienne Tempier, Bishop of Paris, at the instigation of the Pope, rejected the Aristotelian understanding of essences, establishing the created world as contingent and as depending on continuing acts of God’s will for its existence.<sup>526</sup> Thus, as recognized by the late-medieval nominalists like William of Ockham, since God’s will was not restrained by any “necessity of his own nature” (which constituted the “Averroistic heresy”), the natural order that God established could not “be known by deduction from any principles whatsoever but only by observation or revelation.”<sup>527</sup> Recognition of the implications of this change in approach took centuries to accomplish the insights of Galileo (who may have benefited from 14<sup>th</sup> Century work in kinetics and dynamics performed in Paris and at Merton College in Oxford). Biblical theology thus generated the scientific method of empiricism,<sup>528</sup> which after Galileo crossed the English channel along with imported technologies from Italy (and other parts of the Continent), propelling both the Industrial Revolution and patents of invention.<sup>529</sup>

Similarly to Greek theology, moreover, in Biblical theology God’s retribution occurs when humans seek to use technology to aspire to excessive fame and security. Before building the tower of Babel, humans had “spoke[n] the same language”; after

<sup>524</sup> GLOVER, *supra* note 34, at 80 (Mercer 1984).

<sup>525</sup> *See id.* at 80-81.

<sup>526</sup> *See id.* at 80-83 (citing Pierre Duhem, *Études sur Leonard de Vinci* (Paris 1906-13), and Pierre Duhem, *Le Système du monde, Histoire des doctrines cosmologiques de Platon à Copernic* (Paris 1913-17)). *See* 1 NIEBUHR, *supra* note 28, at 133 (“The Biblical doctrine of the creator, and the world as His creation, is itself not a doctrine of revelation, but it is basic for a doctrine of revelation. It expresses perfectly the Basic Biblical idea of both the transcendence of God and His intimate relation to the world.... The Bible retains this ‘primitive’ concept [of moulding clay] because it preserves and protects the idea of the freedom of God and His transcendence. These are lost or imperiled by the more rational concept of ‘first cause’ (which takes the place of God in naturalistic philosophies), and of the concept of a form-giving *nous*, (which is the basic conception of divinity in idealistic philosophies).”). *See generally* JOHN DUNS SCOTUS, *GOD AND CREATURES: THE QUODLIBETAL QUESTIONS* (Felix Alluntis & Allan B. Wolter trans., Princeton U. Press 1975) (c. 1307-08); Stanford Encyclopedia of Philosophy, John Duns Scotus (Aug. 26, 2004), <http://plato.stanford.edu/entries/duns-scotus/> (last visited Sept. 25, 2006) (Scotus agreed with Thomas Aquinas that all knowledge of God comes from knowledge of creatures, through reasoning from effect back to cause, but disagreeing with Aquinas in that we can apply the same terminology with the same meaning to God as to creatures).

<sup>527</sup> GLOVER, *supra* note 34, at 83.

<sup>528</sup> *See id.* at 85-87.

<sup>529</sup> *See, e.g.*, BUGBEE, *supra* note 10, at 14-15, 29 (describing patents of importation granted in 1234 and 1449, and the 1559 petition of Giacopo Acontio (Jacobus Acontius) to Queen Elizabeth, S.P. 15/9 #39, requesting a grant of exclusive rights for twenty years based, as “those who by searching have found out things useful to the public should have some fruit of their ... labours.”); (describing the policy of William Cecil, Lord Burghley, to have Queen Elizabeth issue patents for imported inventions as an industrial policy to bring new technology from the Continent to England).

moving to Babylonia some sought to “build a city with a tower that reaches to the sky!... We’ll become famous, and we won’t be scattered all over the world.”<sup>530</sup> This was viewed by the ancient Israelites as “the epitome of pagan hubris, motivated solely by a desire for self-aggrandisement.”<sup>531</sup> To avoid having humans “do anything they want” God “confuse[d] them by making them speak different languages.... [and] scatter[ing] them all over the earth.”<sup>532</sup>

Beginning in the 16<sup>th</sup> Century, scientific progress provided humans with substantial control over nature, leading to “an intellectual ‘enlightenment’ that denigrated myth as useless, false, and outmoded.”<sup>533</sup> As a result of this alienation and of overt efforts “to emancipate science from the shackles of mythology,” Western Christian religion was transformed.<sup>534</sup> God was not eliminated, but rather was sought to be proved “the great ‘Mechanick’ who had brought the intricate machine of the universe into being.”<sup>535</sup> In this context, of post-Enlightenment English Protestantism that the American Puritan religion arose. And in that context, the sin of Pride was a constant focus and concern, even for the Deists.<sup>536</sup>

b. American Puritanism, Nature, and Technology

“The fact that the American colonies were English colonies meant, first of all, that the colonists in background if not always in active affiliation would be predominantly Protestant.”<sup>537</sup> However, American Protestantism, unlike the predominant Anglicanism in England was pluralistic, including (among others) Presbyterians, Congregationalists, Baptists, Anglicans, and Quakers, all “diverse in [their] outward ecclesiastical form[s] ... within the limits of the common faith of English Puritanism.”<sup>538</sup>

English Puritanism was characterized by its evangelical spirit, “which sprang from a transforming experience of God’s grace and a consequent dedication to warfare against sin,” and in America stressed “the importance of personal religious experience” and rejected the notion that Christian life involved merely observing outward formalities of religion.<sup>539</sup> English Protestantism after the Reformation had placed an emphasis on the “priesthood of believers and its appeal to the plain testimony of Scripture,”<sup>540</sup> *i.e.*, on the

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<sup>530</sup> *Genesis* 11:1-4.

<sup>531</sup> ARMSTRONG, *supra* note 28, at 60. In contrast, the early Mesopotamian city dwellers “saw the city as a place where they could encounter the divine.” *Id.*

<sup>532</sup> *Genesis* 7:9.

<sup>533</sup> ARMSTRONG, *supra* note 28, at 121. *See id.* at 122.

<sup>534</sup> *Id.* at 124. *See id.* at 123-25 (citing FRANCIS BACON, *ADVANCEMENT OF LEARNING* (1605)).

<sup>535</sup> *Id.* at 125 (citing Isaac Newton).

<sup>536</sup> *See* GLOVER, *supra* note 34, at 115 (“The Christian conception of sin is not a simple, pragmatic judgment regarding the prevalence of immorality; it is a highly sophisticated doctrine of the relationship of God and man. Sin is man’s willful independence of God. Its result is alienation from God and the centering of each human life falsely in the man himself.”).

<sup>537</sup> HUDSON, *supra* note 31, at 6.

<sup>538</sup> *Id.* at 7.

<sup>539</sup> *Id.* at 60, 78.

<sup>540</sup> *Id.* at 12.

ability of individual church members to determine right and wrong.<sup>541</sup> The early Calvinists from whom American Protestants were descended possessed “a firm confidence in God’s overruling providence and ... a strong conviction that the chief end of man is to glorify God...”<sup>542</sup> Puritanism reflected a particular strain of evangelical Protestantism, which placed God’s providence as actively at work in the natural and human world. “The heart of covenant theology was the insistence that God’s predestinating decrees were not part of a vast impersonal and mechanical scheme, but that, under the Gospel dispensation, God had established a covenant of grace with the seed of Abraham. This was to be appropriated in faith, and hence was irreducibly personal... [and] would come as an individuated personal encounter with God’s promises.”<sup>543</sup>

Unlike the national church in England, the American churches were formed by individual clergymen relying on their congregations, who quickly decided things by majority control. Given the religious diversity that was present in America, moreover, America became a locus of religious toleration.<sup>544</sup> Nevertheless, as English colonists, Americans inherited an understanding of “the course of history as predetermined by God’s overruling providence.”<sup>545</sup> Thus, the colonization of America was part of God’s plan to redeem humanity by establishing a model society implementing God’s will in the wilderness and thus to demonstrate to the world how to live “in open covenant with God.”<sup>546</sup> During the Great Awakening that began around 1740, America itself became understood as a work of God’s redemptive spirit leading to a new age.<sup>547</sup> And the Awakening “contributed greatly to the development of a sense of cohesiveness among the American people.... [George] Whitefield, [William] Tennent, and [Jonathan] Edwards were rallying names for Americans a full three decades before Washington, Jefferson, Franklin and Samuel Adams became familiar household names.”<sup>548</sup>

In the middle of the 18<sup>th</sup> Century, Jonathan Edwards theology was becoming well-known. In the early part of the Century, Edwards had had a personal conversion experience that “involved a genuinely new kind of vision of God’s visible glory in every

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<sup>541</sup> See, e.g., Marv Knox & Greg Warner, *Debate over believer’s priesthood reveals tension between individual, community*, Nov. 2, 2004, <http://www.abpnews.com/1132.article> (last visited Sept. 25, 2006) (discussing differences between the priesthood of the believer or of the believers, the former “the idea each individual Christian is capable of reading and interpreting Scripture and no mediator other than Jesus Christ stands between the believer and God,” the latter “the idea that our interpretation of Scripture should take into account what the church has taught through the ages, such as through creeds and statements of faith”)

<sup>542</sup> HUDSON, *supra* note 31, at 84. See generally 1 AQUINAS, *supra* note 28, at 120-25 (Q.22 “The Providence of God”) (discussing “four points of inquiry: (1) Whether providence is suitably assigned to God? (2) Whether everything comes under divine providence? (3) Whether divine providence is immediately concerned with all things? (4) Whether divine providence imposes any necessity on things foreseen?”).

<sup>543</sup> AHLSTROM, *supra* note 31, at 133.

<sup>544</sup> See HUDSON, *supra* note 31, at 23-58.

<sup>545</sup> *Id.* at 19 (citing JOHN FOXE, BOOK OF MARTYRS (1571)).

<sup>546</sup> *Id.* at 20.

<sup>547</sup> See *id.* at 21 (citing Jonathan Edwards, *Work of Redemption*, in II THE WORKS OF JONATHAN EDWARDS 153, 158 (Worcester, Mass. 1808-09)).

<sup>548</sup> *Id.* at 76-77.

aspect of the natural world.... In this frame of mind he began his appropriation of Locke... [and] of conforming his inherited Puritanism to a larger manner of apprehending the world.”<sup>549</sup> This would lead by 1746 to his efforts to provide an answer to the question of the origins of religious emotional experience. For Edwards, “the first objective grounds of gracious affections, is the transcendently excellent and amiable nature of divine things, as they are in themselves, and not any conceived relation they bear to self, or self-interest.... What makes men partial in religion is, that they seek themselves, and not God, in their religion.”<sup>550</sup>

Thus, for Edwards, contemplation of nature generated true religion and morality, because nature exists in itself and not for selfish human purposes.<sup>551</sup> More importantly, Edwards argued that nature was causal and that human action could not reflect free will or God would be shut out of the world.<sup>552</sup> Thus, “if once it should be allowed, that things may come to pass without a cause, we should not only have no proof of the being of God, but we should be without evidence of the existence of anything whatsoever, but our own immediate present ideas and consciousness... and so all means of our knowledge is gone.”<sup>553</sup> God’s presence in the world was not only the necessary ground for scientific knowledge but human will (and thus moral action) was the causal result of a deterministic human nature (tainted by original sin and expressed in history in the ‘undeniable truth ... that sin and death are everywhere.’<sup>554</sup>

Further, Edward’s justification for his views on original sin was grounded in his belief that God was continually present in nature.<sup>555</sup> “God not only created all things, and gave them being at first, but continually preserves them, and upholds them in being.”<sup>556</sup> Of even greater relevance here, the presence of God in nature led to the grounds for moral action regarding nature (based on Christian Platonism).<sup>557</sup> Nature exists so that

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<sup>549</sup> AHLSTROM, *supra* note 31, at 299.

<sup>550</sup> JONATHAN EDWARDS, A TREATISE CONCERNING RELIGIOUS AFFECTIONS 393-94 (John E. Smith ed. Yale U. Press 1959) (1746).

<sup>551</sup> Cf. John E. Smith, *Christian Virtue and Common Morality*, in THE PRINCETON COMPANION TO JONATHAN EDWARDS 155 (Sang Hyun Lee ed., Princeton U. Press 2005) (“In short, love to Being in general is the ultimate ground of virtue; to suppose any other object to fill this role is to be involved in an infinite regress.”).

<sup>552</sup> See AHLSTROM, *supra* note 31, at 305-06.

<sup>553</sup> JONATHAN EDWARDS, A CAREFUL AND STRICT ENQUIRY INTO THE MODERN PREVAILING NOTIONS OF THAT FREEDOM OF WILL, WHICH IS SUPPOSED TO BE ESSENTIAL TO MORAL AGENCY, VIRTUE AND VICE, REWARD AND PUNISHMENT, PRAISE AND BLAME 183 (Paul Ramsey ed., Yale U. Press 1957) (1754).

<sup>554</sup> AHLSTROM, *supra* note 30, at 307 (citing Jonathan Edwards, *The Great Christian Doctrine of Original Sin Defended*, in 2 JONATHAN EDWARDS, THE WORKS OF JONATHAN EDWARDS (1957) (1758). See *id.* at 306-08.

<sup>555</sup> Cf. L. BERKHOFF, SYSTEMATIC THEOLOGY 134 (William B. Eerdmans, 2d ed. 1946) (explaining a fundamental tenet of Calvinism that “While God gave the world an existence distinct from His own, He did not withdraw from the world after its creation, but remained in the most intimate connection with it. The universe is not like a clock which was wound up by God and is now allowed to run off without any further divine intervention. This deistic conception of creation is neither biblical nor scientific.”).

<sup>556</sup> Edwards, *supra* note 543, at 487-88.

<sup>557</sup> See AHLSTROM, *supra* note 31, at 308-10.



people can learn about it *and thereby glorify God*, which is the purpose of God having created nature and humans in the first place.<sup>558</sup>

The great and last end of God's works ... is indeed but *one*: and this *one* end is most properly and comprehensively called, THE GLORY OF GOD... and is fitly compared to an effulgence or emanation of light.... The emanation or communication of the divine fullness, consisting in the knowledge of God, love to God, and joy in God, has relation indeed both to God and the creature; but it has relation to God as its fountain; and as the communication itself, or thing communicated, is something divine.... In the creature's knowing, esteeming, loving, rejoicing in, and praising God, the glory of God is both exhibited and acknowledged; his fullness is received and returned. Here is both *emanation* and *remanation*. The refulgence shines upon and into the creature, and is reflected back to the luminary.... So that the whole is *of* God, and *in* God, and *to* God, and God is the beginning, middle, and end in this affair.<sup>559</sup>

Stated differently, science and the understanding of nature are holy enterprises. The knowledge of nature is God's work, and therefore is not for profane concepts of ownership. Such profane concepts would constitute the ultimate hubris against God's purposes.

In the second half of the 18<sup>th</sup> Century, the followers of Jonathan Edwards, including Joseph Bellamy, Samuel Hopkins, Jonathan Edwards Jr., and began to preach a New England Theology of a very strong form of Protestantism, which was rewarded at the end of the 18<sup>th</sup> Century with the Second Great Awakening.<sup>560</sup> New England Theology was a "bleak and cruel Calvinism" of "theology *plus* an independent set of 'duties'" that eventually gave way at the end of the Century to "a humanized liberalism."<sup>561</sup> As noted by Paul Tillich,

[t]he Protestant principle ... is the theological expression of the true relation between the unconditional and the conditioned or, religiously speaking, between God and man.... The Protestant principle ... is the

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<sup>558</sup> See BERKHOFF, *supra* note 545, at 135-36 (describing the two answers to the "final end of God in Creation" as (1) "the happiness of man or of humanity," which originated in the "earlier philosophers, such as Plato, Philo, and Seneca" based on the desire of God "to communicate Himself to His creatures; their happiness was the end He had in view" – and although not stated by Berkhoff, this conception was resurrected as utilitarianism -- and (2) "the declarative glory of God," or "the external manifestation of His inherent excellency," as "God did not create first of all to receive glory, but to make His glory extant and manifest," which manifestation "is not intended as an empty show, a mere exhibition to be admired by the creatures, but also aims at promoting their welfare and perfect happiness.... [by] attune[ing] their hearts to the praises of the Creator, and to elicit from their souls the expression of their gratefulness, love and adoration").

<sup>559</sup> Edwards, *supra* note 544.

<sup>560</sup> See AHLSTROM, *supra* note 31, at 403-14 (discussing New England Theology); *id.* at 415-28 (discussing the Second Great Awakening).

<sup>561</sup> AHLSTROM, *supra* note 31, at 413 (quoting JOSEPH HAROUTUNIAN, PIETY VERSUS MORALISM: THE PASSING OF THE NEW ENGLAND THEOLOGY 127, 176, 127 (Henry Holt 1932)).

guardian against the attempts of the finite and conditioned [man] to usurp the place of the unconditional [God] in thinking and acting. It is the prophetic judgment against religious pride, ecclesiastical arrogance, and secular self-sufficiency and their destructive consequences.<sup>562</sup>

In short, the New England Theologists preached that grace, not faith or works, led to salvation and that the developing scientific rationalism of England, expressed in competing American rationalist theologies and resulting from the influence of Isaac Newton, John Locke, and John Taylor,<sup>563</sup> represented hubris that must be stamped out. As framed by the New England Theology, the “truth that man’s redemption was effected by God’s sovereign grace alone was to be defended at whatever cost to human pride, and all attempts to substitute man’s moral attainments for the righteousness that comes only as a gift were to be resolutely opposed.”<sup>564</sup>

The New England Theology was not uniformly accepted. In particular, the “Deists” (particularly Thomas Jefferson and Benjamin Franklin) had developed from the religious “rationalism” associated with the Enlightenment (“that the ‘essentials’ of true religion are those truths which can be known by human reason without the aid of any special revelation”) and developed by John Locke (who had based his equality theory and thus his property rights conceptions on religion rather than reason).<sup>565</sup> However, until very late in the 18<sup>th</sup> Century, Deism was largely “confined to an aristocratic elite who frowned upon any widespread dissemination of their views because they believed that the ‘superstitions’ of revealed religion did little harm and actually had the beneficial effect of

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<sup>562</sup> PAUL TILlich, THE PROTESTANT ERA Ch. 11, available at <http://www.religion-online.org/showchapter.asp?title=380&C=98> (U. Chicago Press 1948).

<sup>563</sup> See, e.g., AHLSTROM, *supra* note 31, at 354 & n.9 (“Utilitarianism, materialism, and atheism seemed to be building great empires in European thought with weapons drawn from Locke.... These radical tendencies ... became increasingly important with the passing years, especially in France.... In provincial America, however, radical views had very few advocates.”).

<sup>564</sup> HUDSON, *supra* note 31, at 79.

<sup>565</sup> *Id.* at 93 (citing JOHN LOCKE, REASONABLENESS OF CHRISTIANITY (1695)). See WALDRON, *supra* note 37, 12-14 (basic equality of humans “a moral and political premise. It was not just a preference or a pragmatic rule-of-thumb; nor was it simply a ‘dictate of reason,’ like Hobbes’s precepts ‘that no man by deed word countenance or gesture, declared hatred or contempt of another’ and ‘that every man acknowledge another for his equal.’ Locke accorded basic equality the strongest grounding that a principle could have: it was an axiom of theology, understood as perhaps the most important truth about God’s way with the world in regard to the social and political implications of His creation of the human person.... ‘Jesus Christ (and Saint Paul) may not appear in person in the text of the *Two Treatises* but their presence can hardly be missed when we come upon the normative creaturely equality of all men in virtue of their shared species-membership.’ I actually don’t think it is clear that we – now – can shape and defend an adequate conception of basic human equality apart from some religious foundation. And I think it is quite an open question how specific, or sectarian, or scriptural, such a foundation has to be.”) (citations omitted); I NIEBUHR, *supra* note 28, at 136-37 (“The historical revelation ... is rather the record of those events in history in which faith discerns the self-disclosure of God.... In personal life the moral experience consists of the sense of moral obligation as being laid upon man not by himself, nor yet by his society but by God; as a judgment upon man for failing in his obligation; and finally as the need for reconciliation between man and God because of the estrangement resulting from man’s rebellion against the divine will.”). Locke’s views on property and their grounding in religious obligations of self-preservation and thus the need for rivalrous depletion to justify exclusion are discussed further below. See *infra* notes \_\_\_-\_\_\_ and accompanying text.

promoting morality....”<sup>566</sup> Although an aggressive Deism that attacked all revealed religion was being promoted after the Constitution was signed by Thomas Paine, Ethan Allen, and Elihu Palmer, Deism “had no deep rootage” and the experience of the French Revolution after 1793 led Americans to reject Deism.<sup>567</sup>

In any event, the Deists were not opposed to the New England Theology on the origins of the universe and thus on the ethical implications of nature and technology. Thus, Yale University’s rector based his education for ministers “upon the deistic [moral philosophy of William] Wollaston’s *Religion of Nature*.”<sup>568</sup> Thus, he taught that “reason was insufficient as the basis of moral obligation,” and that when God makes a creature God “communicates to him some degree of his own perfection.”<sup>569</sup> This can be understood by evaluating the Deistic theology of Benjamin Franklin.

[I]t is clear that Franklin’s reflection on William Wollaston’s *Religion of Nature Delineated* ... first led him to atheism, not to deism. And the deism which he ultimately ... did arrive at... is usually contrasted to pietism; but, “‘religion of the heart’ rather than ‘religion of doctrine’ certainly epitomizes Franklin’s approach to God.”<sup>570</sup>

Wollaston, like other rationalists, understood God as having created nature but as being “non-interventionist,” and thus built an ethical system based on “‘an obligation to do what ought not to be omitted,’” by looking “to the facts of reality for the distinction between good and evil.”<sup>571</sup> Wollaston based his *moral* understanding of property rights (“‘the sole right of using and disposing’”<sup>572</sup>) on the individuation of the body. Bodies constituted nature localized and owned by a particular person, whose moral obligation was to promote his or her own happiness, according to personal sentiments or pleasures that other people might not know.<sup>573</sup> Individuation of bodies created individuation of the results of the labor of the body, which was the source of property. “And if C [a person who did not produce the object by labor] should pretend any property in that which B only can truly call his, he would act contrary to *truth*.”<sup>574</sup>

Because such property was based on the law of nature (“natural law”), rather than grounded in acts of government, such for Wollaston property rights existed in the “‘state of nature,’” contrary to the competing understanding of Thomas Hobbes that “‘every man has a right to every thing; even to one another’s body.’”<sup>575</sup> Unlike John Locke, however,

<sup>566</sup> HUDSON, *supra* note 31, at at 131-32.

<sup>567</sup> *Id.* at 132.

<sup>568</sup> Riley, *supra* note 29, at 475 (citing WOLLASTON, *supra* note 37).

<sup>569</sup> *Id.*

<sup>570</sup> Edwin S. Gaustad, *Benjamin Franklin and Nature’s God*, 25 Wm. & Mary Q. 320, 321 (1968) (citing ALFRED O. ALDRIDGE, *BENJAMIN FRANKLIN AND NATURE’S GOD* 266 (Duke U. Press 1967)).

<sup>571</sup> George H. Smith, *William Wollaston on Property Rights*, 2 J. LIBERTARIAN STUDIES 217, 218 (1978) (citing WOLLASTON, *supra* note 37, at 25-26). Thus, the “‘ought’” can be derived from the “‘is.’” *Id.*

<sup>572</sup> *Id.* at 219 (citing WOLLASTON, *supra* note 37, at 136).

<sup>573</sup> *See id.* Cf. MILL, *supra* note 30.

<sup>574</sup> Smith, *supra* note 561, at 220.

<sup>575</sup> *Id.* at 220-21 (citing THOMAS HOBBS, *LEVIATHAN* 103 (Micahel Oakeshott ed., 1970) (1660)).

who believed that God had given all land to humans in common, Wollaston believed that unoccupied land “rightfully belongs to the ‘first possessor,’ as it required the “‘cultivation and labor of the first possessor.’”<sup>576</sup> But unlike the scientific principles on which the clockwork of nature operated and which God had provided,<sup>577</sup> labor transformed the land and made it the subject of property.

This capacity of the order of nature ordained by God to be treated in independence of theology ironically led to its being absolutized into a new world order in which the mechanistic methods of science were converted into a mechanistic metaphysics. That conversion was a very complicated development, the history of which has not yet been unraveled.<sup>578</sup>

Thus, William Blackstone had clearly excluded science and nature from objects subject to private property, not by denying labor but because these were things required to be held in common free for all who came upon them to use, and based on the belief that understanding nature was the purpose of life.

God, when he created matter ... established certain rules for the perpetual direction ... so when he created man, and endued him with freewill to conduct himself in all parts of life, he laid down certain immutable laws of human nature, whereby that freewill is in some degree regulated and restrained, and gave him also the faculty of reason *to discover the purport of those laws.*

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But, after all, there are some few things, which notwithstanding the general introduction and continuance of property, must still unavoidably remain in common; being such wherein nothing but an usufructuary property is capable of being had; and therefore they still belong to the first occupant, *during the time he holds possession of them, and no longer.* Such (among others) are the elements of light, air, and water; which a man may occupy by means of his windows, his gardens, his mills, and other conveniences;: such also are the generality of those animals which are said to be *ferae naturae* ... which any man may seize upon and keep for his own use or pleasure. All these things, so long as they remain in possession, every man has a right to enjoy without disturbance; *but if once they escape from his custody, or he voluntarily abandons the use of them,* they return to the common stock, and any man else has an equal right to seize and enjoy them afterwards.<sup>579</sup>

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<sup>576</sup> *Id.* at 221 & n.21 (citing LOCKE, *supra* note 36, at 327-28, and WOLLASTON, *supra* note 37, at 136).

<sup>577</sup> See GLOVER, *supra* note 34, at 110 (noting the three central tenets of deism as a belief in “(1) a watchmaker God who had created the word as a perfect machine in the workings of which he no longer needed to intervene; (2) moral law, which was a part of the law of nature; and (3) an afterlife of rewards and punishments.”).

<sup>578</sup> *Id.* at 93.

<sup>579</sup> 1 BLACKSTONE, *supra* note 36, at 39-40 (emphasis added); 2 BLACKSTONE, *supra* note 36, at 14 (emphasis in original and emphasis added). See also 1 BLACKSTONE, *supra* note 36, at 8 (“what is it that gave a man an exclusive right to retain in a permanent manner that *specific* land which before belonged

The Enlightenment therefore was based on a contradiction that “a progress based on science could hardly ‘owe nothing’ to the nature which is the object of scientific study.” This contradiction was made manifest by the French Revolution, where “there was a radical disagreement as to what cultural values were to prevail; in this situation appeals to Nature and Reason were revealed as so much empty rhetoric without any power to resolve the conflicts.”<sup>580</sup> As Reinhold Niebuhr has noted:

The mistake of the Renaissance was to overcome the freedom and the power of man in history. This power and freedom in history is ambiguous.... Yet his ability to make decisions in history depends upon this same sphere of transcendence. Any individual who is completely immersed in the historical process is naturally forced to accept the moral, political, and religious norms which the caprices of that process make definitive at a given moment.... An irrevocable defeat of a socio-historical cause which gives meaning to the life of the individual must create a complete sense of meaninglessness unless the individual is sustained by a religion which interprets such defeats from the aspect of the eternal. If, however, the eternity to which the individual flees is an undifferentiated realm of being, which negates all history and denies its significance, the individual is himself swallowed up in that negation, as the logic of mysticism abundantly proves. Consequently it is only in a prophetic religion, such as Christianity, that individuality can be maintained. This faith alone does justice to both the natural and the spiritual bases of individuality.<sup>581</sup>

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generally to every body, but particularly to nobody.... [I]t is agreed upon all hands that occupancy gave also the original right to the permanent property in the *substance* of the earth itself... Grotius and Puffendorf insisting, that this right of occupancy is to be founded upon a tacit and implied assent of all mankind ... and Barbeyrac, Titius, Mr Locke, and others, holding that there is no such implied assent, neither is it necessary that there should be; for that the very act of occupancy, alone, being a degree of *bodily* labour, is from a principle of natural justice, without any consent or compact, sufficient of itself to gain a title.”); *id.* at 42 (the revealed or divine law found in the holy scriptures “are found upon comparison to be really a part of the original law of nature .... But ... we find that, until they were revealed, they were hid from the wisdom of the ages. As then the moral precepts of this law are indeed of the same original with those of the law of nature, so their intrinsic obligation is of equal strength and perpetuity. Yet undoubtedly the revealed law is (humanly speaking) of infinitely more authority than what we generally call the natural law. Because one is the law of nature, expressly declared so to be by God himself; the other is only what, by the assistance of human reason, we imagine that law to be.... Upon these two foundations, the law of nature and the law of revelation, depend all human laws....”). Cf. 1 AQUINAS, *supra* note 28, at 423 (Q84, 2<sup>nd</sup> Art.) (“The ancient philosophers held that the soul knows bodies through its essence.... But this opinion will not hold. First, because in the material principle of which they spoke, the various results do not exist save in potentiality. But a thing is not known according as it is in potentiality, but only according as it is in act ... wherefore neither is a power known except through its act.”).

<sup>580</sup> *Id.* at 129.

<sup>581</sup> 1 NIEBUHR, *supra* note 28, at 68-69.

Given the nominalism of 17<sup>th</sup> Century thought,<sup>582</sup> moreover, atomistic materialism (based on the Greek *logos* of Democritus and Lucretius) had “proved congenial to the thinking of many of the *virtuosi*... and yet suspect because of its atheistic associations in classical thought.”<sup>583</sup> Efforts to understand God’s place in a natural world of mechanical operations thus resulted in the revelationist work of David Hume and the Protestant response of Immanuel Kant. Hume posited a skepticism that placed “some questions beyond rational solution.”<sup>584</sup> In contrast, Kant “made a basic epistemological distinction between our knowledge of phenomena and our understanding of noumenal realities which include God, freedom, and duty. The noumenal world is the creation of God. The phenomenal world is a world of appearances; it is a creation of man.”<sup>585</sup> However, the Kantian dichotomy did not account for the Christian conception of sin. That conception

is a highly sophisticated doctrine of the relationship of God and man. Sin is man’s willful independence of God. Its result is alienation from God and the centering of each human life falsely in the man himself. This false centering has the further result of disrupting the relationships between persons.<sup>586</sup>

Christian sin reflected a revised version of Greek hubris, of particular concern in a mechanistic world from which God can easily be left out.

Although the Deists did not focus on Christian sin (or hubris), given their humanist world view, humanism for them had not yet swallowed up a morality tied to God through nature.

The loss of any purposefulness external to man was not keenly felt in the eighteenth century because it was assumed that standards and direction were given in the Laws of Nature.... The concept of perfectibility ... was rather a belief in an unlimited possibility.... But on the other hand, progress and the possibility of *perfectibilité* presupposed, at least as the eighteenth century understood them, a non-recurring historical reality such as is found in the biblical tradition.... This [more positive role of man as an actor in history] was not, however, a radical departure from earlier concepts of history.<sup>587</sup>

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<sup>582</sup> Nominalism is contrasted with realism, and denies that categorical concepts have a separate existence (outside of the mind) from the objects they describe. “Nominalism is appropriate to materialist and empirical philosophy and hence has been popular in modern thought.” THE COLUMBIA ENCYCLOPEDIA, NOMINALISM (6<sup>th</sup> ed., 2001-05), available at <http://www.bartleby.com/65/no/nominali.html> (last visited Sept. 25, 2006).

<sup>583</sup> GLOVER, *supra* note 34, at 96.

<sup>584</sup> *Id.* at 99 (citing DAVID HUME, DIALOGUES CONCERNING NATURAL RELIGION 89 (Richard H. Popkin ed. 1980) (1854).

<sup>585</sup> *Id.* at 99-100.

<sup>586</sup> *Id.* at 113.

<sup>587</sup> *See id.* at 117, 118.

More importantly, for American deists in the 1870s, “[i]f the orthodox doctrine of sin was too much for most of them, yet they retained commonsense cultural derivatives from it.” Thus, Thomas Jefferson “saw the greed and perversity of man as part of his essential nature provided by the Creator for ultimately beneficial purposes,” and the dual nature of humans as good and evil provided the same basis for political action as the traditional conception of Christian sin.<sup>588</sup>

Benjamin Franklin’s religion was even more complex. Franklin was a foremost scientist, technologist, and rationalist,<sup>589</sup> who had as a young man read not only Wollaston but also “John Locke, Lord Shaftesbury, Joseph Addison, and others who embraced the freethinking religion and Enlightenment philosophy of deism.”<sup>590</sup> Although Franklin had published in 1725 (after helping to print an edition of *The Religion of Nature Delineated*) his own religious tract, it was such a poor effort at solving the conflict between free will and an all-knowing God that he later conceded it to be “so shallow and unconvincing as to be embarrassing,” printing only a hundred copies, calling it an “erratum,” and burning all versions he could retrieve.<sup>591</sup> Franklin ultimately settled on a religion that had both a distant God as the creator of nature and “a more intimate God” composed of metaphorical “lesser and more personal gods for mortal men to worship.”<sup>592</sup> Further, Franklin was forced by “process of elimination” (because the alternatives would have denied God’s infinite power, good, or wisdom) to settle on a partially providential God, who “sometimes interferes by His particular providence and sets aside the effects which would otherwise have been produced by any of the above causes.”<sup>593</sup> The consequence was practical, that people should “pray to Him for His favor and protection” and should lead lives of virtue.<sup>594</sup> By the time of the Constitutional Convention, Franklin would state in urging the delegates to begin each session with a prayer, that “[t]he longer I live, the more convincing proofs I see of this truth – that God governs in the affairs of men. And if a sparrow cannot fall to the ground without his notice, is it probable that an empire can rise without his aid?”<sup>595</sup>

Franklin (and America at the time of the Constitution) thus stood at the boundary between providential and rationalist Christianity, forming the bridge to a wholly secular humanism. Only a few years later, Thomas Paine would write the *Age of Reason*,<sup>596</sup> providing a more serious attack on religious sensibilities. But Franklin clearly

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<sup>588</sup> *Id.* at 137 (citing RICHARD HOFSTADTER, *THE AMERICAN POLITICAL TRADITION AND THE MEN WHO MADE IT* (New York 1948), MERILL D. PETERSON, *ADAMS AND JEFFERSON: A REVOLUTIONARY DIALOGUE* (U. Georgia Press 1976), and DANIEL J. BOORSTIN, *THE LOST WORLD OF THOMAS JEFFERSON* (Henry Holt and Co. 1948)).

<sup>589</sup> See WALTER ISAACSON, *BENJAMIN FRANKLIN: AN AMERICAN LIFE* 44-46, 129-45, 263-66 (Simon & Shuster 2003).

<sup>590</sup> ISAACSON, *supra* note 579, at 46.

<sup>591</sup> *Id.* at 45 (citing BENJAMIN FRANKLIN, *A DISSERTATION ON LIBERTY AND NECESSITY, PLEASURE AND PAIN* (1725)).

<sup>592</sup> *Id.* at 85 (citing BENJAMIN FRANKLIN, *ARTICLES OF BELIEF AND ACTS OF RELIGION* (1728)).

<sup>593</sup> *Id.* at 87 (citing Benjamin Franklin, *On the Providence of God in the Government of the World*, in 1 BENJAMIN FRANKLIN, *PAPERS OF BENJAMIN FRANKLIN* 236 (Yale 1959) (1730 or 1732)).

<sup>594</sup> *Id.*

<sup>595</sup> *Id.* at 451.

<sup>596</sup> THOMAS PAINE, *THE AGE OF REASON* (1795).

understood both the moral obligation of scientists to give their discoveries to society for free use (and thus articulated for American – on unstated religious grounds – the principle of open science long before Robert Merton<sup>597</sup>) and the sin of Pride in human relationships to nature (and in human nature).

My list of virtues contain'd at first but twelve; but a Quaker friend having kindly informed me that I was generally thought proud; that my pride show'd itself frequently in conversation; that I was not content with being in the right when discussing any point, but was overbearing, and rather insolent, of which he convinc'd me by mentioning several instances; I determined endeavouring to cure myself, if I could, of this vice or folly among the rest, and I added *Humility* to my list, giving an extensive meaning to the word.

I cannot boast of much success in acquiring the *reality* of this virtue, but I had a good deal with regard to the *appearance* of it.

....

In reality, there is, perhaps, no one of our natural passions so hard to subdue as *pride*. Disguise it, struggle with it, beat it down, stifle it, mortify it as much as one pleases, it is still alive, and will every now and then peep out and show itself; you will see it, perhaps, often in this history; for, even if I could conceive that I had compleatly overcome it, I should probably be proud of my humility.<sup>598</sup>

In his autobiography, Franklin also noted that the colonial Governor of Pennsylvania had offered to grant him an exclusive patent for his celebrated Franklin stove, but that he refused the offer.<sup>599</sup> Franklin recognized:

a Principle which has ever weigh'd with me on such occasions, viz. *That as we enjoy great Advantages from the Inventions of others, we should be*

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<sup>597</sup> ROBERT K. MERTON: ON THE SHOULDERS OF GIANTS (Free Press 1965); ROBERT K. MERTON, SOCIAL THEORY AND SOCIAL STRUCTURE (Free Press 1968); ROBERT K. MERTON, THE SOCIOLOGY OF SCIENCE (1973); ROBERT K. MERTON, ON THE SHOULDERS OF GIANTS: A SHANDEAN POSTSCRIPT (Harcourt Brace Jovanovich 1985). Significantly, Merton's doctoral thesis linked the developing Protestant pietism to the development of the values of the new science that arose in the 17<sup>th</sup> Century, similarly to Max Weber's thesis that the values of Protestantism had led to modern capitalism. See ROBERT K. MERTON, SCIENCE, TECHNOLOGY, AND SOCIETY IN SEVENTEENTH CENTURY ENGLAND (H. Fertig 1938); MAX WEBER, THE PROTESTANT ETHIC AND THE SPIRIT OF CAPITALISM (1905). See generally Piotr Sztompka, *Robert K. Merton*, in BLACKWELL COMPANION TO MAJOR CONTEMPORARY SOCIAL THEORISTS 12-33 (George Ritzer ed., Blackwell 2003). Merton also wrote a theory of multiples, or simultaneous invention, which is highly relevant to obviousness (even if science itself were patentable), as simultaneous scientific discoveries should also lead to simultaneous applications as technology. See Robert K. Merton, Multiple Discoveries in Science, in ROBERT K. MERTON, ON SOCIAL STRUCTURE AND SCIENCE 305-17 (U. of Chicago Press 1996) (1961).

<sup>598</sup> BENJAMIN FRANKLIN, AUTOBIOGRAPHY, THE COMPLETED AUTOBIOGRAPHY OF BENJAMIN FRANKLIN ¶¶ 186-89 (Mark Skousen ed., Regnery Pub. 2006).

<sup>599</sup> See BUGBEE, *supra* note 10, at 72.



*glad of an Opportunity to serve others by any Invention of ours, and this we should do freely and generously.*<sup>600</sup>

Further, as Franklin told it:

And now I asked, have we forgotten that powerful friend? Or do we imagine we no longer need its assistance? I have lived a long time; and the longer I live, the more convincing proofs I see of this truth, *that GOD governs in the affairs of men!*... and I also believe that without his concurring aid, we shall succeed in this political building no better than the builders of Babel”).<sup>601</sup>

The other most-prominent Deist was Thomas Jefferson.<sup>602</sup> Jefferson’s original draft of the Declaration of Independence contained Locke’s thesis on the basic equality of humanity, but held “these truths to be sacred and undeniable.” Franklin changed the language to be “self-evident.”<sup>603</sup> Thus Jefferson, more than Franklin, believed in the divinely providential nature of moral relations of humans in nature, *i.e.*, that the equal status of humans “was an assertion of religion. Franklin’s edit turned it instead into an assertion of rationality.”<sup>604</sup> “Jefferson’s view of man was not merely a secularization of the Christian idea of man as an essentially good creature corrupted by sin. Jefferson saw the greed and perversity of man as part of his essential nature provided by the Creator for ultimately beneficial purposes.”<sup>605</sup>

In an 1823 letter to John Adams, Jefferson expressly affirmed his conviction that the Universe was the result of Divine Creation and that it operated via universal laws.

I hold (without appeal to revelation) that when we take a view of the Universe, in it's parts general or particular, it is impossible for the human mind not to perceive and feel a conviction of design, consummate skill, and indefinite power in every atom of it's composition. The movements of

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<sup>600</sup> FRANKLIN, *supra* note 557, at 588. *See id.* at 32 (“God has been very good to us in many respects. Therefore, let us enjoy his favours with a thankful and cheerful heart; and, as we can make no direct return to him, show our sense of his goodness to us, by continuing to do good to our fellow creatures, without regarding the returns they make us, whether good or bad. For they are all his children ... but his favour, if we can secure it, is an inheritance forever.”); *id.* at 229 (“the best service to God is doing good to men”); *id.* at 298 (“Private property is a creature of society and is subject to the calls of that society whenever its necessities shall require it, even to its last farthing.”). Again, Bugbee failed to see in Franklin’s statement that natural law did not apply to such inventions, focusing on the freedom that Franklin possessed to decline compensation as “a man of independent wealth.” BUGBEE, *supra* note 10, at 72. *See supra* note —

<sup>601</sup> *Id.* at 365. *See also id.* at 288 (“[I]f it had not been for the justice of our cause, and the consequent interposition of Providence in which we had faith, we must have been ruined. If I had ever before been an atheist, I should now have been convinced of the being and government of a Deity. It is He who abases the proud and favours the humble.”); *Id.* (discussing moral perfection and humility).

<sup>602</sup> *See* AHLSTROM, *supra* note 31, at 367 (describing Jefferson as “unquestionably the most significant of the American rationalists ... [and] the St. Paul of American democracy.”).

<sup>603</sup> Isaacson, *supra* note 579, at 312.

<sup>604</sup> *Id.*

<sup>605</sup> Glover, *supra* note 34, at 137.

the heavenly bodies, so exactly held in their course by the balance of centrifugal and centripetal forces, the structure of our earth itself, with its distribution of lands, waters and atmosphere, animal and vegetable bodies, examined in all their minutest particles, insects mere atoms of life, yet as perfectly organised as man or mammoth, the mineral substances, their generation and uses, it is impossible, I say, for the human mind not to believe that there is, in all this, design, cause and effect, up to an ultimate cause....<sup>606</sup>

Jefferson also recognized the lack of natural-law or common-law rights in scientific principles. God (even as deistically transcendent and removed) had created nature, the non-rivalrous character of scientific principles and ideas precluded natural law property rights, and there was a moral obligation to freely disseminate scientific knowledge for all to use.

Stable ownership is the gift of social law, and is given late in the progress of society. It would be curious then, if an idea, the fugitive fermentation of an individual brain, could, of natural right, be claimed in exclusive and stable property. If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of every one, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me. *That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density in any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement or exclusive appropriation. Inventions then cannot, in nature, be a subject of property.* Society may give an exclusive right to the profits arising from them, as an encouragement to men to pursue ideas which may produce utility, but this may or may not be done, according to the will and convenience of the society, without claim or complaint from anybody.<sup>607</sup>

This fact was recognized by the Supreme Court in *Graham v. John Deere Co.*,<sup>608</sup> when discussing the Constitution purpose of the Authors and Inventors Clause and its limitation on legislative authority.<sup>609</sup>

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<sup>606</sup> Letter of Thomas Jefferson to John Adams (Aug. 13, 1823), reprinted in THOMAS JEFFERSON, THE PORTABLE THOMAS JEFFERSON (Merrill D. Peterson ed., Penguin Books 1977).

<sup>607</sup> Jefferson, MacPherson Letter, *supra* note 15, at 529-30 (emphasis added).

<sup>608</sup> 383 U.S. 1 (1966).

In contrast to Franklin and Jefferson, John Adams was more overtly providentially religious. Adams possessed “[s]omething of the spirit of the old Puritan diarists,” and was constantly obsessed with self improvement and avoiding “vanity” (or “being overly proud, conceited”).<sup>610</sup> Adams never doubted that God was at work in the world, particularly in the American Revolution.

That the hand of God was involved in the birth of the new nation he had no doubt. “It is the will of heaven that the two countries should be sundered forever.” If the people were now to have “unbounded power,” and as the people were quite as capable of corruption as “the great,” and thus high risks were involved, he would submit all his hopes and fears to an overruling providence, “in which unfashionable as the faith may be, I firmly believe.”<sup>611</sup>

Further, Adams like Franklin and Jefferson understood their religious duty to disseminate knowledge for human benefit. Thus, Adams (who was less technologically and scientifically inclined than Franklin or Jefferson) saw:

“a general knowledge among the people” (which was a necessary condition to preserve liberty) as “a right from the frame of [human] nature ... as their great Creator who does nothing in vain, has given them understandings and a desire to know. But besides this they have a right, an indisputable, unalienable, indefeasible *divine* right to the most dreaded and envied kind of knowledge, I mean of the characters and conduct of their rulers.”<sup>612</sup>

Finally, unlike Jefferson, he believed the lesson of history in regard to successful governance was not egalitarianism and popular sovereignty, but rather “an equilibrium of power among different orders of men and principles of government in pale imitation of

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<sup>609</sup> See *id.* at 8 n.2. See also *id.* at 9.

<sup>610</sup> DAVID MCCULLOUGH, JOHN ADAMS 41-42 (Simon & Shuster 2001) (citation omitted). See MERILL D. PETERSON, ADAMS AND JEFFERSON: A REVOLUTIONARY DIALOG 6, 20 (U. of Georgia Press 1976) (“‘Sin,’ although wrenched from its old theological associations, remained a prominent word in his political vocabulary, roughly translated as human weakness and selfishness.... Adams, although he thought Machiavelli, Hobbes, and Mandeville had painted human nature too black, without any color of benevolence, nevertheless felt that ‘self-love’ was the dominant passion in men and that government must deal with it.”). See also *id.* at 6-7 (“Unlike Adams, for whom the New England Church was an ally, Jefferson came to the Revolution as a man alienated from the traditional religious culture of his community.... Jefferson felt no need to maintain the centrality of religion in human affairs.”). Notwithstanding his religious upbringing as the son of a Deacon, Adams “most likely ... was not close at all” to becoming a minister. MCCULLOUGH, *supra*, at 37. But “[a]lthough he shook off the theological inheritance from the fathers, he cherished the Puritan past and rather than replace the original model of a Christian commonwealth ... he sought to transform it into a model of virtuous republicanism.” PETERSON, *supra*, at 5.

<sup>611</sup> MCCULLOUGH, *supra* note 600, at 130 (citations omitted).

<sup>612</sup> *Id.* at 60 (citation omitted).

the English king, lords, and commons.”<sup>613</sup> Adams thus had an acute sensitivity for the institution of private property. He “solved the problem of the senate by proportioning its membership to the amount of taxes paid in the several electoral districts, that is to say, basing it on property.”<sup>614</sup> Similarly, he treated the “great object of government [as] being the security of property,” and viewed the efforts to level property (and thus to eliminate aristocracy – part of the natural order of government) as having caused the demise of both the Athenian republic and the French Revolution.<sup>615</sup>

But Adams nevertheless understood that property was the cause of the dark ages of Western civilization, when the interests of feudal land holders (who required military obedience and payments from their vassals) were combined with the interests of the ecclesiastical (Roman Catholic) clergy. The clergy had controlled “the rules and obligations of morality; with authority to license all sorts of sins and crimes,” for the purpose of “aggrandizement of their own order,” and had accomplished this result by “reducing the[] mind [of the people] to a state of sordid ignorance and staring timidity, and by infusing into them a religious horror of letters and knowledge.”<sup>616</sup> As a result, “human nature [was] chained fast for ages in a cruel, shameful, and deplorable servitude to [God] and his subordinate tyrants, who, it was foretold, would exalt himself above all that was called God, and that was worshipped.”<sup>617</sup> Worse yet, a “wicked confederacy between the two systems of tyranny described above” had resulted, where the feudal lords “did everything in their power to maintain the ascendancy of the priesthood,” and the priests “should employ their ascendancy over the consciences of the people, in impressing on their minds a blind, implicit obedience to civil magistracy.”<sup>618</sup> Thus, property was the foundation of misery and servitude, whereas universal knowledge was the necessary condition for liberty and human welfare:

Thus, as long as this confederacy lasted, and the people were held in ignorance, liberty, and with her, knowledge and virtue too, seemed to have deserted the earth, and one age of darkness succeeded another, till God in his benign providence raised up the champions who began and conducted the Reformation. From the time of the Reformation to the first settlement of America, knowledge gradually spread in Europe, but especially in England....

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<sup>613</sup> PETERSON, *supra* note 600, at 39. *See generally* Thom Brooks, Plato, Hegel, and Democracy (Sept. 25, 2006), available at <http://ssrn.com/abstract=932555> (University of Newcastle upon Tyne (UK), Working Paper Series) (discussing similar democratic theories of elites checked by popular democratic will).

<sup>614</sup> PETERSON, *supra* note 600, at 25. *See id.* at 26 (discussing Adams view that “power always follows property,” and his belief that property qualifications on the vote were consistent with “his republican objectives,” given his historical understanding of the wide distribution of landholdings in Massachusetts, which contrasted sharply with Jefferson’s experience in Virginia where “the balance of property was against equal liberty”) (citation omitted).

<sup>615</sup> *Id.* at 115.

<sup>616</sup> JOHN ADAMS, *A Dissertation on Canon and Feudal Law*, in THE PORTABLE JOHN ADAMS 211 (Penguin Classic 2004) (1765).

<sup>617</sup> *Id.*

<sup>618</sup> *Id.* at 212.

It was this great struggle that peopled America. It was not religion alone, as is commonly supposed; but it was a love of universal liberty, and a hatred ... of the infernal confederacy before described....

....

[The settlers of America] were convinced, by their knowledge of human nature, derived from history and their own experience, that nothing could preserve their posterity from the encroachments of the two systems of tyranny, in opposition to which, as has been observed already, they erected their government in church and state, *but knowledge diffused generally through the whole body of the people*. Their civil and religious principles, therefore, conspired to prompt them to use every measure and to take every precaution in their power to propagate and perpetuate knowledge. For this purpose they laid very early the foundation of colleges... and it is remarkable that they have left among their posterity *so universal an affection and veneration for those seminaries, and for liberal education, that the meanest of the people contribute cheerfully to the support and maintenance of them every year...* But the wisdom and benevolence of our fathers rested not here.... They made it a crime for such a town to be destitute of a grammar schoolmaster for a few months, and subjected it to a heavy penalty. *So that the education of all ranks of people was made the care and expense of the public, in a manner that I believe has been unknown to any other people ancient or modern.*<sup>619</sup>

Given the necessity to assure universal knowledge, knowledge itself could not be a proper subject of property.

Adams was a Christian who believed in the revelation of God in nature, and thus he “was most at odds with Jefferson on the issue of materialism and spiritualism.... Adams [was convinced] that mortal man could know nothing of either matter or spirit.”<sup>620</sup> Unlike for Jefferson the philosopher and scientist, for whom knowledge *per se* was disqualified from being property by its inherent nature, for Adams the politician, knowledge was disqualified by its external necessity, given the corruption of human nature. Further, for Adams it was the moral duty of all the public to support the dissemination of knowledge so as to assure freedom from tyranny. And the blessed and unique posterity of America was that the American people did so cheerfully. And if any incentive were needed for the generation of knowledge, it would be found in recognition and fame that the inventor or author would receive.<sup>621</sup>

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<sup>619</sup> *Id.* at 212-13, 217-18

<sup>620</sup> PETERSON, *supra* note 600, at 124. *See also id.* (“Even Dupuis ... had not shaken [Adams] belief that Christianity was a revelation.”) (citation omitted).

<sup>621</sup> *See* JOHN ADAMS, *Discourses on Davila*, in THE PORTABLE JOHN ADAMS, *supra* note 606, at 346-47, 352-53 (“Is there in science and letters a reward for the labor they require?... They renounce their pleasures, neglect their exercises, and destroy their health, for what?... But the universal object and idol of men of letters is *reputation*. It is the *notoriety*, the *celebration*, which constitutes the charm that is to compensate the loss of appetite and sleep, and sometimes of riches and honors. The same ardent desire of the *congratulations* of others in our joys, is the great incentive to the pursuit of honors.... that the most heroic actions in war, the sublimest virtues in peace, and the most useful industry in agriculture, arts,

Adams thus could not have conceived of subjecting *any* knowledge to property, particularly given his unwillingness to level hereditary property. Propertizing knowledge would have resulted in the landed aristocracy buying up the knowledge for political domination. Further, Adams could not have conceived that the scientific discoveries of God’s revelation in nature, which led to technology that could be used for political suppression, should be excluded from the duty to disseminate knowledge freely that was the foundation of liberty and moral government.<sup>622</sup> Thus, as Adams wrote in the Massachusetts Constitution (which contained “in Section II of Chapter 6, a paragraph headed ‘The Encouragement of Literature, Etc.,’ which was like no other declaration to be found in any constitution ever written until then”<sup>623</sup>):

No man, nor corporation or association of men have any other title to obtain advantages *or particular and exclusive privileges* distinct from those of the community, *than what arises from the consideration of services rendered to the public.*

....

Wisdom and knowledge, as well as virtue, diffused generally among the body of the people being necessary for the preservation of their rights and liberties; and as these depend on spreading the opportunities and advantages of education in various parts of the country, and among the different orders of the people, it shall be the *duty of legislators and magistrates* in all future periods of this commonwealth to cherish the interests of literature and the sciences ... to encourage private societies and public institutions, rewards and immunities, *for the promotion of agriculture, arts, sciences, commerce, trades, manufactures, and a natural history* of the country....<sup>624</sup>

That service could result only from publication, and thus no natural law right existed but only the public’s discretion to reward the service. These rewards and immunities were not a property conception in the idea itself, moreover, either for scientific principles (philosophy) distinct from their embodiment in technology or for the literary ideas (science) distinct from their embodiment in a literary copy.<sup>625</sup> Adams thus “offered ...

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manufactures, and commerce, proceed from such emulations on the one hand, and jealousies ... seditions, and wars on the other.”).

<sup>622</sup> See JOHN ADAMS, in THE PORTABLE JOHN ADAMS, *supra* note 606, at 481-82 (“The Watchmaker has in his head an Idea of the System of a Watch before he makes it. The Mechanician of the Universe had a compleat idea of the Universe before he made it; and this Idea, this Logos, was almighty or at least powerful enough to produce the World, but it must be made of Matter which was eternal. For creation out of Nothing was impossible. And Matter was unmanageable. It would not, and could not be fashioned into any System, without a large mixture of Evil in it; for Matter was essentially evil... He who loves the Workman and his Work, and does what he can to preserve and improve it, shall be accepted of him.”).

<sup>623</sup> MCCULLOUGH, *supra* note 600, at 222.

<sup>624</sup> John Adams, A Constitution or Form of Government for the Commonwealth of Massachusetts, reprinted in MCCULLOUGH, *supra* note 600, at 222-23 (citing IV JOHN ADAMS, WORKS OF JOHN ADAMS 219-67 (Charles Francis Adams ed., Little and Brown 1851) (1779)) (emphasis added).

<sup>625</sup> That Adams understood the difference between the physical and intangible was also reflected in his morality. “When he had written the Massachusetts Declaration of Rights that ‘all men are by nature free

his dream of establishing a Society of Arts and Sciences at Boston, as a counterpart to the American Philosophical Society at Philadelphia.”<sup>626</sup>

Finally, Adams was foremost a patriot. As President he would go along with the Alien and Sedition Acts of 1798, because the interests of the state were to be held paramount to the knowledge and interests of the individual.<sup>627</sup> The idea of natural right arising from the discovery of knowledge of science and nature thus would have been the antithesis of republican duty, by even temporarily placing the value of the knowledge to the individual above the value of the knowledge to the (re)public.

In summary, knowledge in general and scientific principles in particular were not to be propertized. For the revelationists, appropriating nature as human property was a sin to be staunchly avoided. For the Deists, it simply was not in the nature of the thing.<sup>628</sup> To better understand this point, we need to revisit Revelationist and Deist conceptions of Natural law. But we must do so with the sin of Pride firmly in mind.

## 2. Natural Law and Property Revisited

Natural law in ancient classical thought differed from natural law as understood in Biblical theology, in the former as a law “immanent in nature” and in the later as a law “imposed on nature by a law-giver beyond and outside of nature” (although the imposed law might be made immanent).<sup>629</sup> The nominalism suggested by Biblical theology thus was not a logical necessity.<sup>630</sup>

But once the question was broached, there were strong affinities between a religious faith which emphasized the reality and worth of every particular creature and some version of nominalism. Not a sparrow falls that God does not know it.... In a nominalistic world it is easy to refer all purpose and meaning to the Transcendent God. This view was reinforced by

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and equal,’ he meant ‘not a physical but a moral equality.’” MCCULLOUGH, *supra* note 600, at 453 (citations omitted).

<sup>626</sup> MCCULLOUGH, *supra* note 600, at 223.

<sup>627</sup> See PETERSON, *supra* note 600, at 77-78.

<sup>628</sup> Whatever his religious beliefs, George Mason was so concerned about granting monopolies in trade and commerce that he refused to sign the proposed Constitution because it contained the Authors and Inventors Clause. See, e.g. WALTERSCHEID, *supra* note 27, at 9. In contrast, Alexander Hamilton may have been such a thoroughgoing rationalist that he focused entirely on a encouraging investment in innovation by securing property rights (monopolies) in inventions. See *id.* at 144-45 (citing X ALEXANDER HAMILTON, THE PAPERS OF ALEXANDER HAMILTON 266-67 (Harold C. Syrett & Jacob Cooke eds., 1966).

Walterscheid correctly suggests that at the time of the Constitution changes were underway from providential to non-providential theories of nature, see *id.* at 140, that the rationales for copyright varied from those for inventions, see *id.* at 145-48, and that Madison “dissembled more than a bit” in seeking to portray the common good as coextensive with private property. *Id.* at 149 (citing THE FEDERALIST NO. 43 (James Madison)). However, Walterschied ultimately fails to enter into the theology of the time. Accordingly, I believe he has failed to recognize that patents for discoveries of scientific principles generally remained a prohibited idea, and thus a commonly agreed premise affecting the understanding of the Authors and Inventors Clause at the time.

<sup>629</sup> GLOVER, *supra* note 34, at 91.

<sup>630</sup> See *id.* at 91 (noting that neither Augustine nor Thomas were nominalists).

biblical emphasis on God's immediate sovereignty over nature as well as history.<sup>631</sup>

Further, because what was knowable was only the relationships created by God in nature, and not the acts or purposes of doing so, and because the mind of God was inscrutable, science was freed from theological speculation and explanation.<sup>632</sup>

As late as the 18<sup>th</sup> Century, nature was understood as “one grand, interrelated design, comprehensible by rational investigation.”<sup>633</sup> This design was present for all humans to benefit from. During this period, invention was understood in the classical sense of uncovering something in nature that had been present all along (through the mechanism of divine providence in permitting human access to such knowledge). If the inventor was no more than God's instrument in bringing His gifts to the community, then he could at most claim user's rights over them.<sup>634</sup> Of greater importance, the divine inventions of science and nature that were revealed to humanity through “those favored mortals ... who share that ray of divinity we call genius” were intended to be freely available, and thus inventors were “entrusted by Providence with the delegated power of imparting to their fellow creatures that instruction which heaven meant for universal benefit.”<sup>635</sup>

At the end of the 18<sup>th</sup> Century, however, the understanding of the faculty of human invention began to shift.<sup>636</sup> Like the changes that had resulted in earlier centuries from use rights to absolute forms of property in land,<sup>637</sup> nature and science as divine commons property underwent a shift from divinely granted use rights to private property.<sup>638</sup> Although it had been a “fixed pole of the debate” in Parliament in 1774 (in

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<sup>631</sup> *Id.* at 91 (citing *Proverbs* 8:29 and FRANCIS OAKLEY, CHRISTIAN THEOLOGY AND NEWTONIAN SCIENCE 436 (1961)).

<sup>632</sup> *See id.* at 93.

<sup>633</sup> MACLEOD, *supra* note 27, at 203 (citing CHARLES WEBSTER, FROM PARACELUS TO NEWTON: MAGIC AND THE MAKING OF MODERN SCIENCE 52-54 (Cambridge U. Press 1982)).

<sup>634</sup> MACLEOD, *supra* note 27, at 198.

<sup>635</sup> 17 THE PARLIAMENTARY HISTORY OF ENGLAND col. 999 (William Cobbett ed., 1806-20) (1774) (Lord Camden). *See* WALTERSCHEID, *supra* note 27, at 39 (“It was the perception which arose during the Middle Ages that genius was a gift of God that largely precluded an earlier development of the concept of intellectual property. For how could one properly seek to obtain commercial value from that which was perceived to have been granted by the grace of God?”).

<sup>636</sup> *Cf.* Jaszi, *supra* note 161, at 468 n.45, 469-71, 472 (discussing “the Romantic reconceptualization of the creative process” during the 18<sup>th</sup> Century, resulting in recognition only in the Copyright Act of 1814 of the principle that authors should benefit from their works, and reflecting “roots in notions of individual self-proprietaryship, provid[ing] the rationale for thinking of literary productions as personal property”).

<sup>637</sup> *See id.* at 198 (citing LAW, ECONOMY AND SOCIETY: ESSAYS IN THE HISTORY OF ENGLISH LAW, 1750-1914 23-36 (G.R. Rubin & David Sugarman eds., Professional Books 1984)); Boyle, *supra* note 45, at 34-35 (describing the enclosure of land from commons property to private property beginning in the 15<sup>th</sup> Century and lasting through the 19<sup>th</sup> Century) (citing, *inter alia*, J.A. YELLING, COMMON FIELD AND ENCLOSURE IN ENGLAND, 1450-1850 (Archon Books 1977), and KARL POLANYI, THE GREAT TRANSFORMATION: THE POLITICAL AND ECONOMIC ORIGINS OF OUR TIME 35 (1957)).

<sup>638</sup> *See* MACLEOD, *supra* note 27, at 198.



the appeal in *Donaldson v. Beckett*<sup>639</sup>) that there were no natural rights in mechanical inventions,<sup>640</sup> a new conception of invention was developing with a modern sense of secular human agency in the creation of new knowledge (through the heroic intellectual mechanism of synthesis by the inventor-genius rather than analysis).<sup>641</sup> The lack of natural rights in inventive genius was not shared, however, in France.<sup>642</sup>

The dominant 18<sup>th</sup> Century conception, however, prevailed in America and was incorporated in the language of the U.S. Constitution, as the power to “promote the Progress of ... useful Arts” was granted to secure exclusive rights “to Inventors for their ... Discoveries.”<sup>643</sup>

## B. Philosophy

John Locke wrote in 1677 that “‘Nature furnishes us only with the material, for the most part rough and unfitted for our use; it requires labour, art, and thought, to suit them to our occasions.’”<sup>644</sup> But Locke was referring to physical appropriation of nature for use, and not of intellectual appropriation of the scientific principles on which nature operated or knowledge of nature itself. Thus, in the late 18<sup>th</sup> Century Joseph Bramah argued (against Watt’s steam engine patent) that the “‘works of men begin’” at the point “‘where the independent works of God end, who by his own secret *principles* and

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<sup>639</sup> 98 Eng. Rep. 257 (H.L. 1774), 2 Bro PC 129. See generally LYMAN RAY PATTERSON, COPYRIGHT IN HISTORICAL PERSPECTIVE 158-79 (Vanderbilt U. Press 1968) (discussing *Donaldson* and its reversal of the natural law-based copyright decision of *Millar v. Taylor*, 98 Eng. Rep. 201 (K.B. 1769)).

<sup>640</sup> MACLEOD, *supra* note 27, at 198, 220-221 (citing 17 THE PARLIAMENTARY HISTORY OF ENGLAND, cols. 954-1003 (William Cobbett ed., 1806-20) (1774) (Lord Camden), and discussing the need for encouragement of individuals to make inventions that, under a “providentialist argument” would have been guaranteed to be made by someone).

<sup>641</sup> See *id.* at 220-21 (citing, *inter alia*, W.C. Kneale, *The Idea of Invention*, 41 PROC. BRIT. ACAD. 85-108 (1955), DANIEL DEFOE, THE HISTORY OF THE PRINCIPAL DISCOVERIES AND IMPROVEMENTS 227 (1727), and WILLIAM DERHAM, PHYSICO-THEOLOGY 306-09 (1713)). See also *id.* (noting that such human creativity was reserved during the 17<sup>th</sup> and 18<sup>th</sup> Centuries for literary creativity) (citing SAMUEL JOHNSON, A DICTIONARY OF THE ENGLISH LANGUAGE (1755) (defining “Invention”); *id.* at 204 (noting the secular basis for the increasing recognition of human agency in scientific research resulting in new and useful discoveries). See Jaszi, *supra* note 161, at 459, at n.11 (describing the Romantic conviction that of the author-genius as “someone who created something entirely new and unprecedented”) (citing Martha Woodmansee, *The Genius and the Copyright: Economic and Legal Conditions of the Emergence of the ‘Author,’* in 17 EIGHTEENTH CENTURY STUD. 425, 428-30 (1983-84)).

<sup>642</sup> See MACLEOD, *supra* note 27, at 199 (reciting a declaration of the National Assembly in 1790 that “‘it would be a violation of the Rights of Man ... not to regard an industrial *discovery* as the property of its author”) (quoting Davies, *Collection* 434) (emphasis added); Greenstreet, *supra* note 166, at 13 (translating the 1790 French patent law as “it would be a violation of the rights of man in their very essence if an industrial *invention* were not the property of its *creator*) (emphasis added). Cf. Thomas M. Meshbesh, *The Role of History in Comparative Patent Law*, 78 J. PAT. & TRADEMARK OFF. SOC’Y 594, 607 (1996) (“the French Revolution engendered a desire to base French patent law upon a natural law, rights-of-man concept ... but this idea acquired no supporters outside of France, and even the French backed away from the idea four years later”).

<sup>643</sup> U.S. CONST., art. I, § 8, cl. 8. But cf. MACLEOD, *supra* note 27, at 199 (suggesting that the natural rights conception was the basis of some American state patent laws).

<sup>644</sup> MACLEOD, *supra* note 27, at 220 (quoting 1 JOHN LOCKE, LIFE OF JOHN LOCKE 162 (Lord Peter King new ed., 1830)).

*methods* ... established the elements and their properties, and stocked the universal storehouse” of endless changes producible by different combinations and proportions.<sup>645</sup>

Locke begins his analysis of property from the basic moral equality of humans as God’s creatures of equal station, having “an equal Right to the use of the inferior Creatures, for the comfortable preservation of their Beings.”<sup>646</sup> From this equal state of control over a natural God-given commons, Locke derives a moral principle of equal human regard (or concern for others, like the Golden rule “[t]hat one should do as he would be done unto”) from the typicality of the “God-given moral status” of each individual.<sup>647</sup> This forces each individual to take each other individual’s duty of self-preservation as having universality, as contrasted to the egoism of Thomas Hobbes’s view of self-preservation “as a *sui generis* source of normativity,” and thus affects “how one views situations of scarcity, danger, and conflict.”<sup>648</sup> Competition is thus not natural but problematic, and although each person as God’s agent must accord priority to his or her own self-preservation,

and though sometimes this priority will require [that agent] to behave in ways in which a perfect altruist would not behave, still [the agent’s] recognition of a common source for the normativity of [the agent’s] self-preservation and [the other’s] self-preservation means that both of them also have a *duty* to orient themselves if possible to a reconciliation of their interests in any circumstance where they tend to conflict. This, as we shall see, is the basis on which Locke *requires individuals to form their conceptions of various constraints and limits on appropriation*, imposed specifically in the interest of others.<sup>649</sup>

What is significant about this conception is, as Jeremy Waldron has cogently stated, that

modern philosophy ... treat[s] Locke’s labor theory as a secular piece of argumentation about entitlements accruing from labor.... [But] the teleology of natural resources [based on the need for human self-preservation as God’s agents in the world] reminds us that the argument about mixing one’s labor is intended as a specific solution to a more general problem about humans finding some way of satisfying their individual needs out of the material basis that God has provided....  
“And [although the Earth and] all the Fruits it naturally produces, and Beasts it feeds, belong to Mankind in common, as they are produced by

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<sup>645</sup> *Id.* (quoting JOSEPH BRAMAGH, A LETTER TO THE RT HON. SIR JAMES EYRE, LORD CHIEF JUSTICE OF THE COMMON PLEAS 77, 83 (1797)).

<sup>646</sup> 1 LOCKE, *supra* note 36, at 87.

<sup>647</sup> WALDRON, *supra* note 38 at 155-57 (quoting LOCKE, *supra* note 113; and citing 1 RICHARD HOOKER, LAWS OF ECCLESIASTICAL POLITY § 8, at 80 (1594)).

<sup>648</sup> *Id.* at 157-58.

<sup>649</sup> *Id.* at 158. See generally Ezra Rosser, Obligations of Privilege (August 15, 2006) (unpublished draft) (on file with author) (discussing obligations of the rich to contribute to society based on their acquiring wealth without merit, based on “effort, good choices, or other qualities”).

the spontaneous hand of Nature ... yet being given for the use of Men, there must of necessity be a means *to appropriate* them in some way or other, before they can be of any use ... to any particular Man.”

....

[W]e find that it is safe (and indeed requisite) to rely on our survival instinct only by relating it rationally to ideas like God, creation, and purpose. These are not given in the inclination themselves; they have to be brought to it by reason.<sup>650</sup>

Even the concept of labor granting the right to appropriation (property)<sup>651</sup> made sense to Locke only in regard to divine purposes. Thus, the analogy of human labor and possession to divine creation and ownership is not (and was not for Locke) apt. “Locke makes it pretty clear that the fact of our being God’s workmanship matters less for His authority than the fact that we are dependent on Him for our being.... On the other hand, it simply is not true that human labor is characterized as God-like in the *Two Treatises*. It does not give us God-like authority over what we produce: there are restrictions....”<sup>652</sup>

Thus Locke, like Blackstone as discussed above,<sup>653</sup> distinguished rights of property in land which were acquired by *cultivation* from other modes of subsistence, in particular roaming or pasturing on unimproved land, which “secures no property in the land that [man] uses.”<sup>654</sup> This was not (as is commonly believed) based on his dehumanizing and devaluing hunter-gatherers (in particular Native Americans) as not fully human, given his belief that “[s]o far as religious practices are concerned, native Americans are to benefit from the same toleration as everyone else, for their pagan practices in matters of worship and ritual are of no prejudice to anybody else’s salvation.”<sup>655</sup> Rather, cultivation was a moral duty imposed by God, in the need to “work hard and subdue the earth, making it bring forth just as much plenty and enabling it to sustain just as many people as it possibly can.”<sup>656</sup> Thus, the distinction of cultivation generating property right results from the lack of an entitlement “to simply tie up in *unproductive occupancy* productive resources whose industrious cultivation could improve both [the hunter-gatherer’s] prospects and those of a much greater population.”<sup>657</sup>

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<sup>650</sup> WALDRON, *supra* note 38, at 158-61 (quoting 2 LOCKE, *supra* note 36, at 26 and citing 1 LOCKE, *supra* note 636, at 86) (emphasis added).

<sup>651</sup> See 2 LOCKE, *supra* note 36, at 44 (“though the things of Nature are given in common, yet Man (by being Master of himself, and *Proprietor of his own Person*, and the *actions or labor* of it) had still in himself the great Foundation of Property.”).

<sup>652</sup> WALDRON, *supra* note 38 at 163.

<sup>653</sup> See *supra* note 443 and accompanying text.

<sup>654</sup> WALDRON, *supra* note 38 at 165. See Margaret Jane Radin, *The Linguistic Turn in Patent Law* 32-37, 44-49 (unpublished draft) (on file with author) (discussing David Hume’s concerns regarding the limits of the property acquired through labor and difficulties of determining an appropriate level of abstraction from the concrete embodiment actually invented) (citation omitted).

<sup>655</sup> *Id.* at 167 (citing JOHN LOCKE, *A LETTER CONCERNING TOLERATION* 43, 46 (James Tully ed., Hackett Publishing 1983)).

<sup>656</sup> *Id.* at 169.

<sup>657</sup> *Id.* Waldron accepts that Locke’s understanding of ecological productivity may have been lacking. See *id.*

Further, and most relevant here, Locke imposed a

spoliation proviso [that] “Nothing was made by God for man to spoil or destroy”.... *To appropriate resources surplus to one’s needs in a way that prevents their being used by anyone else* runs directly counter to this principle, for “[n]othing was made by God for Man to spoil or destroy”... So understood, this principle respects basic equality in the most elementary sense: the natural resources are there for human use, where human use means use by any human – by someone or anyone who can use them. For *everyone* to be denied the use of them by someone who has no use for them himself, or does not propose to put them to human use, is a direct affront to the teleological relation in which each of us stands to the bounty provided by God. In those circumstances, the validity of their appropriation by labor (or by any other means) evaporates and the resources become common again.<sup>658</sup>

Although Locke did not have scientific principles (science, nature, and ideas) specifically in mind in regard to spoliation, property in such ideas necessarily results in precisely the kind of spoliation that Locke decried. By appropriating a non-rivalrous principle (whose application might be instantiated anywhere in nature) or a discovered natural *res* based on its identity of character rather than on its tangible and concrete physical occupation, the possessor of the “intellectual property” derived from the labor of the mind would “[deny] everyone ... the use by someone who has no use for them himself, or does not propose to put them to human use,” absent an exchange by barter or for money. If the exchange occurs, then no spoliation will occur and the possession is not spoliation. But “if for some reason market processes didn’t work to that effect, then the proviso [against spoliation] would remain available as a basis for reproaching [the appropriator].”<sup>659</sup> But precisely because the discoverer of a scientific principle or abstract idea could not anticipate all possible instantiations of the principle, they could not meaningfully license all possible uses (and even if they could try to do so, many could not afford to pay).<sup>660</sup> Similarly, appropriating not merely the fugitive tangible and

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<sup>658</sup> *Id.* at 170-71 (quoting 2 LOCKE, *supra* note 36, at 31) (emphasis added).

<sup>659</sup> *Id.* at 172.

<sup>660</sup> Locke eliminates inability to pay as a criterion for spoliation, allowing property to be owned in excess of the owner’s needs, based both on his belief that the poorest are still better off than the richest of a hunter-gatherer economy, and on the consent of wage laborers to assign value to money, and thus have by consent “agreed to a disproportionate and unequal Possession of the earth.” 2 LOCKE, *supra* note 36, at 50. See WALDRON, *supra* note 38, at 175-77. I therefore do not rely on inability to pay here, although as Waldron notes, “I am not saying this a convincing argument.” *Id.* at 176. I also do not rely here on Locke’s principle of charity, based on “God ...[having] given no one of his Children such a Property in his peculiar Portion of the things of this World, but that he has given his needy Brother a Right to the Surplussage of his Goods; so that it cannot justly be denied him, when his pressing Wants call for it.” 1 LOCKE, *supra* note 36, at 42. See WALDRON, *supra* note 38, at 177-87. Although charity is sufficient to disable a property right in discoveries that generate surplussage in excess of personal need where a sufficient “Want” exists in others, it requires generating hierarchies of need and is also compatible with granting a property right subject to redistributive duties. In contrast, the principle of spoliation demonstrates that science, nature, and ideas were understood as not subject to property rights and were invalid in the first place, because their

concrete instantiation of a natural discovery would lead to waste, because the ownership would apply to identical natural concrete and tangible instantiations of the discovery that were never occupied by the discoverer, and either would lie fallow (precluding the claim on the failure to cultivate grounds described above) or would escape licensing if someone else came upon them.

Waste is thus inherent in making discoveries of science, nature (as fungible items), and ideas into property, precisely because of their non-rivalrous nature and their capability of being brought into (or to bear on) physical existence or of being obtained anywhere by anyone. Conversely, as Locke had noted, that a person who “leaves as much as another can make use of, does as good as take nothing at all.”<sup>661</sup> Although Locke had deployed this principle as a justification for property in the absence of scarcity (non-rivalrous physicality),<sup>662</sup> the principle precludes any invasion of any property interest that might be granted in intangible scientific principles, fungible natural discoveries, and abstract ideas. These “things” were not properly subject to property *as natural law rights*, notwithstanding the labor invested in discovering them. And the principle of spoliation operated as a constraint on the scope of positive rights that could be granted by consent of the governed, because unless the principle of invention or discovery was sufficiently concrete and tangible it could not be meaningfully licensed and would result in waste from the failure to use it.

A further and more basic objection to making science, nature, and ideas the subject of property, however, was implicit in Locke’s philosophy. God had created humans in God’s image, and “wherein soever else the *Image of God* consisted, the intellectual Nature was certainly a part of it, and belong’d to the whole Species.”<sup>663</sup> This intellectual capacity was the basis for equal participation in political society of men and women, and for the definition of humanity (as “*corporeal rationality* ... [or] a fundamentally relevant resemblance among certain individuals” that provides the distinction of humans from other species that are not otherwise differentiated morally by their essences).<sup>664</sup> Of even greater importance, what distinguished humanity from other species was the power of *abstract thought*, “the faculty to enlarge them by any kind of *Abstraction*.”<sup>665</sup> Given this privileged status of abstraction as the basis for identifying

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intangible and nonrivalrous nature would result in staking of excessive claims; they were not valid although excessive, requiring redistribution of some (and only some) of the excess. In contrast, Lockean, charity might justify compulsory licensing or pardoning invasions: “The needy have a right to surplus goods, and the rich have no right to withhold it from them.” WALDRON, *supra* note 38, at 185. Even if charity is not a duty that can be generally enforced except as needed to prevent economic inequality turning into political inequality, *see id.* at 180, 182, it can be built into the positive grant of rights (from the consent of the governed) for those things that are the proper subject of property. *See id.* at 185 (Locke had in mind “not so much affirmative obligations (which once introduced into the picture, might have to be enforced) but unjust and uncharitable withholding and denying (which may have to be prevented by the state). *Cf. supra* notes \_\_\_ - \_\_\_ and accompanying text (discussing Adams on disseminating information as necessary to prevent property from devolving through feudalism into denials of political equality).

<sup>661</sup> 2 LOCKE, *supra* note 36, at 33.

<sup>662</sup> *See* WALDRON, *supra* note 38, at 172 (citing 2 LOCKE, *supra* note 636, at 33).

<sup>663</sup> 1 LOCKE, *supra* note 36, at 30.

<sup>664</sup> *See* WALDRON, *supra* note 38, at 25, 67-68.

<sup>665</sup> LOCKE, *supra* note 113, at bk. 2, ch. 11, ¶ 11.

humans as moral equals, information was required to assure that human thought would develop to the point of adequate capability for the exercise of moral behavior:

All that is needed is some power of abstraction applied to what we see in the world around us: “For the visible marks of extraordinary Wisdom and Power [of God] appear so plainly in all the Works of the Creation, that a rational Creature, who will but seriously reflect on them, cannot miss the discovery of a *Deity*.”

....

Indeed, Locke’s premise is not just original equality, it is original communism – it is “very clear, that God, as Kind *David* says, *Psalm. CXV. Xvj. Has given the Earth to the Children of Men*; given it to Mankind in common”... and even original community. By the law of nature, says Locke, “*Mankind are one Community ... one Society, distinct from all other Creatures.*”<sup>666</sup>

Access to information *about nature* (which leads to revelation of the moral law) was thus a necessary condition in Locke’s thought for political society to exist, by providing the method of distinguishing humans from beasts, and thus was fundamental to the equality of humans found within political society.

Locke also developed his conception of property in response to arguments of Sir Robert Filmer that private property “derogate[d] from the providence of God Almighty to ordain a community which could not continue ... [and] the act of our forefathers, in abrogating the natural law of community by introducing that of property, to be a sin of high presumption?”<sup>667</sup> Locke’s response (discussed above) was to rely on his concern for the self-preservation to permit private property. But Locke’s most fundamental belief (as described above) was that of moral concern of others, the concern for others as moral equals in God’s creation, to permit *their* self-preservation wherever possible. Because sharing knowledge of God’s natural laws (science, nature, and ideas) could not reduce the discoverer’s ability to employ them in nature, the discoverer had a *moral duty* deriving from this fundamental concern for the self-preservation of others to share knowledge of nature that could increase cultivation *by others*.<sup>668</sup> This also followed from Locke’s effort:

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<sup>666</sup> WALDRON, *supra* note 38, at 79, 154 (quoting LOCKE, *supra* note 113, at bk. 1, ch.3, ¶ 9, and 2 LOCKE, *supra* note 36, at 25, 128); *id.* at 88 (considering Locke’s belief that laborers have sufficient free time to learn morality through reason, as a “striking ... endorsement of his position about the fundamental basis of equality – the capacity that almost everyone has to engage in abstract thought sufficient to ‘think of his Soul, and inform himself in Matters of Religion.’”) (quoting LOCKE, *supra* note 113, at ck. 4, ch. 20, ¶ 3).

<sup>667</sup> ROBERT FILMER, OBSERVATIONS CONCERNING THE ORIGINAL OF GOVERNMENT 218 (1652).

<sup>668</sup> See WALDRON, *supra* note 38, at 79-80 (“No matter how inadequate the average human is for a ‘universal, or perfect Comprehension, it yet secures their great Concernments that they have Light enough to lead them to the Knowledge of their Maker, and the sigh of their own Duties.’... The implicit reference here is Locke’s argument for the existence of God.... Knowing that he has been sent into the world by God, ‘by his order, and about his business,’ the individual person has an interest in finding out pretty damned quick what he supposed to do. But Locke believes this also affects fundamentally the way we ought to deal with one another.... Because creatures capable of abstraction can be conceived as ‘all the servants of one Sovereign Maters, sent into the World by his order and about his business,’ we must treat

(with [Richard] Hooker’s help) ... to [make] the case that may be made for the Golden Rule: “Love thy neighbor as thyself” or “Do unto others as you would have them do unto you.”... Richard Hooker’s argument cited by Locke in section 5 of the *Second Treatise* is supposed .... To show that once we acknowledge that no human has a superior status, we have no choice but to treat the needs and desires of others as on a part with our own.<sup>669</sup>

Given this equal concern, humans would want other discoverers to share their information regarding nature freely, so as to better assure the self-preservation of the self, *for the purpose of best preserving God’s creation.*

One can take away the theological purpose behind the duty, but with a moral equality theory in place one cannot treat the *duty* as a matter of solely utilitarian concern (at least if, along with John Rawls, one takes a difference principle approach to morality).<sup>670</sup> As a matter of natural law to Locke, and of equality theory to us, it is a social duty of each person to share knowledge for the good of all other individuals. This is a foundational social *duty*, not merely a voluntary collective commitment (codified by positive law) where each individual should be willing to benefit others so as (on average) to promote the greatest good for the many.<sup>671</sup> Conversely, as a matter of positive law, no

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them as ‘his Property, whose Workmanship they are, made to last during his, not one another’s Pleasure’ and refrain from destroying or harming them.”) (citations omitted); *id.* at 95 (“Locke is arguing that a being with the power of abstraction can recognize that it has an obligation to act in accordance with God’s purposes; and when it sees the same power of abstraction manifested by others, it can recognize that they too have been sent into the world about God’s business, and so they must be respected – equally with oneself – as being commissioned by the purposes of God. This is a natural law argument.”).

<sup>669</sup> *Id.* at 155 (citing 1 RICHARD HOOKER, LAWS OF ECCLESIASTICAL POLITY § 8, 80 (1594)).

<sup>670</sup> See COHEN, *supra* note 77, at 120-21 (John “Rawls says that inequality is justified when it has the effect that those who are worst off are better off than they would be if the inequality were removed. Inequality is (not only justified but) just, for Rawls, when and because it is necessary to enhance the position of the worst off, and he thinks it typically *is* necessary to that end, in virtue of the benign influence on productive motivation of the material incentives associated with economic inequality.... Rawls’s purportedly normative defense of inequality exposes itself, on properly insistent interrogation, as a merely factual defense of it. That is because ... an anti-egalitarian selfishness must be attributed to the more productive, as part of the explanation for why inequality is necessary, to the extent that it is indeed necessary.”). See also JOHN RAWLS, A THEORY OF JUSTICE 151 (Harvard U. Press 1971) [hereinafter JOHN RAWLS, A THEORY OF JUSTICE] (“If, for example, these inequalities set up various incentives which succeed in eliting more productive efforts, a person in the original position may look upon them as *necessary* to cover the costs of training and to encourage effective performance.”); JOHN RAWLS, *Justice as Fairness, in PHILOSOPHY, POLITICS, AND SOCIETY* 140 (Peter Laslett & W.G. Runciman eds., Blackwell 1962) (1957) (“If ... these inequalities work as incentives to draw out better efforts, the members of society may look upon them as concessions to human nature: they, like us, may think that people ideally should want to serve one another. But as they are mutually self-interested, their acceptance of these inequalities is merely the acceptance of the relations on which they actually stand, and a recognition of the motives which lead them to engage in their common practices.”).

<sup>671</sup> See COHEN, *supra* note 77, at 124, 126-27 (“affirmation of the difference principle implies that justice *requires* (virtually) unqualified equality itself, as opposed to the ‘deep inequalities’ in initial life chances with which Rawls thinks justice to be consistent.... The inequality consequent on different material incentives is said to be justified within the terms of the difference principle, for, so it is said, that inequality

private property rights could be granted over the intangible discoveries of science, nature, and ideas even if to do so would (given currently selfish human attitudes) incentivize greater discoveries (and thus more readily increase production capacity for others).<sup>672</sup> Utilitarianism is a moral gamble in regard to nature, and if as Einstein famously stated “God does not play dice,”<sup>673</sup> neither can we (particularly assuming we are created in God’s image).

As John Adams also realized from his Protestant Christian commitments, for Locke knowledge was a good that needed free distribution to enable participation in political society. Thus, Locke sometimes used the term “property” to refer more broadly to the possessions of “Lives, Liberties, and Estates, which I call by the general name, *Property*,” meaning for morally equal individuals that “the ends of government corresponds to a sense that everyone... has proprietorial rights in his person and God-given liberty, which he may intelligibly enter society to protect and which he may legitimately defend ... against despotical encroachment.”<sup>674</sup> The only remedy to prevent spoliation and to maximize production (as teleologically dictated for Locke by God) of discovered science, nature, and ideas was a duty of universal publication (not discussed by Locke but later recognized by Lord Camden, John Adams, and William Robinson).<sup>675</sup>

Given Locke’s principle of appropriation of land as distinct from usufructory rights in fungible nature, the distinction between natural law rights in tangible property and the lack of such rights (at least once properly learned by others rather than stolen from trade secret status) in intangible property was well known to the legal community of England and American in the late 18<sup>th</sup> Century. In *Millar v. Taylor*,<sup>676</sup> when addressing natural and common law copyrights, Justice Willes rejected the “[m]etaphysical

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benefits the worst off of people: the inequality is necessary for them to be positioned as well as they are, however paltry their position may nevertheless be.... [P]rinciples of justice operate in a just society, as Rawls specifies the concept .... [only if] the talented people do affirm the difference principle – that, as Rawls says, they apply the principles of justice *in their daily life* and achieve a sense of their own justice in doing so. But they can then be asked why, in the light of their own belief in the principle, they require more pay than the untalented get, for work which may indeed demand special talent but which is not specially unpleasant)... The talented can be asked whether the extra they get is *necessary* to enhance the position of the worst off, which is the only thing, according to the difference principle, that could justify it.... [I]t is the [talented] themselves who *make* those rewards necessary, through their own unwillingness to work for ordinary rewards as productively as they do for exceptionally high ones, an unwillingness which ensures that the untalented get less than they otherwise would.” (citing, *inter alia*, JOHN RAWLS, A THEORY OF JUSTICE, *supra* note 660, at 7, 528). *Cf. id.* (discussing “the very special cases in which the talented literally *could* not – as opposed to the normal case where they (merely) would not – perform as productively as they do without superior remuneration,” which may have relevance to the obviousness standard in regard to distinguishing when more than normal investments are required to make inventions).

<sup>672</sup> See COHEN, *supra* note 77, at 127-28 (“this conclusion about what it means to accept and implement the difference principle implies that the justice of a society is not exclusively a function of its legislative structure, of its legally imperative rules, but is also a function of the choices people make within those rules.... A society that is just within the terms of the difference principle ... requires no simply just coercive *rules* but also an *ethos* of justice that informs individual choices.”).

<sup>673</sup> Albert Einstein 4114, SIMPSON’S CONTEMPORARY QUOTATIONS (Houghton Mifflin Co. 1988), *available at* <http://www.bartleby.com/63/14/4114.html>.

<sup>674</sup> *Id.* at 126 (quoting 2 LOCKE, *supra* note 36, at 123).

<sup>675</sup> See *supra* notes \_\_\_\_-\_\_\_\_, \_\_\_\_-\_\_\_\_, \_\_\_\_-\_\_\_\_ and accompanying text.

<sup>676</sup> 4 Burr. 2303 (1769 K.B.), 98 Eng. Rep. 201.



reasoning” to extend “the supposed modes of acquiring the property” of physical objects, such as “acorns, or a vacant piece of ground” in the state of nature, because “the comparison does not hold between things which have a physical existence, and incorporeal rights.”<sup>677</sup> Similarly, Justice Aston noted “the capacity to fasten on, as a thing of a corporeal nature, being a requisite in every object of property,” *i.e.*, on rivalrous depletion and on the consequent need for exclusion.<sup>678</sup> Significantly, Justice Aston distinguished the copy of a book from a copy of a machine, because:

the property of the maker of a mechanical engine is confined to that individual thing which he has made; that the machine made in imitation or resemblance of it, is a different work in substance, materials, labour, and expence, in which the maker of the original machine can not claim any property; for it is not his, but only a resemblance of his; whereas the reprinted book is the very same substance; because its doctrine and sentiments are its essential and substantial part....<sup>679</sup>

To Justice Aston, the labor in mechanical inventions created a property right only in the tangible object, not in the intangible principle on which it operated. This was because the tangible object reproduced was distinguishable from the original (in the sense of losing its identification as the tangible object created by the inventor).<sup>680</sup>

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<sup>677</sup> *Millar*, 4 Burr. at 2334. By “acorns,” Justice Willes was referring to Locke’s argument on the restriction of any universal property rights to surplussage that was needed for subsistence by others. See 2 LOCKE, *supra* note 36, at 28 (“[W]ill any one say [that a man] had no right to those Acorns or Apples he thus appropriated, because he had not the consent of all Mankind to make them his?... If such a consent as that was necessary, Man had starved, notwithstanding the Plenty God had given him.”).

<sup>678</sup> *Millar*, 4 Burr. at 2340. See *id.* at 2339 (citing to Pufendorf, Locke, and Grotius for limiting tangible property to “the necessaries of life” and what “any one could use to an advantage of life before it spoiled,” as “beyond this, was more than his share, and belonged to others”); Mossoff, *supra* note 138, at 1258 (noting that the shift from patents as royal prerogative or royal contract to property right or social contract “occurred at approximately the same time as the natural-rights theories of Hugo Grotius, Samuel Pufendorf, and John Locke became popular political and legal currency in England”). See also *id.* at 1282 n.113 (noting Grotius argument that the high seas could not be owned by occupancy) (citing HUGO GROTIUS, THE RIGHTS OF WAR AND PEACE, Bk. 2, ch. 2, § iii (1625)); *id.* at 1282-84 (noting that Grotius’s theory of moral rights to property from occupation was “limited to pre-existing tangible goods,” as was that of Pufendorf) (citing SAMUEL PUFENDORF, OF THE LAW OF NATURE AND OF NATIONS 27-28 (Basil Kenner trans., 1703) (1672)); GROTIUS, *supra*, bk 2, ch. 2, § iii (excluding the high seas from property because one can acquire property rights only in things that can be appropriated and that might be depleted if not carefully managed). Nevertheless, relying largely on the views of William Wollaston regarding the natural law right to property in one’s labor (as derived from exclusion in one’s body as the source of such labor), Justice Aston stated that “[i]t is settled and admitted, and is not now controverted but that literary compositions in their original state, and the incorporeal right of publication of them are the private and exclusive property of the author ... and that if they are ravished from him *before publication*, trover or trespass lies.” *Millar*, 4 Burr. at 2340. See *id.* at 2337 (quoting WOLLASTON, *supra* note 37, at 127-28 (1722)); *id.* at 2342 (rejecting arguments that publication destroys the owner’s natural right in the published words, based on views articulated by Cornelius van Bynkershoek and others that “property ends, when corporeal possession ceases,” because it “seems to be quite harsh and unreasonable”). See generally Smith, *supra* note 561, at 219-21 (discussing Wollaston’s theory and the relation of the sole right to individual human agency to rights in the fruit of one’s labor).

<sup>679</sup> *Millar*, 4 Burr. at 2348-49.

<sup>680</sup> See *id.* at 2349. See also *id.* at 2361 (“yet we all know, whenever a machine is published, (be it ever so useful and ingenious,) the inventor has no right to it, but only by patent; which can only give him a

In contrast, Justice Yates rejected the argument that value (even when created by labor) necessarily resulted in property.<sup>681</sup> More importantly, Justice Yates argued that an inventor did not:

gain the sole property in the abstract principles upon which he constructed his machine.... [because] no act of occupancy can be asserted on a bare idea of the mind. Some act of appropriation must be exerted, to take the thing out of the state of being common, to denote the accession of a proprietor: for otherwise, how should other persons be apprized they are not to use it? These are acts that must be exercised upon something.<sup>682</sup>

In short, property required physical rivalry, so there could be no natural law property in an abstract idea,<sup>683</sup> only in its physical embodiment (and any new embodiment applying the inventive principle would be a separate property). For this reason, patents were created by a positive act of the government, and while applying to the range of physical embodiments applying the inventive idea were restricted from the inventive idea itself.<sup>684</sup>

Nevertheless, utilitarianism has covered over the conceptual and theoretical grounds of these limitations. As Harold Fox cogently recognized:

Granted that the socialists propose to abolish *private* property, the answer to that is that the proposals have been made since the time of Plato and More, and, though many such plans were tried, none have proved successful.

Once it is admitted that property – private property – is an acceptable and proper incident of law and of human life, then the argument against monopoly fails. For every property constitutes monopoly, and everything that we own creates a monopoly. Those rights of property have usually been acquired by purchase – a right which the moralists will agree is

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temporary privilege”). In contrast, the labor in works of authorship created a property right in “[t]he composition ... [a]s the substance; the paper, ink, type, only the incidents or vehicle.” *Id.* at 2349. *See id.* (“his mixing ... his such like materials with the author’s property does not ... render the author’s property less distinguishable than it was before”).

<sup>681</sup> *See id.* at 2356.

<sup>682</sup> *Id.* at 2357.

<sup>683</sup> Justice Yates also argued that ideas are not distinguishable to their discoverers, and thus cannot be the subject of property. “[W]hat distinguishing marks can a man fix upon a set of intellectual ideas, so as to call himself the proprietor of them?” *Id.* at 2366.

<sup>684</sup> *See id.* at 2358 (“at what time and by what act, does the author’s common law property attach?... And in the case of a mechanical invention, it commences from the date of the patent.”). Justice Yates rejected arguments that sale of an invention did not convey the right to reproduce and sell, similar to the arguments for perpetual copyright, because (absent a patent) “it is well known, no such property can exist, after the invention is published.” *Id.* at 2387. In contrast, Justice Mansfield noted that the copy was “incorporeal: it relates to ideas detached from any physical existence,” but rejected as circular the argument that publication converted what was property before publication into common property, as that consequence depended on the lack of legal protection on publication. *Id.* at 2397. *See id.* at 2399.

hardly as high a right as arises from production. John Stuart Mill, the great moralist of the nineteenth century, summed up the position by saying that “it would be a gross immorality in the law to set everybody free to use a person’s work without his consent and without giving him an equivalent.” Jeremy Bentham was no less emphatic, when, in his *Manual of Political Economy*, he said: “With respect to a great number of inventions in the art, an exclusive privilege is absolutely necessary, in order that what is sown may be reaped. In new inventions, protection against imitators is not less necessary than in established manufactures against thieves. He who has no hope that he shall reap, will not take the trouble to sow. But that which one man has invented, all the world can imitate.”<sup>685</sup>

Without God, and with personal utility and happiness as the goal that motivates humans to action, patents are necessary to induce disclosure. Further, without God, it does not matter whether inventors had a natural right to their inventions following publication. If they could not be induced to publish for the good of society, there was no other value to protect, as the inventor could derive the personal benefit of an invention without putting the public in possession of it. So much for the duty of scientists and inventors to their fellow men....

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<sup>685</sup> FOX, *supra* note 61, at 204.