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IMPLICATIONS OF THE PLANT PATENT ACT FOR THE PATENTABILITY OF MICROORGANISMS

INTRODUCTION

Patent law provides a constitutionally sanctioned incentive system aimed at encouraging disclosure of new and useful inventions to the public. The patentee exchanges full and complete disclosure of how to make and use the claimed invention for the court-protected right to exclude others from making, using, or selling the claimed invention for the statutory period of seventeen years. The patent scheme recognizes the investment of time and money by the patentee and protects him from easy and inexpensive duplication of his invention by others, the fear of which would encourage the patentee's keeping his invention a secret. Thus, the effect of the patent system is to assure an open marketplace for technological ideas.

One area of considerable commercial importance, microbiology, has been denied much of the developmental stimulus inherent in the patent system because of judicial reluctance to afford patent protection for a living product, the microorganism itself. Recently, however, the United States Court of Customs

1. U.S. CONST. art. I, § 8, cl. 8, provides that Congress shall have the power "to promote the Progress of Science and useful Arts, by securing for limited Times to ... Inventors the exclusive Right to their ... Discoveries."

2. Although the patent grant is commonly viewed as a contract between an inventor and the federal government, it is promotion of the public's interest in disclosure, and not protection of the patentee's rights, which serves as the motivating force behind the patent system:

The philosophy behind the patent law is very simple. It just says, "Let's encourage disclosure." That is its purpose, its lifeblood, its raison d'être. ... The patent system was the first "freedom of information act" and the first "sunshine law." The system is not based on an award to the inventor. The hope for a profit is the carrot, but any award to the inventor is left entirely to the public. A patent on the unwanted is worthless.


3. 35 U.S.C. §§ 112, 154 (1976) deal with disclosure requirements and the content and term of the patent grant, respectively.

4. In America, if an inventor wants to profit from his invention, he has two alternatives. He can try to keep it a trade secret or he can disclose it. ... If, after years of money, effort, time, blood, sweat, and tears, the inventor discloses his invention, and if there be no adequate patent system, then anyone can simply copy it, and because they have no such investment to recoup they can immediately sell it cheaper. Without protection the inventor will decide "I better keep it a trade secret." Markey, C.J., supra note 2, at 205.

and Patent Appeals issued *In re Bergy (Bergy II)*, a landmark decision in which the court held man-altered microorganisms to be patentable subject matter within the scope of 35 U.S.C. § 101. *Bergy II* consolidated the cases of two prospective patentees. In the first case, Bergy claimed a patent in a biologically pure culture of the microorganism *Streptomyces vellosus*, asserting that it was either a manufacture or composition of matter within the meaning of section 101. Bergy had discovered the microorganism in the course of inventing a new process for producing the antibiotic lincomycin. The new process, utilizing the *Streptomyces vellosus* in controlled laboratory conditions, resulted in a more efficient recovery of lincomycin than was previously possible. The second case involved a patent application for a *Pseudomonas* bacteria that the claimant Chakrabarty genetically modified by high frequency transmission of plasmids into the bacterial cell. Thus altered, the microorganisms were able to degrade crude oil and its residue and, hence, would be useful in controlling oil spills. The single issue considered in *Bergy II* was whether a man-modified microorganism is excluded from the categories of patentable subject matter listed in section 101 solely because it is alive.

The correctness of the court's ruling can only be determined through an examination of the intent of Congress in enacting the patent legislation.

7. 35 U.S.C. § 101 (1976) provides: "Whoever invents or discovers any new or useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."
8. 596 F.2d at 967-68.
9. Bergy's patent claims for the lincomycin-producing process using the microorganism had been allowed by the patent examiner; his claim for the microorganism itself was rejected. *Id.*
10. *Id.* at 968-70. Chakrabarty also developed a process for controlling oil spills utilizing the *Pseudomonas* bacteria he had altered. His patent claim with respect to that process, as well as the process for developing the microorganism, was allowed. *Id.* at 970-71.
11. The narrow, technical issue before the court was whether the particular definitions of their inventions used by Bergy and Chakrabarty in their claims for patents pursuant to § 112 would be allowed. *Id.* at 955. Both Bergy and Chakrabarty had inventions determined to be patentable: the patent claims to the processes utilizing the respective microorganisms were allowed; only the claims for the microorganisms themselves were disallowed. See notes 9 & 10 supra. Section 112 requires that the applicant "particularly [point] out and distinctly [claim] the subject matter which [he] regards as his invention." 35 U.S.C. § 112 (1976). The question whether Bergy's and Chakrabarty's claims were allowable involved, according to the court, what meanings were to be given "manufacture" and "composition of matter" within the context of § 101, 596 F.2d at 955-56, because the applicant must define his invention in his patent claims in such a way as to fall within cognizable subject matter of § 101. In the court's view, therefore, the question was whether certain of Bergy's and Chakrabarty's patent claims to
Unfortunately, the legislative history of the general patent statute, which is in pertinent content essentially the same as the statute passed in 1790 by the First Congress, offers no useful guidance with respect to patent grants for living products; however, subsequent patent legislation may provide such guidance. The 1930 Plant Patent Act is central to the controversy because it specifically concerns living material. The 1930 Act entitles one who discovers or invents and asexually reproduces a new and distinct variety of plant to obtain a patent, excluding others from asexually reproducing the plant and from selling or using any plant so reproduced. Since In re Arzberger it has been clear that the Act does not extend patent protection to microorganisms, despite their scientific classification as plants and their ability to reproduce asexually. The significance of the Act in the context of Bergy II therefore lies in its implications with respect to the general patent provision.

This Note will examine the Plant Patent Act and its import for the question of "aliveness" raised in Bergy II. Although plant patent legislation, which has existed for fifty years without serious constitutional challenge, establishes that the quality of "aliveness" is not a constitutional bar to patentability, the argument can be made that if the quality of "aliveness" necessitated specialized legislation in the case of plants, it is a bar to patentability under the general patent authorization provision. It is therefore essential to understand the

their respective finds — the claims to the microorganisms themselves — were cognizable as manufactures or compositions of matter within the meaning of § 101.

The court distinguished this narrow issue from the broader question whether Bergy and Chakrabarty had made patentable inventions in their microorganisms. That Bergy and Chakrabarty had patentable inventions had already been determined. The court thus saw its role as interpreting § 101 and not creating or "extending" patent law. See id. at 955.

The reason the issue whether a man-modified microorganism is excluded from the categories of patentable subject matter is couched in negative terms of exclusion lies in the nature of the subject matter. Patent law regulates the products of innovation, and innovation connotes the unforeseen. The question, therefore, cannot be whether Congress foresaw the specific technological advances involved in Bergy II and intended that they be included in § 101 but whether Congress intended to deny patent rights under § 101 solely on the basis of "aliveness." See id. at 973-76. It is important to note that no prior case had held that § 101 either explicitly or implicitly precludes granting a patent simply because the subject matter is alive. See id. at 971.

14. Tuber-propagated plants (e.g., potatoes) are specifically excluded from plant patent protection. Id. § 161. Undoubtedly, this exception is based on the impossibility of enforcing patent protection for the asexual reproduction of a plant, where the reproductive part of the plant is sold for food.
15. 112 F.2d 834 (C.C.P.A. 1940).
16. In In re Arzberger, the Court of Customs and Patent Appeals held that Congress "in the use of the word 'plant,' was speaking 'in the common language of the people,' and did not use the word in its strict scientific sense." Id. at 838. This decision has been variously criticized, and many commentators have maintained that reconsideration and reversal of the ruling are in order. See, e.g., Daus, Bond, & Rose, Microbiological Plant Patents, 10 IDEA 87 (1966); Irons & Sears, supra note 5, at 329–31.
17. See, e.g., In re Bergy, 596 F.2d 952, 999–1002 (1979) (Miller, J., dissenting).
purposes motivating passage of the Plant Patent Act in order to determine whether living organisms per se are barred from the statutory subject matter of section 101. This Note suggests that passage of the 1930 Act was necessary only because plant breeding requires innovation different in kind and degree from that needed to obtain a patent under section 101. Moreover, the principal reason why several commentators have interpreted the 1930 Act as a response to the "aliveness" of plants, rather than to their unique status as inventions, is the difficulty of describing living organisms in detail, a difficulty that is acknowledged in the statute itself. Description problems simply indicate that "aliveness" is one characteristic of the invention. The quality of life does not constitute the essence of an invention, either in the case of plants or in the case of the Bergy II microorganisms.

**Bergy II**

In Bergy II the Court of Customs and Patent Appeals reaffirmed its earlier rulings in favor of microorganism patentability in In re Bergy (Bergy I) and In re Chakrabarty. After the initial decisions in those cases, the Supreme Court granted certiorari with respect to Bergy I but did not confront the issue presented. Instead, it summarily vacated the Court of Customs and Patent Appeals' decision and remanded the case for further consideration in light of Parker v. Flook. In light of the Court's action in Bergy I, the Court of Customs and Patent Appeals, at the government's request, vacated its ruling in Chakrabarty, choosing to rehear and decide the two cases as though formally consolidated.

Upon reconsideration of the two earlier cases, the Court of Customs and Patent Appeals found the Supreme Court's decision in Flook wholly inapplicable to product claims for man-modified microorganisms. Flook had held a claimed process to be nonpatentable subject matter where its only arguably novel feature

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19. 35 U.S.C. § 162 (1976) states that a plant patent cannot be declared invalid if its description "is as complete as is reasonably possible."
23. 596 F.2d at 957.
24. Id. at 967.
was an unpatentable mathematical formula. The court concluded that the only relevant link between Flook and the Bergy I and Chakrabarty cases was the issue of statutory interpretation of section 101 subject matter. Inasmuch, however, as Flook involved interpretation of the word "process" within the meaning of section 101, it was not useful in deciding what was a composition of matter or manufacture, the question posed in Bergy II. Quoting the Flook holding that an "improved method of calculation . . . is unpatentable subject matter," the court stated that since the cases before it did not involve methods of calculation, Flook, strictly speaking, had no bearing. It went on, however, to consider the implications of the Flook opinion for the meaning of section 101.

The court said that neither Bergy's nor Chakrabarty's microorganism could be excluded from the categories of statutory subject matter as being within the traditional principles or laws of nature exclusions. It also pointed out that the microorganisms could not be excluded on the basis of being within the prior art in the way the Supreme Court related that concept to the scope of statutory subject matter in Flook. Both the patent examiner and the Board of Appeals of the Patent and Trademark Office in each case had expressly found that no question of the prior art had been raised.

25. The process was a method of calculation for certain alarm limits in the process of catalytic conversion of hydrocarbons. Its essential feature was a new formula for computing the values of the alarm limits. See 437 U.S. at 587. The Supreme Court declined to consider the novelty of the formula itself; rather, it treated the formula as a mathematical expression of a well-known scientific principle. Id. at 588-89. Laws of nature, natural phenomena, abstract intellectual concepts, and scientific truths had never been considered patentable because they could not be said to be the invention of the patent seeker. Id. at 589. See also I A. DELLER, WALKER ON PATENTS § 14 (2d ed. 1964). Consequently, the Court held: "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." 437 U.S. at 594. Whether the scientific principle at issue in Flook was, in fact, well-known was irrelevant; it had always existed in nature, and its discovery could not support a patent, there being no other new and useful aspect to its application. Id.

26. 596 F.2d at 964–65. Both Bergy's and Chakrabarty's process claims had been allowed. See notes 9 & 10 supra.

27. 596 F.2d at 965 (quoting Parker v. Flook, 437 U.S. 584, 595 (1978)).

28. Id.


30. 596 F.2d at 965–66. See also note 25 supra.

31. 596 F.2d at 966. Judge Rich, writing for the majority, expressed concern over the Supreme Court's evident confusion in Flook in the application of § 101, which requires only that a claimed invention be useful and that it fall within one of the listed subject matter categories, and §§ 102 and 103, which set forth the criteria of novelty and nonobviousness respectively. Id. at 965–66. The novelty and nonobviousness criteria are not applied until
Finally, the Court of Customs and Patent Appeals specifically rejected the applicability of dictum from *Flook* that suggested that the judiciary "proceed cautiously when . . . asked to extend patent rights into areas wholly unforeseen by Congress." The court noted that *Deepsouth Packing Co. v. Latram Corp.* the case cited by the Supreme Court in *Flook* in support of this contention, was inapplicable in the context of *Bergy II*. *Deepsouth* dealt with a request to make a change in the law by expansion or overruling prior interpretations of a statute. By contrast, what was contemplated in *Bergy II*, a case of first impression, was a straightforward interpretation of section 101.

Before considering the merits of Bergy's and Chakrabarty's appeals, the Court of Customs and Patent Appeals noted the basis of the Board of Appeals' conclusion that the microorganisms were not patentable subject matter because they are alive. Although the Board acknowledged that section 101 did not expressly exclude living matter from the covered subject matter, it argued that if Congress had intended to include living matter in section 101, it would not have found it necessary in 1930 to enact special patent legislation for plants, the claimed invention satisfies one of the subject matter categories of § 101. *Id.* at 960–64. An invention must be novel in that it evidences a change from that which went before, *i.e.*, the prior art. P. Rosenberg, *Patent Law Fundamentals*, ch. 6, § 1 (1975). Nonobviousness refers to the character of this change: if the difference between the claimed invention and the prior art is such that the invention as a whole would have been obvious at the time it was made to any person skilled in the art, then the invention fails for obviousness. *Id.* ch. 8, § 2. See note 66 infra.

The court emphasized that prior art is irrelevant with respect to the preliminary determination of subject matter patentability under § 101. Only after an invention has been shown to be encompassed within one of the statutory categories does prior art become a consideration. 596 F.2d at 962–63. In *Flook*, however, the Supreme Court had arguably relied upon the concept of prior art in rejecting the applicant's process claim under § 101. The Court equated the abstract scientific principle embodied in *Flook*'s mathematical formula with the prior art and held that the process depending on the formula was not within the categories of patentable subject matter. 437 U.S. at 594. As a result, the decision leaves unclear whether the claimed process is unpatentable because the formula on which it depends, like a law of nature, is non-statutory subject matter per se or because the formula is obvious given its origin, *i.e.*, an abstract principle that has always existed in nature. In any event, neither objection properly arises in the context of determining what is a process within the meaning of § 101.

The Court of Customs and Patent Appeals summarized the distinction: "It is one thing to say that a principle, natural cause, or formula, per se, is not within the categories of § 101, but quite another to say it is prior art in determining the nonobviousness of an invention predicated on it even though the inventor discovered it." 596 F.2d at 966. It foresaw that the Supreme Court's equation of laws of nature and the prior art might undermine the established rule that patentability can be predicated on discovery of a problem's cause, even though, once that cause is known, the solution is effected by obvious means. Discovered causes are oftentimes classed as laws of nature or their effects: if such causes are considered part of the prior art, their discovery in conjunction with an obvious solution would not support a finding of patentability. *Id.*

32. 437 U.S. at 594.
34. 596 F.2d at 966–67.
35. *Id.* at 971.
which are living matter. If living matter fell within section 101, the Plant Patent Act was superfluous. The Board reasoned, therefore, that the Congressional intent in enacting the general patent legislation was to exclude living matter from the statutory categories.

Holding that microorganisms were patentable subject matter under section 101, the Court of Customs and Patent Appeals noted that a new technology need not have been foreseen by Congress at the time of enactment of section 101 for it to fall within the section. Indeed, such a restriction would negative the purpose to provide an incentive to invent, especially in light of modern technological advances. The court found that the claims involving Bergy's and Chakrabarty's modified microorganisms could fall within the language of section 101, which had historically been interpreted broadly. What the patent legislation traditionally had encouraged was the development of new industries. The court noted the burgeoning industry involving microorganisms, analogous to industries utilizing and creating non-living chemicals, which had always been considered patentable subject matter. The difference between inanimate chemicals and living organisms used for their chemical reactions was not legally significant.

Moreover, since processes utilizing microorganisms had always been within section 101, the court found it "illogical" that the microorganisms themselves should be excluded as patentable subject matter.

In the earlier Chakrabarty and Bergy I opinions, the Court of Customs and Patent Appeals had found that the legislative history of the Plant Patent Act of 1930 had no relationship to, and, therefore, no bearing on, the cases dealing with microorganisms. In Bergy II, the court reasserted this position. However, because the Board of Appeals' position in Bergy II was based solely on the negative implication drawn from the Plant Patent Act that life forms were never intended to be included in the general patent legislation, the court believed it was necessary to consider the history and purposes of the Act. It first denied that the Act could reflect the legislative intent of the earlier Congress that had enacted the original patent statute. The court enumerated three reasons for passage of separate plant patent legislation: to afford agriculture the same incentives enjoyed by industry, to avoid the judiciary's "product of nature" prejudice, and to mitigate the description problems encountered in living

36. Id.
37. Id. at 973–74.
38. Id.
39. Id. at 974–75.
40. Id. at 975.
41. Id. at 977.
43. 596 F.2d at 978.
44. Id. at 978–79.
45. Id. at 982.
46. Id. at 982–83. Much has been written about the judicially-created "product of nature" objection. E.g., Jacob, Patentability of Natural Products, 52 J. PAT OFF. Soc'y 473
inventions." It concluded that the purposes of enactment of plant patent legislation created no inferences about the patentability of living organisms as a class — in 1930, Congress was thinking about plants, and plants alone.

Finally, in response to the Board of Appeals' contention that allowing these claims would be an unwarranted extension of the patent law, the majority noted that over the years numerous patents had issued for manufactures, compositions of matter, and processes that incorporated living organisms and their life functions and questioned the logic of disallowing patentability simply because the man-modified product was the organism itself. The court concluded that


The relevant case law indicates that the objection is not a distinct doctrine applied consistently by the courts. See, e.g., American Fruit Growers, Inc. v. Brogdex, 283 U.S. 1 (1930) (decay-resistant, borax-treated oranges held unpatentable); In re Marden, 47 F.2d 957 (C.C.P.A. 1931) (ductile uranium held unpatentable); General Electric Co. v. DeForest Radio Co., 28 F.2d 641 (3d Cir.), cert. denied, 278 U.S. 656 (1928) (purified ductile tungsten held unpatentable). But see Merck & Co., Inc. v. Olin Mathieson Chem. Corp., 253 F.2d 156 (4th Cir. 1958) (vitamin B12 recovered from life processes of microorganisms held patentable); Parke-Davis & Co. v. H. K. Mulford Co., 189 F. 95 (S.D.N.Y. 1911), aff'd, 196 F. 496 (2d Cir. 1912) (purified adrenalin extracted from the suprarenal glands of living animals held patentable). The "product of nature" cases diverge along two lines that one commentator has labeled the restrictive and the expansive views. Kip, supra, at 377–83. While the restrictive school emphasizes the previous inherent being of a natural product or a process, regardless of its practical availability, the expansive school stresses the newly accessible effects of the discovery to demonstrate that the claimed subject matter in itself is not identical with what was known or used or practically available before, and hence does not encroach upon a public right. In so doing, as far as tests of statutory novelty are concerned, the expansive school classifies contrivances composed of natural elements in the same category as artificial patentable subject matter.

Id. at 380–81. Another commentator has ably criticized the restrictive approach for its practical effects:

There was evidence in these cases of a large amount of effort, research, and originality expended by inventors in man-making them. Therefore, if a definition of the term "product of nature" were adopted from these decisions, it would be so broad that the "product of nature" rule would seriously if not completely curtail patentability of products of any sort. Other cases indicate, however, that the true definition of "product of nature" is much narrower. It appears from these decisions that, as generally defined, a product of nature is one occurring on the earth in a form that has not been changed by any act of a human being.

47 Mich. L. Rev. 391, supra, at 395 (footnotes omitted). Given the uncertain climate created by these cases, it is understandable why Congress might be concerned about judicial disfavor of patent protection for new varieties of plants.

47. 596 F.2d at 984.

48. Id.

49. Id. at 985–86. Perhaps the most famous of such patents was issued to Louis Pasteur in 1873 for a purified form of yeast. One commentator views Pasteur's patent as evidence that Bergy's claimed invention "involves not so much new technology as an unobvious advance in a very old technology." Kiley, Common Sense and the Uncommon Bacterium — Is "Life" Patentable?, 60 J. Pat. Off. Soc'y 468, 470 (1978).
allowing microorganism product patents to issue was not the unsupportable
extension of patent rights proscribed by the dictum in Flook.\textsuperscript{50}

Judge Baldwin concurred in the result reached by the majority, but
disagreed with the conclusion that Flook had no applicability to the issues
presented in Bergy II.\textsuperscript{51} Examining the cases cited by the Supreme Court in
Flook, Judge Baldwin found that "[t]he common thread throughout these cases
is that claims which directly or indirectly preempt natural laws or phenomena
are proscribed, whereas claims which merely utilize natural phenomena via
explicitly recited manufactures, compositions of matter or processes to accom-
plish new and useful end results define statutory inventions."\textsuperscript{52} He concluded
that Bergy's and Chakrabarty's claimed microorganisms, though not found in
nature in the state claimed in the patent applications, performed functions that
are phenomena of nature. However, neither Bergy nor Chakrabarty attempted
by his claim to preempt performance of these functions.\textsuperscript{53} The lack of natural
phenomena preemption in Bergy's and Chakrabarty's claimed inventions, in
addition to the constitutional patentability of living things as demonstrated by
the Plant Patent Act, convinced Judge Baldwin that man-modified microorgan-
isms are patentable subject matter within the scope of section 101.\textsuperscript{54}

Judge Miller, the sole dissenter, believed that the majority had missed the
main point of Flook. He understood the point to be that, inasmuch as Congress
could not have foreseen much of new technology, the courts should move slowly
in extending the law in particular areas when there is "substantial doubt" as to
the intent of Congress in an area.\textsuperscript{55} The issue presented in Bergy II raised such a
substantial doubt. He cited the passage of the 1930 Plant Patent Act, which
extended patent protection to certain asexually reproduced plants, as a strong
indicator of Congressional intent in the original patent provision. He reasoned
that passage of the specialized statute would have been superfluous had living
organisms been patentable under the 1790 Act, and rules of statutory
construction support a presumption that Congress does not legislate unnecessar-
ily.\textsuperscript{56} Judge Miller thus emphasized the issue that is central to this Note: What
characteristic of the plant breeder's work spurred Congress to enact special
patent protection apart from that already afforded under the general patent
provision?

\textsuperscript{50} 596 F.2d at 984–86.
\textsuperscript{51} Id. at 988. Judge Baldwin's concurrence may be most interesting for his conversion
from his previous position in Bergy I, 563 F.2d at 1039–42 (Miller, J., Baldwin, J.,
dissenting), and In re Chakrabarty, 571 F.2d at 44–45 (Baldwin, J., dissenting).
\textsuperscript{52} 596 F.2d at 988.
\textsuperscript{53} Id. at 996–97.
\textsuperscript{54} Id. at 998–99.
\textsuperscript{55} Id. at 999.
\textsuperscript{56} Id. at 999–1002.
PLANT PATENT ACT

THE 1930 PLANT PATENT ACT

1. Purposes Motivating Passage of the Act

The Plant Patent Act was the first legislation anywhere in the world to take cognizance of the value of the plant breeder's work and, hence, the need to extend the incentives of the patent system to this area. One commentator of the time expressed the hopes of the legislation's supporters:

It will be extremely interesting to follow the new developments in plant breeding in order to determine the influence of the new patent protection on agriculture. In years to come, much of the food consumed, many of the clothes worn and even the houses occupied by man may be radically changed by the mass attack of plant breeders so that the future generations may speak of a horticultural revolution rivaling, if not surpassing the great industrial revolution.

The express purpose of the Act was to afford agriculture the same economic incentives for experimentation and invention that industry enjoyed.

Despite the express desire to extend the same economic benefits of the patent scheme to inventors of both plants and manufactures, Congress' treatment of agriculture and industry indicates a perceived distinction in the nature of the processes involved in the development of new plant varieties and the invention of a "process, machine, manufacture, or composition of matter." The distinction becomes clearer in light of a statement made by Judge Baldwin in his dissent to the Court of Customs and Patent Appeals' initial decision in Chakrabarty:

The law, as propounded by the Supreme Court, defines three alternatives. Between true "products of nature" and statutory subject matter of "manufactures" lies an intermediate category of things sufficiently modified so as not to be products of nature, but not sufficiently modified so as to be statutory "manufactures."

57. 11 CLEV.-MAR. L. REV. 430, 430 (1962).
59. H.R. REP. No. 1129, 71st Cong., 2d Sess. 1 (1930); S. REP. No. 315, 71st Cong., 2d Sess. 1 (1930). Unfortunately, the Act did not produce the intended effect. Eighteen years after passage of this legislation, one commentator noted that, of the few plant patents which had been issued, most had been for new varieties of flowers and fruit- and nut-bearing plants resulting in a "surprising dearth of patents granted for potentially valuable utilitarian or agricultural purposes." Magnuson, A Short Discussion on Various Aspects of Plant Patents, 30 J. PAT. OFF. SOC'Y 493, 511 (1948). See also Dienner, Patents for Biological Specimens and Products, 35 J. PAT. OFF. SOC'Y 286, 289–93 (1953). Although the Plant Patent Act has not spurred dramatic innovation in the field of agriculture, it may yet contribute heavily to progress in science and the useful arts because of its implication in the controversy surrounding microorganism patentability.
60. 571 F.2d at 45.
The Plant Patent Act protects inventions or discoveries that fall within this intermediate category. Nonetheless, invention as applied to plant patents comprises the same two inventive acts which are required in other patents: conception and reduction to practice. Conception is the recognition that a new variety exists, and reduction to practice consists of asexual reproduction of the new variety.

In the plant patent context, these two inventive acts, although they may be preceded by years of patience and skillful breeding, are so intertwined with the natural processes of growth and reproduction as to fall somewhere in the intermediate area of the continuum propounded by Judge Baldwin.


The constitutionality of the specialized plant patent legislation was questioned at the time of its proposal before Congress in 1930. The Constitution authorizes Congress to grant exclusive rights to only two classes of persons—authors and inventors. Whether the plant originator qualified as a "constitutional inventor" was addressed by the Senate Committee on Patents in its report on the proposed bill. The Committee asserted that "there is no apparent difference . . . between the part played by the plant originator in the development of new plants and the part played by the chemist in the development of new compositions of matter." Like the former, the chemist who invents relies upon the natural properties of his materials. The Committee added the following statement:

But even were the plant developer's contributions in aid of nature less creative in character than those of the chemist in aiding nature to develop a composition of matter which has theretofore been non-existent (an assumption which the committee does not believe to have basis in fact and which is here made solely for the purposes of argument), nevertheless the protection

61. The legislation focuses upon protection of new varieties of plants. A variety is the basic category of plant classification. In fact, every plant may be considered a variety in that it possesses its own individual characteristics, whether as a result of chromosomal changes, cultivation methods, environmental factors, or any combination of the three. 11 CLEV.-MAR. L. REV. 430, 430 (1962). Much of the time, these individual variations are too insignificant to perpetuate; however, when a plant manifests unique characteristics of distinctive usefulness or beauty, the plant breeder can preserve the variety by asexual reproduction.

New and distinct varieties may be cultivated from sports, mutants, hybrids, and new found seedlings. For an explanation of the first three plant types, see Rossman, supra note 58, at 13. New found seedlings, asexually reproduced by the patentee, became patentable subject matter under the 1954 amendment to 35 U.S.C. § 161. For a discussion of this amendment, see text accompanying notes 83 to 90 infra.


63. S. REP. No. 315, 71st Cong., 2d Sess. 7 (1930).
This statement suggests that the statutory standards of invention for "any new and useful art, machine, manufacture, or composition of matter" — the ordinary patent subjects — are more rigorous than is the constitutional standard.

64. Id. at 8. See also 596 F.2d at 1001 (Miller, J., dissenting). Judge Miller interpreted the Committee's remark as its recognition of a dichotomy existing between animate and inanimate inventions. For him, the quality of animateness, or life, predominated over any distinction which could be made between plants and other patentable subject matter.

65. Act of March 3, 1897, ch. 391, § 1, 29 Stat. 692 (1897) (amending 60 R.S. § 4886 (1878), current version at 35 U.S.C. § 101 (1976)). In 1930, the list of patentable subject matter under the general statute did not include "process" as does the current statute, although "process" is probably synonymous with "art" as used in the older statute. See I. A. Deller, Walker on Patents, supra note 25, § 15.

66. Among commentators, whether there is in fact a constitutional standard of invention is a hotly debated issue. See, e.g., Irons & Sears, The Constitutional Standard of Invention — The Touchstone of Patent Reform, 1973 Utah L. Rev. 653 (1973). But see, e.g., Markey, Special Problems in Patent Cases, 57 Pat. Off. Soc'y 675 (1975); Rich, The Vague Concept of "Invention" as Replaced by § 103 of the 1952 Patent Act, 8 IDEA 136 (1964); Rich, Principles of Patentability, 28 Geo. Wash. L. Rev. 393 (1960). As discussed in the text above, Congress purportedly determined that plants are patentable subject matter. However, the question still existed, and to some extent still exists, whether particular subject matter must meet a constitutional standard of invention to be patented or whether satisfaction of the statutory requirements satisfies the Constitution. The controversy today centers on the nonobviousness requirement of 35 U.S.C. § 103, which first appeared in the 1952 revision of the general patent statute. See note 31 supra. Congress added the requirement in an attempt to clarify a confusing array of past cases which had demanded that a claimed process or product possess the elusive quality of "invention." See H.R. Rep. No. 1923, 82d Cong., 2d Sess. 7 (1952). The confusion had culminated in Cuno Eng'r Corp. v. Automatic Devices Corp., 314 U.S. 84 (1941), in which the Supreme Court held a claimed patent invalid for failure to display "the flash of creative genius," as opposed to the mere "skill of the calling." Id. at 91. Prior to the 1952 amendment, subject matter and the criteria to patentability were combined in a single section of the statute. Act of May 23, 1930, ch. 312, § 1, 46 Stat. 376 (1930), providing in pertinent part, "any person who has invented or discovered any new and useful art... not known or used by others, and not patented or described in any printed publication... and not in public use... may... obtain a patent therefor." (emphasis added). Courts had read this section to require utility, novelty and "invention."

The nonobviousness requirement codified a test for invention that had developed in the cases; i.e., whether "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole should have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. § 103 (1976). Cf. Hotchkiss v. Greenwood, 52 U.S. (11 How.) 248, 267 (1851) ("[F]or unless more ingenuity and skill in applying the old method... were required in the application of it [to the new use] than were possessed by an ordinary mechanic acquainted with the business, there was an absence of that degree of skill and ingenuity which constitute essential elements of every invention."). Inasmuch as Congress in the 1952 amendment intended to eliminate the confusing aspects of the judicial concept of invention and codify what was the essence of the requirement of invention, it has been argued that satisfaction of the requirements of the patent statute...
Congress' determination that the products of plant breeders could meet a threshold standard of invention and thus that plant breeders are within the constitutional class of inventors led it to amend the general patent statute to include new varieties of plants which had been asexually reproduced as an additional category of patentable subject matter. In enacting the Plant Patent Act, however, Congress failed to acknowledge that although the products in the new category shared the constitutional minimal inventiveness of the other categories, there is an important distinction between the utility patent categories and the new category for asexually reproduced plants. In contrast to the entirely man-made utility patent product, natural processes are necessarily involved in the plant innovators' "invention." Rather than alleviating the courts' product of nature prejudice, including asexually reproduced plants in the categories of patentable subject matter, as Judge Rich discussed in the majority opinion in *Bergy II*, seemed instead to perpetuate the prejudice by failing to make the distinction.

This statutory union was criticized:

There are such fundamental differences between plant breeding and mechanical invention that the attempt to form a biologio-legal hybrid between them seems fraught with needless difficulties. Genus hybrids are notoriously sterile, and indications are that this union of life and law is no exception. Just as design patents are dealt with under a separate statute, so should plant patents be considered to be distinct, having only a slight connection with mechanical and chemical patents.

These remarks came in the wake of the first court test of the plant patent legislation, *Cole Nursery Co. v. Youdath Perennial Gardens, Inc.* In *Cole Nursery*, the court invalidated a patent issued for the upright barberry plant, which had been developed by a process of selection and genetics through five generations of seedling planting and growth. Dictum in the opinion reflects the
conceptual difficulty created by merging the new legislation with the inventor's traditional subject matter:

The use of nature and knowledge of propagation of plant life seem to me to have been the forces behind the development of the upright variety of barberry. I am not prepared to accord invention to the result produced by such uses in respect of the upright barberry; but if it were otherwise, the fact of the knowledge and existence of the plant prior to the amendment of May, 1930, and its prior public use, would fatally impair its validity.72

One commentator expressed concern over the court's belief that the active process of selective breeding did not constitute invention. If breeding techniques could not produce a valid patent, then patents obtained for sports and mutants, sporadic abnormalities over which the breeder has no control, would be invalid also.73

A subsequent case, *Ex parte Foster*,74 proved these exact fears unfounded. In Foster, the Board of Appeals of the Patent and Trademark Office made a distinction between persons who have engaged in "plant cultivation or care" and plant explorers who have accidentally happened upon what they recognize to be a new variety in nature.75 In Foster, the applicant, a professional in plant cultivation, propagation, and hybridization, while on a business trip to South America, discovered in a downtown garden in a Colombian city two syngonium plants that differed from the other syngoniums in the garden. He returned to Florida with the two plants, decided that they were a new variety, and asexually reproduced them.76 The Board of Appeals held that the words "invented or discovered" and "new" have the same meaning whether applied to plants or other classes of patentable subject matter. Because the plants found by the applicant had previously existed in nature, they did not satisfy the terms of the statute.77 As a basis for its holding, the Board specifically noted that all classes of patentable subject matter are listed in the same sentence of the statute, with no language to signal differential treatment of any particular class.78

72. Id. at 160.
73. Cook, supra note 70, at 190.
74. 90 U.S.P.Q. 16 (1951).
75. Id. at 18.
76. Id. at 17.
77. Id.
78. Id. The Board also found support for its decision in the legislative history of the Plant Patent Act. Id. at 17-18. In its report on the proposed bill, the Senate Committee on Patents had disapproved the proposal to grant patents on mere finds:

[1]It is to be noted that the committee has, by its amendment in striking out the patenting of "newly found" varieties of plants, eliminated from the scope of the bill those wild varieties discovered by the plant explorer or other person who has in no way engaged either in plant cultivation or care and who has in no other way facilitated nature in the creation of a new and desirable variety.

S. REP. NO. 315, 71st Cong., 2d Sess. 7 (1930).
The Plant Patent Act is now codified separately from the general patent provisions. The new section, 35 U.S.C. § 161, engrafts the Act onto the general patent law, requiring that the provisions of Title 35 "relating to patents for inventions shall apply to patents for plants, except as otherwise provided." The only express exception appears in section 162, which relaxes the description requirements for plant patents, so that the claimed plant variety must satisfy the criteria of novelty and nonobviousness demanded of all other inventions. The application of these criteria is secondary to a determination of subject matter patentability, however. Although plant products must satisfy the general standards of patentability, the statutory separation of plants from other patentable subject matter facilitates the different conceptualization of invention necessary when the invention is a plant.

A further example of the different conceptualizations of invention is found in the 1954 amendment to the Plant Patent Act, which specifically excludes plants "found in an uncultivated state" from patent protection. The legislative history of the amendment indicates that its purpose was clarification of Congress' intent that patent protection be afforded to one "who through no particular efforts of his own other than perhaps by accident, develops a new plant which is, nevertheless, due to his activity." In a memorandum reviewing the proposed amendment, Commissioner of Patents Watson pointed out the ambiguity in the statutory language: "It is possible that the references to cultivation in the present bill might be urged as distinguishing from a pure chance find. . . [However,] it is not certain whether the new plant itself must be the subject of cultivation, or must merely be found in a cultivated area." Commissioner Watson noted that under the terms of the statute, a prospective patentee might simply recognize, i.e., discover, a new variety that he finds growing in his neighbor's garden. This happenstance would be tantamount to a chance find, and a statute authorizing patent grants for such discoveries would be of dubious constitutionality.

Commissioner Watson's hypothetical case became an actual case in Ex parte Moore. In Moore, the Board of Appeals of the Patent and Trademark Office held

80. Id. § 161.
81. Id. § 162.
82. See text accompanying notes 94 to 104 infra.
87. Id. See also Irons & Sears, supra note 5, at 328 n.31. Irons and Sears suggest that the 1954 amendment, construed to provide protection for chance finds, is unconstitutional in that it permits grants to issue on products of nature. For a discussion of the product of nature objection, see note 46 supra.
that one who recognizes a new variety growing in his neighbor's yard and asexually reproduces it with his neighbor's permission has a valid claim for a patent over the neighbor's claim because the neighbor did not recognize the new variety and so could not have been the "discoverer." One commentator has pointed out that the fact patterns in Moore and Foster are virtually indistinguishable: both cases seem to involve chance finds in cultivated areas, yet Moore's plant patent was determined to be valid, while Foster's patent was invalidated. Although Moore was adjudicated after the 1954 amendment, it is difficult to understand how the variety claimed by Moore was brought into existence "due to his activity" any more than was the plant claimed by Foster. Despite the amendment's declared purpose of merely clarifying existing law, the Board of Appeals' interpretation of the amendment has led to the creation of new law. Nonetheless, Moore makes clear that a "plant invention" requires innovation different in kind and degree from that needed to obtain a utility patent. In other words, the innovation required of the plant patentee is to "appreciate" that a plant variety is new. Without recognition of such appreciation, the plant breeder would not be motivated to reproduce the plant and the variety would be lost.

3. Description Problems

The principal reason why several commentators have focused upon the characteristic of life as the distinguishing feature of patentable plants, rather than upon the unique approach to their invention, is the difficulty of describing a living organism in detail.

From a written and/or pictorial description of the usual utility or design patent, one skilled in the relevant art can make and use the invention. This is not true of living matter. A mere description is incapable of placing the plant in the hands of the public. Consequently, the paper application is not deemed an enabling disclosure.

Because of this distinction, the Court of Customs and Patent Appeals in In re LeGrice ruled that the publication of the descriptions of two new Rosa

89. Id. at 147.
90. 11 CLEV.-MAR. L. REV. 430, 435 (1962). This commentator does identify one point of distinction between the two cases: in Foster, two plants of the new variety were discovered by the patentee giving rise to the inference that the variety had already existed in nature. The Board of Appeals in Foster did not rely upon this point in its opinion, however. Id.
91. Id.
93. 115 U.S.P.Q. at 147.
95. P. ROSENBERG, supra note 31, ch. 5, § 1.5 (footnote omitted).
96. 301 F.2d 929 (C.C.P.A. 1962).
floribunda varieties in an English catalog would not invalidate the applicant’s claim for their invention made one year later. A printed description of the plant placed nothing in the hands of the public; therefore, a patent grant on each plant would not deprive the public of anything that it had previously enjoyed. A corollary to this rule is that a plant patente cannot establish infringement unless he can show that the accused’s plant is the asexual progeny of his patented variety. This means, as a practical matter, that the patente must prove that the alleged infringer had access to the patente’s stock. Plant patents involve a singular biological entity. In fact, there cannot be a basic or dominating patent that encompasses a later, narrower claim in the plant context — a situation that frequently arises with mechanical patents.

Specification difficulties for living organisms result from genetic instability in the reproductive process. The principal reason for the provision in the Plant Patent Act for only asexual reproduction of the newly-discovered variety is to preserve the unique characteristics of the plant:

If an attempt is made to reproduce [the plant] by planting [its] seeds, many of the desirable characteristics found in the parent will divide up among the offspring with mathematical exactness as determined in Mendel’s law of heredity, and others produced by the chance union of complementary mendelizing “factors,” will not reappear in the progeny.

The Court of Customs and Patent Appeals alluded to the problem of genetic instability in LeGrice:

While man can and does assist nature by the cross-pollination of selected parent plants, the actual creation of the new plant, because of the almost infinite number of possible combinations between the genes and chromosomes, is not presently subject to a controlled reproduction by act of man. While those skilled in this art now understand the mechanics of plant reproduction and the general principles of plant heredity, they are not presently able to control the factors which govern the combinations of genes and chromosomes required to produce a new plant having certain predetermined desired properties.

97. Id. at 944.
98. Kim Bros. v. Hagler, 167 F. Supp. 665 (S.D. Cal. 1958), aff’d, 276 F.2d 259 (9th Cir. 1960); Armstrong Nurseries, Inc. v. Smith, 170 F. Supp. 519 (E.D. Tex. 1958). See also Langrock, Plant Patents — Biological Necessities in Infringement Suits, 41 J. PAT. OFF. Soc’y 787 (1959). Langrock asserts that the requirement of proving physical appropriation creates an almost insurmountable burden for the plaintiff patentee. He suggests that the law be changed to create a presumption of infringement upon a showing that the defendant’s allegedly infringing plants are “substantially the same” as the patented variety and that the defendant had a “minimum opportunity” for appropriation. The burden of proof would then shift to the defendant who, after all, is in the best position to explain the origin of his plant. Id. at 789–90.
100. Rossman, supra note 58, at 13.
101. 301 F.2d at 938.
There are, however, considerations militating against the genetic instability argument, especially in light of recent developments in the area.\textsuperscript{102} The court in LeGrice noted that the rapidly evolving fields of plant heredity and plant eugenics might someday make it possible to file a written description of a new plant that would constitute an enabling disclosure.\textsuperscript{103} The Plant Variety Protection Act of 1970,\textsuperscript{104} which authorizes patent-like protection for new varieties of seeds, illustrates that breeding techniques have advanced to the stage where plant varieties now may be reproduced from seeds true to form. Written description of living organisms based on their genetic makeup was not unforeseen when the Plant Patent Act was passed;\textsuperscript{105} surely, now that plant breeders can assure stable transmission of desirable characteristics from one generation to the next, there is no reason to focus on genetic instability as the primary distinction between living material and other patentable subject matter.\textsuperscript{106}

\section*{Conclusion}

The basis for passage of the Plant Patent Act was the distinction perceived by Congress between agriculture and industry. The majority opinion in Bergy II did not address the root of this distinction when it was confronted with the argument that the legislative purpose of the Act was to enable life forms to be patented. Rather, the court merely echoed the legislative history of the Plant

\textsuperscript{102} Irons and Sears assert that the genetic instability argument is a "shibboleth." Irons & Sears, \textit{supra} note 5, at 325 n.20. Interestingly, the Court of Customs and Patent Appeals recently invoked the genetic instability argument to affirm the Board of Appeals' rejection of claims both for a process for breeding normal chickens from dwarf hens and normal cocks and for the chicken brought into existence by this process. The Board did not discuss whether either claim involved statutory subject matter, thereby leaving open the issue of the patentability of living things under § 101. In re Merat, 519 F.2d 1390 (C.C.P.A. 1975).

\textsuperscript{103} 301 F.2d at 939.

\textsuperscript{104} 7 U.S.C. §§ 2321-2583 (1976). This statute, unlike the Plant Patent Act, is not administered by the Patent Office, but rather by the Office of Plant Variety Protection, a bureau within the Department of Agriculture. Grants of protection under this Act are similar to plant patents; however, the grants are termed Certificates of Plant Variety Protection. Specifically excluded from protection under this legislation are okra, celery, peppers, tomatoes, carrots, and cucumbers.

Irons and Sears believe that the Act is prima facie unconstitutional because it permits patent-like protection for seeds which, although novel, may not be either useful or inventive. Irons & Sears, \textit{supra} note 5, at 331 n.43.

\textsuperscript{105} Rossman, \textit{supra} note 58, at 15.

\textsuperscript{106} The Court of Customs and Patent Appeals has held that an applicant for a patent on an invention that involves the use of an unknown, generally unavailable microorganism may satisfy the disclosure requirements by depositing a culture in an established repository. In re Argoudelis, 434 F.2d 1390, 1393 (C.C.P.A. 1970). \textit{See also} In re Glass, 492 F.2d 1228, 1232-34 (C.C.P.A. 1974); In re Hawkins, 486 F.2d 569, 574-75 (C.C.P.A. 1973). The deposit must be permanent and irrevocable, guaranteeing free accessibility thereto by the public once the patent actually issues. Irons & Sears, \textit{supra} note 5, at 324. Certainly, the deposit procedure would provide an equally accurate description for claims which cover the microorganism per se.
Patent Act and did not explain why special legislation should be necessary to protect the early phases of one field of endeavor when the general patent provision traditionally protects the embryonic stages of new technologies.\textsuperscript{107} The foregoing discussion indicates that Congress perceived the need for the 1930 Act because the plant breeder's approach to invention differs in kind and degree from that of the industrial patentee. The plant breeder's work is more closely bound to natural processes than is the work of the manufacture inventor. While Congress made the determination that the plant breeder is within the constitutional class of inventors, those plants that can be patented have to show evidence of having been invented, of being more than naturally occurring. Congress addressed itself to delineating the parameters of "invention" for plants in enacting the Plant Patent Act of 1930 and subsequent amendments. Moreover, Congress was concerned with certain description problems associated with the patenting of plants.

The Plant Patent Act does not demonstrate that Congress intended to exclude nonliving subject matter from the general patent statute and relegate it to its own section of patent law. On the contrary, if plant inventions are no longer set apart on the sole basis of their aliveness, microorganisms (and other inventions which happen to be alive) are patentable under the general patent statute. Additionally, the deposit system devised by the Court of Customs and Patent Appeals for inventions using microorganisms mitigates many of the objections to patenting a live manufacture or composition of matter based on description problems.

\textsuperscript{107} According to Judge Rich, "Congress had in mind the stimulation of a field of endeavor that, unlike chemistry, for example, had not as yet flowered into an industry." 596 F.2d at 982 (emphasis in original). The Plant Patent Act was designed to stimulate "an art still in the research and experimental stage." \textit{Id.}