MAN-MADE ORGANISMS RECEIVE PATENT PROTECTION
Diamond v. Chakrabarty, 100 S. Ct. 2204 (1980)

In Diamond v. Chakrabarty1 the United States Supreme Court for
the first time2 included a man-made, genetically cross-bred3 bacterium
within the scope of patentable subject matter.4

Chakrabarty, a General Electric Company microbiologist,5 filed an
application6 to patent a genetically engineered bacterium7 capable of

1. 100 S. Ct. 2204 (1980).
2. Whether genetically engineered bacteria are patentable subject matter is a matter of first
impression in the federal courts. In re Bergy, 596 F.2d 952 (C.C.P.A. 1979). See G. Rose, Pat-
ent Law Handbook 8 (1979); notes 17-18 infra.
3. Genetic cross-breeding involves the hybridization of the genes of an individual plant or
animal whose parents are different varieties of the same species or of different but closely related
cross-breeding leads to efficient production of chemicals, pharmaceuticals, food additives, and
substances used in disposal of industrial waste. See generally Irons & Sears, Patents in Relation to
Microbiology, 29 Ann. Rev. of Microbiology 319 (1975).

Congress has held extensive hearings in response to the growing use of genetic cross-breeding in
industry. See Hearings on Genetic Engineering Before the Subcomm. on Science, Technology, and
(1977); Recombinant DNA Research of 1977: Hearings on Genetic Engineering Before the Sub-
comm. on Health and the Environment of the House Comm. on Interstate and Foreign Commerce,
95th Cong., 1st Sess. (1977); Hearings on Genetic Engineering Before the Subcomm. on Health of

Congress has thus far regulated only federally funded genetic research. See 43 Fed. Reg. 60080,
and dangers of genetic cross-breeding, see generally J. Richards, Recombinant DNA: Sci-
ence, Ethics, and Politics (1978); M. Rogers, Biohazard (1977); Berger, Government Regula-
tion of the Pursuit of Knowledge: The Recombinant DNA Controversy, 3 Vt. L. Rev. 83 (1978);
of Microbiology 507 (1976); .

or discovers any new and useful machine, manufacture, or composition of matter, or any new and
useful improvement thereof, may obtain a patent thereof, subject to the conditions and require-
ments of this title." The Court ruled Chakrabarty's bacterium is a "manufacture" or "composi-
tion of matter" under § 101, although it did not specify which category is controlling. 100 S. Ct. at
2207, 2212.

5. General Electric Co. became the real party in interest regarding Chakrabarty's patent
application under 35 U.S.C. § 261 (1976), which provides for the assignment of patent applica-
tions by an instrument in writing because Chakrabarty left the employ of General Electric before
trial. See 100 S. Ct. at 2205.

rabarty's application, patent serial No. 260,563, filed June 8, 1972, contained 36 claims divided
into three groups: Processes for producing the bacterium; claims for the bacterium's carrier mate-
rial; and claims for the bacterium itself. 100 S. Ct. at 2205-06. See notes 10-11 infra.
7. 100 S. Ct. at 2205-06. Chakrabarty's genetically engineered bacterium derives from the
genus Pseudomonas, which contains energy generating plasmids to provide a separate hydrocar-

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cleaning oil spills. The Patent and Trademark Office examiner rejected claims to patent the bacterium, and the Patent and Trademark Office Board of Appeals affirmed. Although the Court of Customs and Patent Appeals reversed and granted the patent, the court later vacated its judgment because of a subsequent Supreme Court ruling.

The plasmids usually take the form of a closed loop of deoxyribonucleic acid (DNA), and can direct the synthesis of complex molecules that in turn determine specific attributes of a plasmid. Bent, Living Matter Found to be Patentable, 11 CONN. L. REV. 311 (1979).

Naturally occurring bacteria, identified in the past, could degrade some, but not all, oil components. Chakrabarty had earlier discovered that the plasmids control the oil degradation abilities of certain bacteria, and that some of these plasmids can degrade camphor and octane, two components of crude oil. 100 S. Ct. at 2205, 2206 n.11. The genetically cross-bred Pseudomonas could then degrade oil components unlike any natural bacterium. Bent, supra note 7, at 311-12. See generally Drazek, Ownership of Living Organisms—In re Bergy, 29 DE PAUL L. REV. 215, 221-22 (1979); The New Biology; 150 NATIONAL GEOGRAPHIC MAGAZINE, no. 3, 355, 374-75 (Sept. 1976); Comment, Bergy, Flook, and Microorganisms As Patentable Products, 29 CATH. U.L. REV. 485, 497-98 (1980).


The examiner granted Chakrabarty's claims for the process and carrier material used in developing the bacterium, but the examiner denied the claims to the bacterium itself reasoning that, (1) the bacterium is a product of nature, and (2) as a living thing, the bacterium is not patentable under 35 U.S.C. § 101 (1976). 100 S. Ct. at 2206. See note 6 supra. But see 596 F.2d 952, 971 (C.C.P.A. 1978). See also 91 HARV. L. REV. 1357, 1358 (1978); notes 11, 41 infra.

11. See 35 U.S.C. § 134 (1976) (provides an appeal to any patent applicant whose claim has been twice rejected by an examiner). The Patent and Trademark Office Board of Appeals (P.T.O. Bd.), agreeing with the examiner that living things are not patentable under 35 U.S.C. § 101 (1976), denied Chakrabarty's claims to the bacterium itself. See 100 S. Ct. at 2206 (citing the unreported decision of the P.T.O. Bd. of Appeals). See also notes 6, 10 supra.


13. See In re Chakrabarty, 571 F.2d 40 (C.C.P.A. 1978). The C.C.P.A. reversed on the authority of the original decision in In re Bergy, 563 F.2d 1031 (C.C.P.A. 1977), vacated sub nom. Parker v. Bergy, 438 U.S. 902 (1978), which held that the living nature of an invention has no significance for purposes of the patent law. 563 F.2d at 1038. See also note 14 infra.

14. The Commissioner of Patents and Trademarks petitioned the C.C.P.A. to vacate its decision in In re Chakrabarty, 571 F.2d 40 (C.C.P.A. 1978), because of the Supreme Court's vacation
ing\textsuperscript{15} that further delineated subject matter limitations of patentability.\textsuperscript{16} On rehearing, the Court of Customs and Patent Appeals approved the patent.\textsuperscript{17} The Supreme Court granted the petition for certiorari\textsuperscript{18} and \textit{held}: A living, man-made bacterium is patentable under the general patent subject matter statute\textsuperscript{19} that provides patent protection to any new manufacture or composition of matter.\textsuperscript{20}

The patent clause\textsuperscript{21} of the United States Constitution, in conjunction with the necessary and proper clause,\textsuperscript{22} grants broad congressional power to patent inventions.\textsuperscript{23} The patenting of inventions provides in-
centive for innovation and research although the duration of a patent is limited. Congress historically has used broad language in patent legislation. The judiciary has interpreted patent legislation liberally, recognizing both the constitutional patent mandate and the language used by Congress in exercising this mandate. The breadth of the patent subject matter statute, however, has been a source of controversy.

Conflicting rules of statutory interpretation, which the Court has implemented in defining patentable subject matter, fuel this controversy. In *United States v. Dubilier Condenser Corp.* the Court warned

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25. 35 U.S.C. § 154 (1976) sets 17 years as the maximum duration of a patent. During this period, the patent holder obtains the right to prevent others from making, using, or selling the invention. *Id.*

26. *See* 100 S. Ct. at 2207.


28. *See* notes 21-22 supra and accompanying text.


31. Justice Frankfurter noted: “Insofar as canons of construction are generalizations of experience, they all have worth. In the abstract, they rarely arouse controversy. Difficulties emerge when canons compete in soliciting judgment, because they conflict rather than converge.” Frankfurter, *Some Reflections on the Reading of Statutes, reprinted in 47 Colum. L. Rev. 527, 544 (1947).*

32. 289 U.S. 178 (1933).
against reading unexpressed limitations into the patent laws.\textsuperscript{33} The Court in \textit{Graham v. John Deere Co.}\textsuperscript{34} similarly held that a narrow interpretation would undermine the intent and goals of the patent laws.\textsuperscript{35} The Court in \textit{Deepsouth Packing Co. v. Laitram Corp.}\textsuperscript{36} however, preached judicial caution regarding liberal interpretation of patent laws by demanding a "clear and certain signal from Congress" before expanding patent rights.\textsuperscript{37} The Court, therefore, has been alternately willing\textsuperscript{38} and reluctant\textsuperscript{39} to liberally interpret the patent laws.\textsuperscript{40}

Other canons of legislative interpretation exacerbate the controversy that arises when statutes coexist within the same area of law.\textsuperscript{41} The Court's legislative interpretations have yielded the following maxims:\textsuperscript{42} Congress is presumed not to legislate superfluously;\textsuperscript{43} courts should read statutes dealing with the same subject matter in unison to ascertain congressional intent;\textsuperscript{44} courts cannot apply the intent of one Con-

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\item \textsuperscript{33} Id. at 199.
\item \textsuperscript{34} 383 U.S. 1 (1966).
\item \textsuperscript{35} Id. at 7-10. \textit{See note 24 supra} and accompanying text.
\item \textsuperscript{36} 406 U.S. 518 (1972).
\item \textsuperscript{37} Id. at 531.
\item \textsuperscript{38} \textit{See} Kewanee Oil Co. v. Bicron Corp., 416 U.S. 470 (1974); \textit{Graham v. John Deere Co.}, 383 U.S. 1 (1966); \textit{Universal Oil Co. v. Globe Co.}, 322 U.S. 471 (1944); \textit{United States v. Dubliner Condenser Corp.}, 289 U.S. 178 (1933). \textit{See also note 50 infra} and accompanying text.
\item \textsuperscript{39} \textit{See} Parker v. Flook, 437 U.S. 584 (1978); Gotschalk v. Benson, 409 U.S. 63 (1973); \textit{Deepsouth Packing Co. v. Laitram Corp.}, 406 U.S. 518 (1972); \textit{Funk Seed Co. v. Kalo Inoculant Co.}, 333 U.S. 127 (1948). \textit{See also note 49 infra} and accompanying text.
\item \textsuperscript{40} Although the Constitution and congressional enactments encourage patents, the Court has been consistently unwilling to allow patents in certain areas, such as products of nature. \textit{See note 5 supra} and accompanying text. Justice Brennan noted: "The patent laws attempt to reconcile this Nation's deep seated antipathy to monopolies with the need to encourage progress." 100 S. Ct. at 2213 (Brennan, J., dissenting). \textit{See note 24 supra} and accompanying text.
\item \textsuperscript{41} Whether there is companion legislation to the general patent subject matter statute is itself a matter of interpretation. \textit{See note 4 supra}. In 1930 and 1970, Congress enacted legislation allowing patents for certain types of plants. \textit{See} notes 52-59 \textit{infra} and accompanying text. Because these Acts permitted the patenting of specific living things, and because Chakrabarty's bacterium is living, it is arguable that it too needs a congressional act to be patentable. \textit{Compare} 100 S. Ct. at 2209-10 (no reason to exclude living things from patentability) \textit{with} 100 S. Ct. at 2213-14 (Brennan, J., dissenting) (if living things patentable, Plant Acts superfluous). \textit{See} notes 79-91 \textit{infra} and accompanying text.
\item \textsuperscript{42} \textit{See} notes 30-31 \textit{supra}.
gress to the intent of another; specific terms prevail over general terms in a statute or companion statutes, and the inclusion of one subject in a statute implies the exclusion of other subjects from the statute or companion statutes.47

Conflicts also arise when courts determine whether the scope of patentable subject matter encompasses living things. Although courts consistently have held that products of nature are not patentable, the courts have issued numerous patents for inventions utilizing products of nature, including living things used to create these inventions.50


47. EEOC v. Kimberly-Clark Corp., 511 F.2d 1352 (6th Cir. 1975); Arley v. United Pac. Ins. Co., 379 F.2d 183 (9th Cir. 1967).

48. See notes 4 supra, 50-59 infra.


Latimer is the seminal case for the proposition that plants, as products of nature, are not patentable. The Court in Chakraborty reasoned that because the organism in question is not a product of nature, but a man-made invention, the Latimer presumption against the patentability of living things was overcome. 100 S. Ct. at 2208-10.

Congress approved patents on certain living things in the Plant Patent Act of 1930, which authorized patent protection to breeders of specified asexually produced plants. In 1970 the enactment of the Plant Variety Protection Act brought certain sexually produced plants within the scope of patentable subject matter. The 1970 Act also provides an express exclusion of bacteria from patent protection. Courts have not interpreted the 1930 or 1970 Acts to allow patenting of any living things, except plants themselves.

51. 35 U.S.C. § 100(b) (1976) defines "process" as "The . . . process, art, or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material." See Cochrane v. Deener, 94 U.S. 780, 788 (1876) for a definition of "process" as a "mode of treatment of certain materials to produce a given result. It is an act, or series of acts, performed on the subject matter to be transformed and reduced to a different state of thing."
The examiner approved patents for the process used by Chakrabarty to breed his bacterium. See also note 10 supra.

52. Courts previously had allowed patenting of a process utilizing living things, but not a living thing itself. See note 40 supra and accompanying text.

53. 35 U.S.C. § 161 (1976). The express legislative purpose of the 1930 Plant Patent Act is "to afford agriculture . . . the same . . . benefits of the patent system as has been given industry."

54. Asexual reproduction is reproduction other than by union of male and female cells. STEEDMAN'S MEDICAL DICTIONARY 1219 (4th unabr. lawyers' ed. 1976).

55. 35 U.S.C. § 161 (1976) provides patent protection to inventors of any new asexually reproduced plant, including cultivated spores, mutants, hybrids, and newly found seedlings, other than a tuber propagated plant, or a plant found in an uncultivated state. See generally R. ALYN, THE FIRST PLANT PATENTS (1934); 3 A. DELLER, WALKER ON PATENTS ch. IX (2d ed. 1964).

In In re Arzberger, 112 F.2d 834 (C.C.P.A. 1940), the C.C.P.A. held that bacteria are not plants for purposes of the 1930 Plant Patent Act. See note 58 infra and accompanying text.


In *Diamond v. Chakrabarty* the Supreme Court reasoned that because a genetically cross-bred bacterium is not a product of nature, but a manufacture or composition of matter under the general patent subject matter statute, the bacterium is patentable subject matter. Chief Justice Burger, writing for the majority, analyzed the history of the patent laws and concluded that although Congress intended the laws to be interpreted liberally, it did not intend courts to interpret them without limitations. The Court determined that because Chakrabarty's bacterium does not occur naturally, it is therefore patentable. The majority held that neither the 1930 Plant Patent Act nor the 1970 Plant Variety Protection Act demonstrate a legislative intent to deny patentability to living things unless expressly permitted by congressional act. Moreover, the Court determined that an absence of legislative history regarding the exclusion of bacteria from patentability in the 1970 Act does not demonstrate a legislative intent to exclude bacteria from patentability under the general patent subject matter statute.

60. 100 S. Ct. 2204 (1980).
61. Id. at 2208. See note 49 supra.
64. 100 S. Ct. at 2212.
65. Id. at 2205. The decision was 5-4.
66. Id. at 2206-08.
68. 100 S. Ct. at 2208. See note 49 supra.
69. 100 S. Ct. at 2208.
72. 100 S. Ct. at 2208-10. Chief Justice Burger, after discussing the legislative history of the 1930 Plant Patent Act, concluded that Congress realized the distinction between patentable and unpatentable subject matter is "not between living and inanimate things, but between products of nature, whether living or not, and human-made inventions." Id. at 2210. The Chief Justice reasoned that the 1930 Act was needed because plants had only recently come within the scope of "human-made inventions." Chief Justice Burger found the 1970 Plant Variety Protection Act inconclusive for similar reasons. Id.
The majority dismissed warnings of judicial usurpation of congressional powers and potential dangers of genetic engineering by claiming that the Court simply performed the judicial function of interpreting existing legislation. The Court concluded that although Congress may enact legislation in the future that forbids patenting of man-made life forms, the general patent subject matter statute presently encompasses such life forms.

Justice Brennan in dissent felt that the majority misread the applicable legislation. Justice Brennan viewed the 1930 and 1970 Plant Acts as evidence that Congress intended to exclude living things, particularly bacteria, from patentability. He objected to the implicit assumption of the majority that Congress acted superfluously in passing the Acts. Justice Brennan concluded that the majority extended the patent system beyond its intended scope.

Although all the Justices agreed that courts should interpret the patent laws liberally, the majority's inclusion of man-made bacteria

United States v. Bornstein, 423 U.S. 303, 310 (1976) ("the absence of specific legislative history in no way modifies the conventional judicial duty to give faithful meaning to language Congress adopted"). See notes 30-31 supra.

74. 100 S. Ct. at 2210. See generally Bent, Living Matter Found to be Patentable: In re Chakrabarty, 11 Conn. L. Rev. 311, 328 (1979).

75. 100 S. Ct. at 2211-12. See note 3 supra.

76. 100 S. Ct. at 2212.

77. Id. Congress has, however, had the opportunity to address the question of the patentability of living things other than plants but has failed to act. When Congress enacted the 1952 Patent Act, ch. 950, Pub. L. No. 82-593, 66 Stat. 792, (codified at 35 U.S.C. §§ 1-293 (1976)), no mention was made of patenting living organisms. See generally Bent, Living Matter Found To Be Patentable: In re Chakrabarty, 11 Conn. L. Rev. 311, 325 (1979).

78. 100 S. Ct. at 2212 (Brennan, J., dissenting). Justice Brennan was joined by Justice White, Justice Marshall, and Justice Powell.

79. Id. at 2213 (Brennan, J., dissenting). The dissent viewed the 1930 Plant Patent Act and the 1970 Plant Variety Protection Act as evidence that Congress had included some specific life forms, i.e., plants, within the scope of patentable subject matter, thereby excluding other life forms. See note 47 supra and accompanying text.

80. Justice Brennan saw the 1970 Plant Variety Protection Act's exclusion of bacteria from the scope of protected subject matter as dispositive. 100 S. Ct. at 2214 (Brennan, J., dissenting). Although admitting the majority's point that the 1970 Act gave no reason for the exclusion of bacteria, Justice Brennan did not take this as giving the Court a "license to invent reasons." Id. See note 73 supra.

81. 100 S. Ct. at 2213 (Brennan, J., dissenting).

82. Id. at 2214 (Brennan, J., dissenting).

83. The majority noted that "Congress plainly contemplated the patent laws would be given wide scope" and adhered to this premise throughout its opinion. Id. at 2207. The dissent, relying heavily on the warnings of Parker v. Flook, 437 U.S. 584 (1978), and Deepsouth Packing Co. v. Laitram Corp., 406 U.S. 518 (1972), to exercise caution when extending patent rights, refused to
within the purview of patentable subject matter is unwarranted. The Court dogmatically adheres to liberal canons of construction\textsuperscript{84} to reach its conclusion, and fails to recognize that other maxims of legislative interpretation become relevant when companion legislation exists.\textsuperscript{85}

Liberal interpretation of the general patent subject matter statute is proper if companion legislation does not exist\textsuperscript{86} because the broad congressional language and the goals of the patent laws would warrant broad construction.\textsuperscript{87} Because companion legislation does exist, however, courts cannot consider the patentability of a man-made bacterium in a legislative vacuum.\textsuperscript{88} Courts must acknowledge the 1930 and 1970 Plant Acts because the Acts further delineate the limits of patentable subject matter by defining the living things that are patentable.\textsuperscript{89}

Congress is presumed not to legislate superfluously.\textsuperscript{90} Justice Brennan in dissent\textsuperscript{91} properly argued that if living things were patentable under the general patent subject matter statute, the 1930 and 1970 Plant Acts would have been unnecessary.\textsuperscript{92}

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\item interpret the broad language of 35 U.S.C. \textsection 101 (1976) as liberally. See 100 S. Ct. at 2213 & n.2 (Brennan, J., dissenting).
\item See Graham v. John Deere Co., 383 U.S. 1, 7-10 (1966); United States v. Dubilier Condenser Corp., 289 U.S. 178, 199 (1933). See also notes 32, 34 supra and accompanying text.
\item See notes 43-44, 46-47 supra and accompanying text.
\item If the statutory interpretation involved only 35 U.S.C. \textsection 101 (1976), the broad language Congress used in that section would justify a broad interpretation. See note 4 supra. But as the Court said in Platt v. Union Pac. R.R., 99 U.S. 48, 66 (1879), statutes must be construed “in connection with all the other provisions made by Congress, endeavoring to give effect to every part.” See note 44 supra.
\item As the dissent noted, the 1930 Plant Patent Act and the 1970 Plant Variety Protection Act added to the scope of patentable subject matter. If 35 U.S.C. \textsection 101 (1976) covered plants, the 1930 and 1970 Acts would have been superfluous. 100 S. Ct. at 2213 (Brennan, J., dissenting). But see note 45 supra and accompanying text.
\item 100 S. Ct. at 2207.
\item Id. at 2213 (Brennan, J., dissenting). The Court in Kokoszka v. Belford, 417 U.S. 642, 650 (1974), refused to interpret legislation without considering “the whole statute or statutes on the same subject . . . .”
\item 100 S. Ct. at 2213.
\item See notes 43, 86 supra.
\item 100 S. Ct. at 2212 (Brennan, J., dissenting).
\item Id. at 2213 (Brennan, J., dissenting). Justice Brennan stated that even if the 1930 Plant Patent Act and the 1970 Plant Variety Protection Act are not evidence of congressional intent to exclude bacteria from patentability, the warnings of caution by the Court in Parker v. Flook, 437 U.S. 584 (1978), and Deepsouth Packing Co. v. Laitram Corp., 406 U.S. 518 (1972), see note 83 supra, not to extend patent rights would be dispositive. “I should think the necessity for caution is that much greater when we are asked to extend patent rights into areas Congress has foreseen and considered [such as the patentability of living things] but has not resolved.” 100 S.Ct. at 2213 n.2 (Brennan, J., dissenting). See notes 43, 86 supra.
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The Court also should have followed other relevant canons of construction. For example, courts should read the general patent subject matter statute and the 1930 and 1970 Plant Acts together to ascertain congressional intent. The specific inclusion of living things in the 1930 and 1970 Plant Acts implied the exclusion of living things from the general patent subject matter statute even though courts cannot apply the intentions of one Congress to another.

Congress not only failed to include bacteria within the scope of patentable subject matter in the 1930 and 1970 Plant Acts, but also expressly excluded bacteria from patentability in the 1970 Act. In Deepsouth the Court demanded a “clear and certain signal” from Congress before expanding patent rights. The Chakrabarty Court argued that a lack of legislative history on the exclusion of bacteria in the 1970 Act renders the exclusion impotent. This assumption undermines the Deepsouth requirement because Congress clearly and certainly excluded bacteria from coverage in the 1970 Plant Act.

The Court could have avoided confusion by recognizing numerous maxims of interpretation that arise when companion legislation exists, and by adhering to the Deepsouth requirement. Because all of the Justices agreed that Congress will send a “clear and certain signal” to the judiciary regarding the patentability of genetically-bred life forms in the future, precedent compels patience.

93. See notes 43-47 supra.
94. See notes 44, 86 supra.
95. See note 45 supra. As the Court in United States v. Price, 361 U.S. 304, 313 (1960) noted, “the views of a subsequent Congress form a hazardous basis for inferring the intent of an earlier one.” See notes 48-49 supra.
98. Id. at 531.
100. See notes 43-47 supra and accompanying text.
102. 100 S. Ct. at 2212; id. at 2214 (Brennan, J., dissenting).