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MAN-MADE ORGANISMS RECEIVE PATENT PROTECTION

Diamond v. Chakrabarty, 100 S. Ct. 2204 (1980)

In *Diamond v. Chakrabarty*¹ 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, PATENT 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 species. STEDMAN'S MEDICAL DICTIONARY 336, 659 (4th unabr. lawyer's ed. 1976). Genetic 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 Space of the Senate Comm. on Commerce, Science, and Transportation*, 95th Cong., 1st Sess. (1977); *Recombinant DNA Research of 1977: Hearings on Genetic Engineering Before the Subcomm. 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 the Senate Comm. on Labor and Public Welfare*, 94th Cong., 1st Sess. (1975).

Congress has thus far regulated only federally funded genetic research. See 43 Fed. Reg. 60080, 60108, 60134 (1978); 41 Fed. Reg. 27902 (1976). For a thorough discussion of the future benefits and dangers of genetic cross-breeding, see generally J. RICHARDS, RECOMBINANT DNA: SCIENCE, ETHICS, AND POLITICS (1978); M. ROGERS, BIOHAZARD (1977); Berger, *Government Regulation of the Pursuit of Knowledge: The Recombinant DNA Controversy*, 3 VT. L. REV. 83 (1978); Curtiss, *Genetic Manipulation of Microorganism: Potential Benefits and Biohazards*, 30 ANN. REV. OF MICROBIOLOGY 507 (1976); .

4. 35 U.S.C. § 101 (1976) defines patentable subject matter and provides: "Whoever invents 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 requirements of this title." The Court ruled Chakrabarty's bacterium is a "manufacture" or "composition 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 applications by an instrument in writing because Chakrabarty left the employ of General Electric before trial. See 100 S. Ct. at 2205.

6. 35 U.S.C. §§ 111-22 (1976) details specifications regarding patent applications. Chakrabarty'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 material; 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-

cleaning oil spills.⁸ The Patent and Trademark Office⁹ examiner¹⁰ rejected claims to patent the bacterium, and the Patent and Trademark Office Board of Appeals affirmed.¹¹ Although the Court of Customs and Patent Appeals¹² reversed¹³ and granted the patent, the court later vacated its judgment¹⁴ because of a subsequent Supreme Court rul-

bon degradative pathway. *Id.* 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 St. Ct. at 2205 n.1. See note 8 *infra*.

8. Prior to Chakrabarty's discovery, oil spills were treated with combinations of natural bacteria. Because bacterial strains tend to compete with each other, the effectiveness of the degradation of oil elements diminished. See Bent, *supra* note 7, at 312.

Chakrabarty developed a process in which four different plasmids that were able to degrade four different oil components could be transferred to and maintained in a single *Pseudomonas* bacterium. The *Pseudomonas*, as it appears in nature, cannot degrade 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).

9. 35 U.S.C. §§ 1-14 (1976) details establishment, officers, and functions of the Patent and Trademark Office. 35 U.S.C. app. I (1976) explains the rules of practice for the office. See Brief for Respondent at 17, *Diamond v. Chakrabarty*, 100 S. Ct. 2204 (1980). See also 35 U.S.C. §§ 134, 141-45 (1976).

10. See 35 U.S.C. §§ 131-35 (1976) (containing regulations for the examination of patent applications).

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*.

12. 35 U.S.C. app. I (1976) establishes the rules of practice for the Court of Customs and Patent Appeals (C.C.P.A.).

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

ing¹⁵ that further delineated subject matter limitations of patentability.¹⁶ On rehearing, the Court of Customs and Patent Appeals approved the patent.¹⁷ The Supreme Court granted the petition for certiorari¹⁸ and *held*: A living, man-made bacterium is patentable under the general patent subject matter statute¹⁹ that provides patent protection to any new manufacture or composition of matter.²⁰

The patent clause²¹ of the United States Constitution, in conjunction with the necessary and proper clause,²² grants broad congressional power to patent inventions.²³ The patenting of inventions provides in-

of *Parker v. Bergy*, 438 U.S. 902 (1978) in light of *Parker v. Flook*, 437 U.S. 584 (1978). The C.C.P.A. granted the Commissioner's petition to vacate. See 596 F.2d at 956-57; Brief for Respondent at 9, *Diamond v. Chakrabarty*, 100 S. Ct. 2204 (1980); note 16 *infra*.

The Supreme Court did not indicate the effect of *Parker v. Flook* when the Court vacated *Parker v. Bergy*, 438 U.S. 902 (1978). See 596 F.2d at 564-67; G. ROSE, *supra* note 2, at 8; note 17 *infra*.

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

16. *Id.* Writing for the majority in *Parker v. Flook*, Justice Stevens held that respondent's method for updating alarm systems during catalytic conversion processes, in which the only novel feature is a mathematical formula, is not patentable under 35 U.S.C. § 101 (1976). In dictum, the Court advised "caution when we are asked to extend patent rights into areas wholly unforeseen by Congress." 437 U.S. at 596.

17. See 596 F.2d 952 (C.C.P.A. 1979). The C.C.P.A. consolidated *In re Bergy* and *In re Chakrabarty*, noting that, "[t]he only thing we see in common in these cases and *Flook* is that they all involve § 101." *Id.* at 964. "[T]he *Flook* holding appears to have no bearing." *Id.* at 965. The C.C.P.A. reaffirmed its holding that because the invention is living does not exclude it from the purview of 35 U.S.C. § 101 (1976). *Id.* at 973. See also 100 S. Ct. at 2211. *But see* 596 F.2d at 988-99 (Miller, J., dissenting); Brief for Respondent at 10, *Diamond v. Chakrabarty*, 100 S. Ct. 2204 (1980). See generally Drazek, *supra* note 8, at 225.

18. See 100 S. Ct. 261 (1979). The Supreme Court granted certiorari in both *In re Bergy* and *In re Chakrabarty*. *Id.* Subsequently, the Court dismissed *In re Bergy* as moot when Bergy canceled the claim to the bacterium itself. 100 S. Ct. at 2206.

19. See 35 U.S.C. § 101 (1976).

20. See 100 S. Ct. 2204 (1980).

21. U.S. CONST. art. I, § 8, cl. 8 provides: "Congress shall have the Power . . . To promote the Progress of Science and the useful Arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

This provision grants Congress power to establish both a patent system and a copyright system. See generally Lutz, *Patents and Science: A Clarification of the Patent Clause of the U.S. Constitution*, 18 GEO. WASH. L. REV. 50 (1949); Rich, *Principles of Patentability*, 28 GEO. WASH. L. REV. 383 (1980).

22. U.S. CONST. art. I, § 8, cl. 18 provides: "Congress shall have Power . . . To make all laws which shall be necessary and proper for carrying into execution the foregoing Powers . . ."

23. 35 U.S.C. § 101 (1976) currently defines patentable inventions. See note 4 *supra*. See generally *Diamond v. Chakrabarty*, 100 S. Ct. at 2204; *Parker v. Flook*, 437 U.S. 584 (1978); *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127 (1948); *Hartranft v. Wiegman*, 121 U.S. 609 (1887); *American Wood Paper Co. v. Fiber Disintegrating Co.*, 90 U.S. (23 Wall.) 566 (1874); *In re Johnston*, 94 F.2d 978 (C.C.P.A. 1938); *In re Fink*, 63 F.2d 103 (C.C.P.A. 1932). See also Noonan,

centive for innovation and research²⁴ although the duration of a patent is limited.²⁵ Congress historically has used broad language in patent legislation.²⁶ The judiciary has interpreted patent legislation liberally,²⁷ recognizing both the constitutional patent mandate and the language used by Congress in exercising this mandate.²⁸ The breadth of the patent subject matter statute, however, has been a source of controversy.²⁹

Conflicting rules of statutory interpretation,³⁰ which the Court has implemented³¹ in defining patentable subject matter, fuel this controversy. In *United States v. Dubilier Condenser Corp.*³² the Court warned

Patentability of Microorganisms: Legal Control of Life, 47 U.M.K.C. L. REV. 130, 133-36 (1978); McDonald, *The Patentability of Living Organisms Under 35 U.S.C. § 101: In re Bergy*, 58 NEB. L. REV. 303, 303-05 (1979).

24. In *Rubber Tire Wheel Co. v. Milwaukee Rubber Works Co.*, 154 F. 358 (7th Cir. 1907), the Seventh Circuit noted that "inventive minds may fail to produce many useful things that they would produce if stimulated by the promise of substantial reward . . ." *Accord*, *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 480-81 (1974); *Graham v. John Deere Co.*, 383 U.S. 1, 7-10 (1966); *Universal Oil Co. v. Globe Co.*, 322 U.S. 471, 484 (1944); *Boehringer Sohn v. Watson*, 256 F.2d 713, 714 (D.C. Cir. 1958) (per curiam) (Burger, J., concurring). *Cf.* *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 330-31 (1945) (patent laws designed for technological advancement, not for individual reward); *Kendell v. Wilson*, 62 U.S. (21 How.) 322, 329 (1859) (rights and welfare of the community must be guarded when awarding patents). *See generally* Guttage, *The Patentability of Microorganisms: Statutory Subject Matter and Other Living Things*, 13 U. RICH. L. REV. 247 (1979); Comment, *Bergy, Flook, and Microorganisms as Patentable Subject Matter*, 29 CATH. U.L. REV. 485 (1980). *See also* 100 S. Ct. at 2213 (Brennan, J., dissenting) (patent laws balance antipathy to monopolies with need to encourage progress).

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.

27. *See* *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 480-81 (1974); *Graham v. John Deere Co.*, 383 U.S. 1, 7-10 (1966); *Universal Oil Co. v. Globe Co.*, 322 U.S. 471, 484 (1944).

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

29. *See* 100 S. Ct. 2204 (1980). *See also* *In re Bergy*, 596 F.2d 952, 959-64 (C.C.P.A. 1979).

30. Canons of statutory interpretation are not rules of law, but are aids to ascertain legislative intent. These canons must yield to evidence of contrary intent, and are only useful in doubtful cases. *Philbrook v. Glodgett*, 421 U.S. 707, 713 (1975); *City of New York v. Train*, 420 U.S. 35, 44-45 (1975); *National R.R. Passenger Corp. v. National Ass'n of R.R. Passengers*, 414 U.S. 453, 458 (1974); *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 491 (1951); *Utah Junk Co. v. Porter*, 328 U.S. 39, 44 (1945); *United States v. Rice*, 327 U.S. 742, 753 (1946). *See generally* F. DICKERSON, *THE INTERPRETATION AND APPLICATION OF STATUTES* (1975); 2 J. SUTHERLAND, *STATUTES AND STATUTORY CONSTRUCTION* (3d ed. 1974).

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.³³ The Court in *Graham v. John Deere Co.*³⁴ similarly held that a narrow interpretation would undermine the intent and goals of the patent laws.³⁵ The Court in *DeepSouth Packing Co. v. Laitram Corp.*,³⁶ however, preached judicial caution regarding liberal interpretation of patent laws by demanding a "clear and certain signal from Congress" before expanding patent rights.³⁷ The Court, therefore, has been alternately willing³⁸ and reluctant³⁹ to liberally interpret the patent laws.⁴⁰

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

33. *Id.* at 199.

34. 383 U.S. 1 (1966).

35. *Id.* at 7-10. See note 24 *supra* and accompanying text.

36. 406 U.S. 518 (1972).

37. *Id.* at 531.

38. See *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470 (1974); *Graham v. John Deere Co.*, 383 U.S. 1 (1966); *Universal Oil Co. v. Globe Co.*, 322 U.S. 471 (1944); *United States v. Dubilier Condenser Corp.*, 289 U.S. 178 (1933). See also note 50 *infra* and accompanying text.

39. See *Parker v. Flook*, 437 U.S. 584 (1978); *Gotschalk v. Benson*, 409 U.S. 63 (1973); *DeepSouth Packing Co. v. Laitram Corp.*, 406 U.S. 518 (1972); *Funk Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127 (1948). See also note 49 *infra* and accompanying text.

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. 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). See note 24 *supra* and accompanying text.

41. Whether there is companion legislation to the general patent subject matter statute is itself a matter of interpretation. See note 4 *supra*. In 1930 and 1970, Congress enacted legislation allowing patents for certain types of plants. See notes 52-59 *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. Compare 100 S. Ct. at 2209-10 (no reason to exclude living things from patentability) with 100 S. Ct. at 2213-14 (Brennan, J., dissenting) (if living things patentable, Plant Acts superfluous). See notes 79-91 *infra* and accompanying text.

42. See notes 30-31 *supra*.

43. See *Tungus v. Skorgaard*, 358 U.S. 588 (1959). Accord, *Platt v. Union Pac. R.R. Co.*, 99 U.S. 48 (1878); *In re Finch*, 535 F.2d 70 (C.C.P.A. 1976); *United States v. Korpan*, 237 F.2d 676 (7th Cir. 1956).

44. See *Morton v. Mancari*, 417 U.S. 535, 551 (1974). Accord, *Kokoszka v. Belford*, 417 U.S. 642, 650 (1974); *Northcross v. Board of Educ. of Memphis*, 412 U.S. 427, 428 (1973); NLRB

gress to the intent of another;⁴⁵ specific terms prevail over general terms in a statute or companion statutes;⁴⁶ 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.⁴⁸ Although courts consistently have held that products of nature are not patentable,⁴⁹ the courts have issued numerous patents for inventions utilizing products of nature, including living things⁵⁰ used to create these inventions.⁵¹

v. Allis-Chalmers Mfg. Co., 388 U.S. 175, 179-80 (1967); *Bobsee Corp. v. United States*, 411 F.2d 231, 236-37 (5th Cir. 1969).

45. *United States v. Southwestern Cable Co.*, 392 U.S. 157, 172 (1968). *Accord*, *United States v. Philadelphia Nat'l Bank*, 374 U.S. 321, 326 (1963); *United States v. Price*, 361 U.S. 304, 310 (1960); *Rainwater v. United States*, 356 U.S. 590 (1958); *United States v. UMW*, 330 U.S. 258, 272 (1947).

46. *Fourco Glass Co. v. Transmirra Prods. Corp.*, 353 U.S. 22 (1957). *Accord*, *MacEvoy Co. v. United States*, 322 U.S. 102 (1944); *Ginsberg & Sons v. Popkin*, 285 U.S. 204 (1932).

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*.

49. 100 S. Ct. at 2206. Courts hold products of nature unpatentable because they are not new as required by 35 U.S.C. § 101 (1976). *See note 4 supra*. As the Supreme Court stated in *Chakrabarty*: "The laws of nature, physical phenomena, and abstract ideas have been held not patentable." 100 S. Ct. at 2208. *See, e.g.*, *Parker v. Flook*, 437 U.S. 584 (1978) (mathematical algorithm); *Gotschalk v. Benson*, 409 U.S. 63 (1973) (numerical code for computer program); *Funk Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127 (1948) (mixed bacteria cultures); *Mackay Radio & Tel. Co. v. Radio Corp. of Am.*, 306 U.S. 86 (1939) (improvements to antenna system); *O'Reilly v. Morse*, 56 U.S. (15 How.) 62 (1853) (electro-magnetic signals); *Le Roy v. Tatham*, 55 U.S. (14 How.) 156 (1853) (improvements to pipemaking machinery); *In re Bergstrom*, 427 F.2d 1394 (C.C.P.A. 1970) (prostaglandin compounds); *Ex parte Latimer*, 46 O.G. 1638 (1889) (decision of the Commissioner of Patents, 1889 C.D. 123) (fiber in trees). *See generally* 1 A. DELLER, WALKER ON PATENTS §§ 22-23 (2d ed. 1964); Kip, *The Patentability of Natural Phenomena*, 20 GEO. WASH. L. REV. 371 (1952).

Latimer is the seminal case for the proposition that plants, as products of nature, are not patentable. The Court in *Chakrabarty* 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.

50. *See, e.g.*, *In re Mancy*, 499 F.2d 1289 (C.C.P.A. 1974) (process for production of antibiotic); *Merck v. Olin Mathieson Chem. Corp.*, 253 F.2d 156 (4th Cir. 1958) (purification process for vitamin B-12); *City of Milwaukee v. Activated Sludge, Inc.*, 69 F.2d 577 (7th Cir. 1934) (process for sewage purification); *Guaranty Trust Co. v. Union Solvents Corp.*, 54 F.2d 400 (D. Del. 1931), *aff'd*, 61 F.2d 1041 (3d Cir. 1932) (process for producing butyl-alcohol); *Parke-Davis v. Mulford*, 196 F. 496 (2d Cir. 1912) (process for purification of adrenalin); *Village of Saratoga Springs v. Cameron Septic Tank Co.*, 159 F. 453 (2d Cir.), *cert. denied*, 209 U.S. 548 (1908) (process using organisms in sewage disposal); Brief for Respondent at 10, *Diamond v. Chakrabarty*, 100 S. Ct. 2204 (1980). *See generally* Irons & Sears, *Patents in Relation to Microbiology*, 29 ANN. REV. OF MICROBIOLOGY 319 (1975).

Congress approved patents on certain living things⁵² in the Plant Patent Act of 1930,⁵³ which authorized patent protection to breeders of specified asexually⁵⁴ produced plants.⁵⁵ In 1970 the enactment of the Plant Variety Protection Act⁵⁶ brought certain sexually⁵⁷ produced plants within the scope of patentable subject matter. The 1970 Act also provides an express exclusion of bacteria from patent protection.⁵⁸ Courts have not interpreted the 1930 or 1970 Acts to allow patenting of any living things, except plants themselves.⁵⁹

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." S. REP. NO. 315, 71st Cong., 2d Sess. 1 (1930); H. R. REP. NO. 1129, 71st Cong., 2d Sess. 1 (1930). See 100 S. Ct. at 2209.

54. Asexual reproduction is reproduction other than by union of male and female cells. *STEDMAN'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. ALLYN, *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.

56. See 7 U.S.C. §§ 2321-2583 (1976); *Plant Variety Protection Act; Hearing Before the Subcomm. on Agricultural Res. & General Legislation of the Senate Comm. on Agriculture and Forestry*, 91st Cong., 2d Sess. 47 (1970); S. REP. NO. 91-1138, 91st Cong., 2d Sess. (1970); S. REP. NO. 91-1138, 91st Cong., 2d Sess. (1970), reprinted in [1970] U.S. CODE CONG. & AD. NEWS 5082; H. R. REP. NO. 91-1246, 91st Cong., 2d Sess. (1970) reprinted in [1970] U.S. CODE CONG. & AD. NEWS 5082.

57. 7 U.S.C. § 2402(a) (1976) provides: "The breeder of any novel variety of sexually reproduced plant (other than fungi, bacteria or first generation hybrids) . . . shall be entitled to plant variety protection . . ." The Plant Variety Protection Act of 1970 is incorporated into the Agriculture title of 7 U.S.C., rather than the patent title of 35 U.S.C., but provides protection similar to the 1930 Plant Patent Act. Compare 7 U.S.C. § 2402 (1976) with 35 U.S.C. § 161 (1976).

58. 7 U.S.C. § 2402(a) (1976). The legislative history gives no reason for the exclusion of bacteria from coverage. See 100 S. Ct. at 2210. *But cf.* *Nix v. Hedden*, 149 U.S. 304 (1893) (scientific definition of a word not controlling in statutory interpretation); *In re Arzberger*, 112 F.2d 834 (C.C.P.A. 1940) ("plants," as used in 1930 Plant Patent Act, is used in its common meaning so as to exclude bacteria).

59. See *In re Arzberger*, 112 F.2d 834 (C.C.P.A. 1940) (bacteria are not plants for purposes of 1930 Plant Patent Act).

In *Diamond v. Chakrabarty*⁶⁰ the Supreme Court reasoned that because a genetically cross-bred bacterium is not a product of nature,⁶¹ but a manufacture or composition of matter⁶² under the general patent subject matter statute,⁶³ the bacterium is patentable subject matter.⁶⁴ Chief Justice Burger, writing for the majority,⁶⁵ analyzed the history of the patent laws,⁶⁶ and concluded that although Congress intended the laws to be interpreted liberally,⁶⁷ it did not intend courts to interpret them without limitations.⁶⁸ The Court determined that because Chakrabarty's bacterium does not occur naturally, it is therefore patentable.⁶⁹ The majority held that neither the 1930 Plant Patent Act,⁷⁰ nor the 1970 Plant Variety Protection Act⁷¹ demonstrate a legislative intent to deny patentability to living things unless expressly permitted by congressional act.⁷² 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.⁷³

60. 100 S. Ct. 2204 (1980).

61. *Id.* at 2208. See note 49 *supra*.

62. 100 S. Ct. at 2209. See generally 1 A. DELLER, WALKER ON PATENTS §§ 17-18 (2d ed. 1964). See also *American Fruit Growers, Inc. v. Brogdex Co.*, 283 U.S. 1, 11 (1931); *P.E. Sharpless Co. v. Crawford Farms, Inc.*, 287 F. 655, 658 (2d Cir. 1923); *Hotel Security Checking Co. v. Lorraine Co.*, 160 F. 467, 469 (2d Cir. 1908); *Shell Dev. Co. v. Watson*, 149 F. Supp. 279, 280 (D.D.C. 1957), *aff'd*, 252 F.2d 861 (D.C. Cir. 1958).

63. 35 U.S.C. § 101 (1976).

64. 100 S. Ct. at 2212.

65. *Id.* at 2205. The decision was 5-4.

66. *Id.* at 2206-08.

67. *Id.* at 2207. *Accord*, *Great Atl. & Pac. Tea Co. v. Supermarket Equip. Corp.*, 340 U.S. 147, 154 (1950) (Douglas J., concurring).

68. 100 S. Ct. at 2208. See note 49 *supra*.

69. 100 S. Ct. at 2208.

70. 35 U.S.C. § 161 (1976).

71. 7 U.S.C. § 2402(a) (1976).

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.*

73. *Id.* The Court applied the maxim that absent some clear indication that Congress focused on the issue at bar, there is no reason for interpreting its actions as modifying the plain meaning of 35 U.S.C. § 101 (1976). *Id. Accord*, *TVA v. Hill*, 437 U.S. 153, 189-93 (1978); *SEC v. Sloan*, 436 U.S. 103, 120-21 (1978); *United States v. Price*, 361 U.S. 304, 313 (1960). *Contra*,

The majority dismissed warnings of judicial usurpation of congressional powers⁷⁴ and potential dangers of genetic engineering⁷⁵ by claiming that the Court simply performed the judicial function of interpreting existing legislation.⁷⁶ 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.⁷⁷

Justice Brennan in dissent⁷⁸ felt that the majority misread the applicable legislation.⁷⁹ Justice Brennan viewed the 1930 and 1970 Plant Acts as evidence that Congress intended to exclude living things, particularly bacteria,⁸⁰ from patentability. He objected to the implicit assumption of the majority that Congress acted superfluously in passing the Acts.⁸¹ Justice Brennan concluded that the majority extended the patent system beyond its intended scope.⁸²

Although all the Justices agreed that courts should interpret the patent laws liberally,⁸³ 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 construction⁸⁴ to reach its conclusion, and fails to recognize that other maxims of legislative interpretation become relevant when companion legislation exists.⁸⁵

Liberal interpretation of the general patent subject matter statute is proper if companion legislation does not exist⁸⁶ because the broad congressional language and the goals of the patent laws would warrant broad construction.⁸⁷ Because companion legislation does exist, however, courts cannot consider the patentability of a man-made bacterium in a legislative vacuum.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.⁸⁹

Congress is presumed not to legislate superfluously.⁹⁰ Justice Brennan in dissent⁹¹ 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.⁹²

interpret the broad language of 35 U.S.C. § 101 (1976) as liberally. *See* 100 S. Ct. at 2213 & n.2 (Brennan, J., dissenting).

84. *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.

85. *See* notes 43-44, 46-47 *supra* and accompanying text.

86. If the statutory interpretation involved only 35 U.S.C. § 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*.

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. § 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.

87. 100 S. Ct. at 2207.

88. *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 . . ."

89. 100 S. Ct. at 2213.

90. *See* notes 43, 86 *supra*.

91. 100 S. Ct. at 2212 (Brennan, J., dissenting).

92. *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*.

The Court also should have followed other relevant canons of construction.⁹³ For example, courts should read the general patent subject matter statute and the 1930 and 1970 Plant Acts together to ascertain congressional intent.⁹⁴ 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.⁹⁵

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.⁹⁶ In *Deepsouth*⁹⁷ the Court demanded a "clear and certain signal" from Congress before expanding patent rights.⁹⁸ 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.⁹⁹

The Court could have avoided confusion by recognizing numerous maxims of interpretation that arise when companion legislation exists,¹⁰⁰ and by adhering to the *Deepsouth*¹⁰¹ requirement. Because all of the Justices agreed¹⁰² 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.¹⁰³

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*.

96. 7 U.S.C. § 2402(a) (1976). See notes 58, 95 *supra*.

97. 406 U.S. 518 (1972).

98. *Id.* at 531.

99. 7 U.S.C. § 2402(a) (1976). See note 57 *supra*.

100. See notes 43-47 *supra* and accompanying text.

101. 406 U.S. 518 (1972). See note 98 *supra* and accompanying text.

102. 100 S. Ct. at 2212; *id.* at 2214 (Brennan, J., dissenting).

103. *Parker v. Flook*, 437 U.S. 584 (1978); *Deepsouth Packing Co. v. Laitram Corp.*, 406 U.S. 518 (1972). See notes 83, 92 *supra*.

