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THE PATENTABILITY OF LIVING MATTER: HEY WAITER, WHAT'S CHAKRABARTY'S PSEUDOMONAS BACTERIUM DOING BACK IN THE SUPREME COURT'S SOUP?

The Constitution provides Congress with the power to promote the progress of science and the useful arts.¹ Accordingly, Congress enacted the patent laws² to provide economic stimulus³ for the invention of any machine, manufacture, process, or composition of matter,⁴ and to promote the dissemination of new ideas and discoveries.⁵ Cognizant of the need to balance the economic interests of inventors with the interests of the public, Congress designed the patent statutes to prevent the patenting of inventions which do not constitute advances in science or technology. Statutory requirements, therefore, preclude the patenting of subject matter which is either known of or used by any other persons, or which was obvious at the time of invention, even though such subject matter falls within the categories eligible for patent protection.⁶ Similarly, in interpreting the patent statutes, courts have fashioned limits to patentability, including rules

¹ The Constitution provides in pertinent part:

The Congress shall have Power . . .

[8] To promote the Progress of Science and Useful Arts, by securing for Limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries; . . . [and]

[18] To make all laws which shall be necessary and proper for carrying into Execution the foregoing Powers.

U.S. CONST. art. I, § 8, cls. 8, 18.

² The Patent Act of 1952, Pub. L. No. 82-593, 66 Stat. 792 (codified at 35 U.S.C. §§ 1-293 (1976)).

³ See 35 U.S.C. § 154 (1976). The patenting of an invention gives the inventor the exclusive right to make, use, or sell the invention throughout the United States for a period of 17 years. *Id.* The stimulus provided by these short-term monopolies is enhanced by statutes permitting the assignment of patent rights. See *id.* §§ 152, 154. Companies can therefore invest heavily in research and benefit from the inventions of employees through the compulsory assignment of employees' patent rights to the employer. See text accompanying notes 116-18 *infra*.

⁴ 35 U.S.C. § 101 (1976).

⁵ See *id.* § 111. An application for a patent must include meticulous written specifications of the subject matter and, where appropriate, detailed drawings. *Id.* §§ 111-113. If a patent is issued, the Commissioner of patents is authorized to furnish copies of the specifications and drawings either to the public or to persons applying for the materials, to print the specifications and drawings, and to supply public libraries with copies of them. *Id.* §§ 10, 11(a)(1), 13. Before the patent is issued, however, the Patent Office must keep the patent applications in confidence. *Id.* § 122.

⁶ *Id.* §§ 102-103. Sections 102 and 103 of the patent statutes establish conditions which must be met if subject matter is to be patented. These requirements prevent the patenting of subject matter which is not sufficiently inventive to warrant patent protection, thereby protecting the public from being deprived of articles and processes which are already available. *Id.*

governing patents for the phenomena of nature.⁷

In the recent case of *In re Bergy*⁸ (*Bergy II*), a divided Court of Customs and Patent Appeals (CCPA) held that living matter is within the scope of potentially patentable subject matter.⁹ The CCPA first decided that living things are patentable in *In re Bergy*¹⁰ (*Bergy I*), by overruling a contrary decision made by the Board of Appeals of the Patent and Trademark Office (PTO).¹¹ Shortly thereafter, in *In re Chakrabarty*,¹² the CCPA relied on *Bergy I* as controlling precedent for the question of the patentability of living matter.¹³ The Supreme Court vacated *Bergy I*, however, and directed the CCPA to reconsider the case in light of *Parker v. Flook*, a recent Supreme Court case interpreting the Patent Act.¹⁴ Due to the similarity of the issues in *Bergy I* and *Chakrabarty*, the CCPA vacated its decision in *Chakrabarty* and reheard the cases together in *Bergy II*.¹⁵

In *Parker v. Flook*,¹⁶ the Supreme Court addressed the question of whether a limited category of useful, though conventional, post-solution applications of an improved method of calculation is patentable.¹⁷ The Court held that an improved method of calculation, even though tied to a

⁷ See text accompanying notes 23-38 *infra*.

⁸ 596 F.2d 952 (C.C.P.A. 1979).

⁹ *Id.* at 973.

¹⁰ 563 F.2d 1031 (C.C.P.A. 1977), *vacated sub nom. Parker v. Bergy*, 438 U.S. 902 (1978), *aff'd on rehearing sub nom. In re Bergy (Bergy II)*, 596 F.2d 592 (C.C.P.A. 1979), *vacated and remanded sub nom. Diamond v. Bergy*, 48 U.S.L.W. 3451 (U.S. Jan. 15, 1980) (No. 79-136) *dismissed-F.2d-(C.C.P.A. 1980)*; see text accompanying note 104 *infra*. In *Bergy I*, the CCPA held that a man-made, pure culture of a naturally occurring microorganism is patentable subject matter under 35 U.S.C. § 101. 563 F.2d at 1035; see text accompanying notes 1-7 *supra*. The only issue before the court in *Bergy I* was whether the fact that the pure culture was alive removed it from the classes of patentable subject matter enumerated in § 101. 563 F.2d at 1035.

¹¹ *Ex parte Bergy*, 197 U.S.P.Q. 78 (Bd. App. 1976).

¹² 571 F.2d 40 (C.C.P.A. 1978), *cert. dismissed sub nom. Banner v. Chakrabarty*, 439 U.S. 801 (1979), *aff'd on rehearing sub nom. In re Bergy*, 596 F.2d 592 (C.C.P.A. 1979), *cert. granted sub nom. Parker v. Bergy*, 100 S. Ct. 261 (1979). In *Chakrabarty*, the CCPA held that a novel, manmade, genetically engineered strain of microorganism was patentable subject matter as defined in § 101. 571 F.2d at 43; see text accompanying notes 44-50 *infra*. The issue before the court in *Chakrabarty* was identical to the issue in *Bergy I*: whether the fact that the microorganism was alive removed it from the scope of patentable subject matter. 571 F.2d at 43; see note 10 *supra*.

¹³ 571 F.2d at 43.

¹⁴ *Parker v. Bergy*, 438 U.S. 902 (1978); see *Parker v. Flook*, 437 U.S. 584 (1978); text accompanying notes 16-38 *infra*.

¹⁵ See *Bergy II*, 596 F.2d 952, 957 (C.C.P.A. 1979); notes 10 & 12 *supra*.

¹⁶ 437 U.S. 584 (1978).

¹⁷ *Id.* at 585. *Flook's* improved method of calculation was a method of updating "alarm limits" in catalytic conversion processes. *Id.* The Court defined "alarm limit" as a number representing maximum and minimum levels for certain "process variables" in the reaction. Inefficiency or danger potentially exists when these process variables, such as temperature and pressure, go beyond the proper maximum and minimum levels for the given stage of the reaction. Although the alarm limits remain essentially the same during steady operational stages of the catalytic conversion process, the limits must be updated during periods when the process variables are constantly changing, such as the start-up period. *Id.* at 585, 596.

specific end use, is unpatentable subject matter.¹⁸ Additionally, the Court recognized a relationship between the patenting of Flook's claimed method of calculation and the patenting of computer programs.¹⁹ The Court declared that, as a matter of policy, prior cases interpreting the Patent Act should be followed carefully, and that caution must be exercised when patent rights are extended into areas wholly unforeseen by Congress.²⁰ This policy rests on the principle that courts should not expand patent protection by overruling or modifying prior cases construing the Patent Act without a clear and certain signal from Congress.²¹ Therefore, even though the cases the Court relied upon in *Flook* were decided before the development of computer technology, the Court felt that any decisions to modify patent law so as to permit the patenting of computer programs should be made by Congress.²²

The cases the Supreme Court relied upon in *Flook* concerned the patentability of phenomena of nature.²³ Although the Patent Act has no pro-

Flook's improvement in the method of calculation was the addition of an intermediate step to a conventional method of calculation. *Id.* at 585-86. The new intermediate step was based on a newly discovered algorithm. *Id.* at 585. The Court defined "algorithm" as a procedure for solving a given type of mathematical problem. *Id.* at 585 n.1. The Court established this definition of algorithm in *Gottschalk v. Benson*, 409 U.S. 63, 65 (1972). In *Gottschalk*, the Court, relying on the rule that a mathematical formula is an unpatentable phenomenon of nature, held that when an algorithm has no practical application except for use with a computer, then the computer program using the algorithm is unpatentable, because the program would wholly preempt the use of the algorithm. 409 U.S. at 71-72; see text accompanying note 29 *infra*.

¹⁸ 437 U.S. at 595-96.

¹⁹ *Id.*

²⁰ *Id.* The principle of following established judicial interpretations of patent law when faced with potential expansion of patent privileges was set forth in *Deepsouth Packing Co. v. Laitram Corp.*, 406 U.S. 518, 531 (1972). In *Deepsouth*, the Supreme Court reversed the Fifth Circuit and held that the activities of defendant DeepSouth Packing Company did not infringe Laitram Corporation's patent for a shrimp deveining machine. *Id.* at 528. DeepSouth had manufactured all the parts for the patented machine and sold them abroad, where the machines could be assembled in a matter of hours. *Id.* at 524. Defining the term "make" as used in the patent infringement statute, see 35 U.S.C. § 271 (1976), as "the substantial manufacture of the constituent parts of the machine," the Fifth Circuit had held that DeepSouth had made the patented machine, thereby infringing upon Laitram's patent rights. *Laitram Corp. v. DeepSouth Packing Co.*, 443 F.2d 936, 939 (5th Cir. 1971). The Supreme Court held, however, that the established definition of the term "make" protected patentees only against the full and operable assembly of the patented subject matter, and that the Court would not modify that established interpretation of the patent statute in order to expand the rights of the patentee. 409 U.S. at 528, 531.

²¹ See note 20 *supra*; note 22 *infra*.

²² 437 U.S. at 596. Policy matters regarding the patenting of computer programs which Congress, not the Court, should decide, include questions concerning the types or programs which should be patented and the duration of the protection to be given the programs. *Id.* at 595; see, e.g., Davis, *Computer Programs and Subject Matter Patentability*, 6 *RUTGERS J. OF COMPUTERS AND THE LAW* 1.

²³ 437 U.S. at 591. The *Flook* opinion suggests two bases upon which the Court made its decision. The Court reasoned that an algorithm is a phenomenon of nature and, since phenomena of nature are unpatentable, Flook's algorithm is unpatentable. *Id.* at 591-92; see

visions concerning phenomena of nature, the courts have developed several rules limiting their patentability. Fundamental to the phenomena of nature rules is the principle that the phenomena are not "inventions," nor are discoveries of phenomena of nature "discoveries" as defined by the Patent Act.²⁴ Consequently, while a phenomenon of nature is unpatentable for want of invention, an inventive application of a phenomenon of nature is patentable.²⁵

In order for subject matter which embodies a phenomenon of nature to be patentable, the invention of the subject matter must have required more than the ordinary skill of a person in the art or profession given the state of the prior art when the subject matter was made.²⁶ Furthermore,

Gottschalk v. Benson, 409 U.S. 63, 67 (1972). As a phenomenon of nature, Flook's newly discovered algorithm must be treated as though it were well known for the purpose of determining whether the method of calculation was patentable. 437 U.S. at 592; see O'Reilly v. Morse, 56 U.S. (15 How.) 62, 115 (1853). The test for determining whether Flook's method of calculation is patentable is whether the process itself, not merely the algorithm, is new and useful. 437 U.S. at 591; see Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130 (1948); Mackay Radio & Tel. Co. v. RCA, 306 U.S. 86, 94 (1939). In holding Flook's method of calculation unpatentable, the Court implicitly held that the method of calculation was not new and useful.

The Court did not rest its decision on this reasoning, however, relying instead on the CCPA's decision in *In re Richman*, 563 F.2d 1026 (C.C.P.A. 1977). 437 U.S. at 595. In *Richman*, the CCPA held that if a patent claim is directed essentially to a method of calculation, even though the method employs a new mathematical equation and is limited to a specific post calculation solution, the claimed method is unpatentable. 563 F.2d at 1030. Although the *Richman* holding is based on the phenomena of nature rules, the holding in that case does not require the application of all the rules discussed in *Flook*. *Id.* Therefore, the Court's review of the phenomena of nature rules in *Flook* is dictum. See Note, Parker v. Flook and Computer Program Patents, 30 HASTINGS L.J. 1627 (1979) [hereinafter cited as *Computer Program Patents*]. See generally Bergy II, 596 F.2d 952, 988-95 (Baldwin, J., concurring).

²⁴ See, e.g., 437 U.S. at 593. In *Flook*, the Supreme Court explained that the prohibition of the patenting of phenomena of nature rests on the "fundamental understanding" that discoveries of phenomena of nature are not "discoveries" within the meaning of § 101. *Id.*; see text accompanying note 4 *supra*.

²⁵ Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 130 (1948); Mackay Radio & Tel. Co. v. RCA, 306 U.S. 86, 94 (1939). In *Mackay Radio*, the Court held that a patent for an antenna system, the dimensions of which were determined in accordance with principles of electro-magnetic wave propagation and the phenomenon of standing waves, was valid. *Id.* at 91-92, 101. Although the principles upon which the system was based were unpatentable phenomena of nature, the antenna system was an inventive application of the phenomena. *Id.* at 101. See also text accompanying notes 89-97 *infra*.

²⁶ See Funk Bros. Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 132 (1948); Armour Pharm. Co. v. Richardson-Merrell Inc., 396 F.2d 70, 79 (3d Cir. 1968). In *Armour*, the court held a patent which had been issued for an enzyme with known medicinal value invalid. *Id.* at 71, 75. The enzyme had been treated in order that the drug could be administered orally. *Id.* at 71, 74-75. The court held that the patent was based on the discovery of the phenomenon of nature that the lower portion of the small intestine absorbed the enzyme. *Id.* at 74. Once the patentee made this discovery, any artisan would have known the process of enterically coating the enzyme to enable it to pass through the digestive system to the small intestine. *Id.* Therefore, the subject matter of the patent did not constitute an inventive application of a phenomenon of nature. *Id.* The Ninth Circuit used a similar standard in *National Lead Co. v. Western Lead Prod. Co.*, 329 F.2d 539 (9th Cir. 1963). The National Lead Com-

the Supreme Court has held all phenomena of nature, even though newly discovered, are treated as though they are well known aspects of the prior art.²⁷ As the Supreme Court has recognized, these rules preclude the pat-

pany held a patent for a process for the manufacture of a composition of lead particles and lead oxides. *Id.* at 540. The process was a modification of a conventional process. *Id.* The improvement was based on the patentee's discoveries that two lead oxides instead of one were present in the composition, and that the temperature used for the process had direct effects on the product. *Id.* at 541. The court held that these discoveries were discoveries of phenomena of nature. *Id.* at 545. Based on this holding, the court held the patent for the process invalid, because once these phenomena of nature were discovered, an artisan required no more than the ordinary skill of the profession to develop the improved process. *See id.* *See also In re Arnold*, 185 F.2d 686 (C.C.P.A. 1950). The *Arnold* court denied a patent for an improved method of the old art of bonding materials by passing high frequency current between electrodes applied to opposite sides of materials to be bonded, thereby activating a cement placed between them. *Id.* at 691. The improvement was based on the discovery that electric current affects the surface molecules of the cement and materials to be bonded differently than the molecules in the inner layers of the materials. *Id.* The court held that once these characteristics had been discovered, the improvement in the process based on altering the frequency of the current was not invention. *Id.* The Seventh Circuit used the "more than the ordinary skill of the profession" requirement in *Davison Chem. Corp. v. Joliet Chems., Inc.*, 179 F.2d 793 (7th Cir. 1950). The Davison Chemical Corporation held a patent on an improved process for the production of silica gel. *Id.* at 793-94. The improvement consisted of changing the temperature of the wash water in the process, which was found to change the structure of the silica product. *Id.* at 794. The court held, however, that the relationship between the wash water temperature and the structure of the silica was a phenomenon of nature. *Id.* at 794-95. Therefore, once this phenomenon was discovered, a person familiar with the process needed to apply only the ordinary skill of the profession to make the improvement in the otherwise generally used process. *Id.*

The "ordinary skill" requirement used by courts to determine sufficiency of invention for applied phenomena of nature is almost identical to the invention requirement set forth in the patent statutes. The patent statutes provide in pertinent part:

A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art which said subject matter pertains.

35 U.S.C. § 103 (1976). Furthermore, the Ninth Circuit decided *National Lead* specifically on the basis of § 103. 324 F.2d at 544. In *Flook*, however, the Supreme Court held that the inventive application of a phenomenon of nature test is based on the invention requirement of § 101. 437 U.S. at 588, 592. *Flook* argued that the Court was improperly importing the inventiveness requirements of § 103 to § 101, thereby making bad law by giving courts two standards on which to determine inventiveness. *Id.* at 592-93. The dissent in *Flook* and the majority in *Bergy II* also objected vehemently to the Supreme Court's holding that § 101 controls. *Id.* at 600 (Stewart, J., dissenting); *Bergy II*, 596 F.2d 952, 962-64 (C.C.P.A. 1979). *See also, Computer Program Patents, supra* note 23, 1634-35. The issue of whether the statutory basis of the test is § 103 or § 101 is irrelevant to the question of whether specific subject matter is patentable, however, because the standard for the test is the same regardless of its statutory basis.

²⁷ *Parker v. Flook*, 437 U.S. 584, 591-92 (1978); *See Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 132 (1948) ("once nature's secret of the noninhibitive quality of certain strains of the species of *Rhizobium* was discovered, the state of the art made the production of a mixed inoculant a simple step"); *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 115-16 (1853) (when determining whether machine embodying phenomenon of nature is patentable, courts must consider case "as if the principle [is] well known"). In *Bergy II*, the CCPA

enting of fundamental applications of phenomena of nature.²⁸ These rules, therefore, conform to the general policy underlying the phenomenon of nature rules of preventing persons from using patent protection to wholly preclude the use of a phenomenon of nature.²⁹

When applying the phenomena of nature rules, a court must first determine whether the patent claim is based on a phenomenon of nature,³⁰ and, if so, the court must define the phenomenon for the given case. Although courts have failed to define adequately the term "phenomenon of nature,"³¹ the cases cited in *Parker v. Flook* show that the following classes are included within the scope of the term. Physical laws of nature, such as gravity,³² and physical properties of nature, such as the heat of the sun and electricity,³³ are phenomena of nature. Other physical properties which are phenomena of nature are the inherent physical properties of

stated that the rule that newly discovered phenomena of nature are included in the prior art was a "novel principle" with "consequences of unforeseeable magnitude." 596 F.2d at 965. The court decided, however, that the rule had no bearing on *Bergy II*, because the phenomena of nature rules were inapplicable to the case. *Id.* at 965-66. Given the tests used in *Morse* and *Funk Brothers*, the CCPA's objection does not appear to be valid. *But see Computer Program Patents*, *supra* note 23.

²⁸ See *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 131 (1948).

²⁹ *Gottschalk v. Benson*, 409 U.S. 63, 71-72 (1972). See also *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948). The Supreme Court's opposition to the use of patents to monopolize a phenomenon of nature is best evidenced by *Benson*. 409 U.S. 63 (1972). In *Benson*, the Supreme Court held a computer program which was not tied to a specific use unpatentable, because the patent would wholly preempt the use of the mathematical equation upon which the program was based. *Id.* at 71-72. Although recognizing that the equation could conceivably be used in other ways than with the program, the Court held that the only "substantial practical application" of the equation was in use with computers. *Id.* Mathematical equations are phenomenon of nature. *Id.*; see text accompanying notes 36-38 *infra*.

³⁰ As Judge Baldwin noted in the dissenting opinion in *Bergy II*, the Supreme Court has analyzed phenomena of nature cases in terms of the phenomenon of nature which made the invention valuable. 596 F.2d at 996 (Baldwin, J., concurring); see, e.g., *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 128-30 (1948) (patent for bacterial fertilizer held invalid because value of patent rested on properties of bacteria, which are phenomena of nature).

³¹ Courts have used the terms "phenomena of nature," "laws of nature," "principles of nature," and "fundamental truths" synonymously. See *Bergy II*, 596 F.2d 952, 965 (C.C.P.A. 1979). The inadequate definition of these terms is attributable partially to the fact they are "vague and maleable terms infected with too much ambiguity and equivocation." *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 135 (1948) (Frankfurter, J., concurring).

³² See, e.g., *Eibel Process Co. v. Minnesota and Ontario Paper Co.*, 261 U.S. 45 (1923). In *Eibel Process*, a machine which had an elevated end to increase the flow rate was held to embody the natural phenomenon of gravity. *Id.* at 50. The machine was held patentable, however, and later courts recognize the machine as an inventive application of a phenomenon of nature. *Id.* at 69; see, e.g., *Parker v. Flook*, 437 U.S. 584, 590 (1978).

³³ See *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948) (recognizing that heat of the sun and electricity are phenomena of nature); *O'Reilly v. Morse*, 56 U.S. (15 How.) 61, 112-13 (1853) (ability of electro-magnetic current to print intelligible signs at a distance held a phenomenon of nature); *LeRoy v. Tatham*, 55 U.S. (14 How.) 156, 179 (1852) (recognizing that electricity, and "any other power in nature" are phenomena of nature).

naturally occurring animate and inanimate matter.³⁴ The scope of this class of phenomena is not well defined, however, due to imprecise definition of the term "inherent properties." The decisions concerning this class of phenomena indicate, however, that a property is inherent in matter even though the property is only exhibited under conditions which do not exist in nature.³⁵ The term "phenomena of nature" also includes all mathematical equations and methods of calculation.³⁶ Equations are considered phenomena of nature, because they only recognize and express relationships which exist despite any contribution of the discoverer.³⁷ Therefore, the mathematical expression of laws of nature and properties of nature are also phenomena of nature.³⁸

In applying *Parker v. Flook* to the appeals of Bergy and Chakrabarty, the majority in *Bergy II* first concluded that the holding of *Flook*, which concerned methods of calculation, was clearly inapplicable to the patent claims in question.³⁹ Bergy's patent application requested patent protection for a new process for the preparation of an antibiotic which used a newly discovered microorganism, and for a biologically pure culture of the newly discovered microorganism.⁴⁰ Bergy received a patent for the process for the production of the antibiotic, but the patent examiner rejected the claim for patent protection for the pure culture of the microorganism on the grounds that it was a product of nature.⁴¹ The PTO Board of Appeals

³⁴ *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948) (properties in strains of bacteria held phenomena of nature); *LeRoy v. Tatham*, 55 U.S. (14 How.) 156, 175-76 (1852) (properties of lead held phenomena of nature).

³⁵ See, e.g., *Davison Chem. Corp. v. Joliet Chems., Inc.*, 179 F.2d 795 (7th Cir. 1950) (property in silicon demonstrated only when silicon subjected to extremely high temperatures held phenomenon of nature). *In re Arnold*, 185 F.2d 686, 691 (C.C.P.A. 1950) (properties in molecules when subjected to extremely high frequency electricity held phenomena of nature).

³⁶ See *Parker v. Flook*, 437 U.S. 584, 595 n.19 (1978); *In re Richman*, 563 F.2d 1026, 1030 (C.C.P.A. 1977).

³⁷ *Parker v. Flook*, 437 U.S. 584, 593 n.15 (1978).

³⁸ See, e.g., *Mackay Radio & Tel. Co. v. RCA*, 306 U.S. 86, 93-94 (1939) (mathematical expression of principle of electro-magnetic wave propagation held a phenomenon of nature).

³⁹ 596 F.2d at 965. Malcolm E. Bergy, John H. Coats and Vedpol S. Malik, referred to collectively as "Bergy," were scientists for the Upjohn Company, to which they had assigned their patent rights. *Bergy I*, 563 F.2d 1031, 1031 (C.C.P.A. 1977). Similarly, Anada M. Chakrabarty was a Staff Biologist in the Research and Development Center of General Electric Company, to which he had assigned his patent rights. *Bergy II*, 596 F.2d 952, 968 (C.C.P.A. 1979).

⁴⁰ U.S. Pat. App. No. 477,776 (June 10, 1974). Bergy's claim for the biologically pure culture of *Streptomyces vellosus* was made by amendment to the original patent application. 596 F.2d at 967.

⁴¹ 596 F.2d at 968, 972. Courts use product of nature rules, like the phenomena of nature rules, to withhold patent protection from subject matter which is not sufficiently inventive to warrant patent protection. See *Merck & Co. v. Olin Mathieson Chem. Corp.*, 253 F.2d 156, 161-64 (4th Cir. 1958). Products of nature rules are used most frequently where a substance or an element which exists in nature has been purified, and that non-naturally occurring pure form of the substance has been patented. See *General Elec. Co. v. DeForest Radio Co.*, 28 F.2d 641, 642-48 (3d Cir.), cert. denied, 278 U.S. 656 (1928) (patent for substantially

upheld the rejection of the claim for patent protection for the pure culture, but ignored the patent examiner's grounds for the decision.⁴² The Board's reason for rejection was that the pure culture was alive, thus excluding it from the scope of patentable subject matter.⁴³

Unlike Bergy's patent claim for a pure culture of a naturally occurring microorganism, Chakrabarty's patent application requested patent protection for a new, man-made strain of microorganism.⁴⁴ Chakrabarty had invented the new strain of microorganism by altering the genetic structure of a naturally occurring bacterium.⁴⁵ The new microorganism had the capacity to degrade several components of crude oil, and was thus useful in controlling oil spills on the oceans.⁴⁶ Other known naturally occurring bacteria had the capacity to degrade single components of crude oil, but the known microorganisms had different environmental requirements for effective degradation.⁴⁷ Consequently, Chakrabarty's strain of the microorganism was more effective than a mixed culture of the known, naturally occurring bacteria.⁴⁸ The patent examiner rejected Chakrabarty's claim

pure tungsten which exists in nature only in oxidized form held invalid); *In re Marden*, 47 F.2d 957, 957 (C.C.P.A. 1931) (pure uranium held unpatentable); *In re Marden*, 47 F.2d 958, 959 (C.C.P.A. 1931) (pure vanadium held unpatentable). The circuit courts are divided on the use of product of nature rules, however, with some courts finding product of nature rules unacceptable. See *Parke-Davis & Co. v. H.K. Mulford Co.*, 189 F. 95, 101-02 (S.D.N.Y. 1911), *aff'd*, 196 F. 496, 500 (2d Cir. 1912) (adrenelin extracted from glands of animals held patentable). See generally, Guttang, *The Patentability of Microorganisms: Statutory Subject Matter and Other Living Things*, 13 U. RICH. L. REV. 247 (1979); Note, *Patent Law—Patentability as Affected by the Law of Nature Rules—The Kalo Doctrine*, 47 MICH. L. REV. 391 (1949).

⁴² See 596 F.2d at 971-72.

⁴³ See *Bergy I*, 563 F.2d 1031, 1033-34 (C.C.P.A. 1977). The PTO Board recognized that the patentability of living matter was a question of first impression on which there was no guiding precedent, but refused to patent living things on the grounds that the patent statute must be construed narrowly. *Id.* at 1033; see 35 U.S.C. § 101 (1976). The Board also maintained that the Plant Patent Act is evidence that living matter not covered by that act is unpatentable. 563 F.2d at 1034. *But see* text accompanying notes 109-115 *infra*.

⁴⁴ U.S. Pat. App. No. 260,563 (June 7, 1972); *Bergy II*, 596 F.2d 952, 969-70 (C.C.P.A. 1979). In addition to the claim for the microorganism itself, Chakrabarty sought patent protection for an inoculum for the degradation of certain hydrocarbons, which consisted essentially of bacteria, at least some of which were the bacteria Chakrabarty had created; for an inoculated medium for degrading oil spills, the inoculum consisting of straw or other material which floats on water that had been inoculated with Chakrabarty's bacteria; and finally, for the process or improvement in a process of altering the genetic structure of the microorganisms. *Id.* at 970-71.

⁴⁵ *Id.* at 968-70. Through a process known as genetic engineering, or plasmid engineering, scientists are able to alter the genetic makeup of simple organisms by splicing the DNA molecules of similar species, thereby creating a new composite genetic structure. DNA, or deoxyribonucleic acid, is the vital component in genetic material which controls the entire nature of an organism. Therefore, by altering the DNA molecules, scientists can create a new organism whose novel genetic structure distinguishes it from all other living matter. Cohen, *The Manipulation of Genes*, *Scientific American*, July 1975, at 24-33.

⁴⁶ 596 F.2d at 968.

⁴⁷ *Id.* at 969.

⁴⁸ *Id.*

for the microorganism on grounds that the microorganisms were a product of nature and further, because the microorganisms were alive.⁴⁹ The PTO Board of Appeals affirmed the examiner's holding, but, as with Bergy's claims, the Board based its rejection on the ground that living things are unpatentable subject matter.⁵⁰

Perceiving a duty to find any possible application of *Flook* to the appeals of *Bergy* and *Chakrabarty*, the CCPA then reviewed the phenomena of nature rules discussed in *Flook*.⁵¹ The majority found that Bergy's and Chakrabarty's claims did not involve phenomena of nature, however, thereby holding the phenomena of nature rules inapplicable to the cases.⁵² The opinion did not give any explanation in support of this holding.

Citing the fact that the patentability of living matter was a question of first impression in the courts and that the question did not involve any established law, the majority rejected the PTO's argument that the policy language in *Flook* regarding the expansion of patent law precludes the patenting of living things.⁵³ Under the majority's interpretation of the policy language in *Flook*, the policy applies only when well established law is changed by decisions expanding patent law.⁵⁴ Furthermore, the majority emphasized that its decision did not expand patent law. According to the majority, decisions defining patentable subject matter for the first time do not expand the law, but instead define the congressional purpose underlying the statute.⁵⁵ Given the court's duty to decide questions of first im-

⁴⁹ *Id.* at 970. In addition to rejecting the patent claim on the microorganism, the patent examiner rejected Chakrabarty's claim for the inoculum which consisted, in part, of Chakrabarty's microorganism. *Id.*; see note 44 *supra*. The patent examiner issued patents, however, for the medium inoculated with the bacteria and for the process for the creation of the microorganism. 596 F.2d at 971; see note 44 *supra*.

⁵⁰ See 596 F.2d at 970-71. The board held that a narrow reading of the patent statutes precluded the patenting of living matter. *Id.*; see 35 U.S.C. § 101; see also note 43 *supra*.

⁵¹ 596 F.2d at 965.

⁵² *Id.* at 965-66. The CCPA characterized the Supreme Court's discussion of phenomena of nature as a review of "hornbook law" which was inapplicable to the appeals of Bergy and Chakrabarty. *Id.* at 965. The CCPA sharply criticized the Supreme Court's holding in *Flook* that the inventive application of a phenomenon of nature test was based on 35 U.S.C. § 101 rather than 35 U.S.C. § 103, as well as the Court's holding that newly discovered phenomena of nature are part of the prior art. *id.*; see text accompanying notes 26-27 *supra*. These criticisms of the Supreme Court's *Flook* opinion had no bearing on the *Bergy II* decision, however, because the CCPA had decided that the phenomena of nature rules were inapplicable to the cases. 596 F.2d at 965.

⁵³ 596 F.2d at 966-67; see text accompanying notes 19-22 *supra*.

⁵⁴ 596 F.2d at 966-67. The CCPA's interpretation of the policy language in *Flook* was based on an examination of the language in the context of *Flook* and *Deepsouth Packing*. The *Bergy II* majority emphasized that when used by the Supreme Court, the policy against expanding patent rights was invoked to prevent the overruling of established cases defining the breadth of the patent statutes. *Id.*; see note 20 *supra*. The majority concluded that application of policy language established in this manner to *Bergy II* would have wrenched the language "out of the context in which it belongs and use[d] it in a manner unwarranted by the situation which spawned it." 596 F.2d at 966.

⁵⁵ 596 F.2d at 967, 984-87; see text accompanying notes 81-82 *infra*.

pression, the majority merely exercised its discretion in deciding that microorganisms are patentable.⁵⁶

By holding *Flook* inapplicable to the appeals, the CCPA had decided that Bergy's and Chakrabarty's claims were not barred by the established limitations on patentable subject matter.⁵⁷ Therefore, the only issue left before the court was whether an otherwise patentable invention is excluded from the categories of patentable subject matter solely because the invention is alive.⁵⁸ Relying on a broad interpretation of the statute defining patentable subject matter, the court held that the fact that something is alive has no legal significance with respect to its patentability.⁵⁹ The majority found that Congress defined the categories of patentable subject matter broadly in order to provide a flexible law capable of encompassing unforeseeable technological developments.⁶⁰ In support of this interpretation, the majority quoted language from the legislative history of the Patent Act defining patentable subject matter as "anything under the sun that is made by man."⁶¹ Since no language in the statutory definition of patentable subject matter distinguished living and non-living matter, the majority refused to infer such a distinction.⁶²

Furthermore, the court rejected the dissent's contention that the Plant Patent Act,⁶³ which provides patent protection for certain classes of plants, precludes the patentability of other living matter.⁶⁴ The dissent argued that, had living matter been patentable, the Plant Patent Act would not have been necessary.⁶⁵ The majority concluded, however, that

⁵⁶ 596 F.2d at 987.

⁵⁷ *Id.* at 971-73. Stressing the fact that Bergy's claim was for a novel, man-made, pure culture of a naturally occurring microorganism, rather than a naturally occurring microorganism itself, the CCPA held that Bergy was not claiming patent protection for a product of nature. *Id.* at 973-77; see note 41 *supra*. Although the question of whether the pure culture was a product of nature had not been raised before the CCPA, the court recognized that as a procedural matter, when the Board affirms an examiner's rejection generally without reversing the grounds on which the examiner relied, those grounds are affirmed. *Id.* at 972; see 37 C.F.R. § 1.196(a) (1979). Therefore, since the examiner's rejection of the patent for the pure culture on grounds that the culture was a product of nature had not been rejected by the PTO Board of Appeals, the rejection was still viable, and the CCPA had to address the issue. 596 F.2d at 972-73. The PTO Board had previously determined that Chakrabarty's man-made microorganism was not a product of nature, and no challenge was made before the CCPA on that ruling. See *id.* at 971; see note 41 *supra*.

⁵⁸ 596 F.2d at 973.

⁵⁹ *Id.* at 975.

⁶⁰ *Id.* at 973-75.

⁶¹ 596 F.2d at 987 (quoting S. REP. NO. 1979, 82d Cong., 2d Sess. 5 (1952); H.R. REP. NO. 1923, 82d Cong., 2d Sess. 6, reprinted in [1952] U.S. CODE CONG. & AD. NEWS 2394, 2399).

⁶² 596 F.2d at 985.

⁶³ Plant Patent Act of 1930, Pub. L. No. 71-245, 46 Stat. 376 (codified at 35 U.S.C. §§ 161-164 (1976)).

⁶⁴ 596 F.2d at 977-84.

⁶⁵ *Id.* at 999 (Miller, J., dissenting). Judge Miller asserted that Congress recognized the dichotomy of animate and inanimate matter and that the Plant Patent Act was designed to

the purpose of the Plant Patent Act was to give horticulture the same opportunity for patent protection that industry enjoyed, and further, that Congress was unconcerned with the fact that plants are alive.⁶⁵ The majority also concluded that the Plant Patent Act's enactment was necessary to overrule cases holding that man-made strains of plants are unpatentable under rules prohibiting patents for products of nature.⁶⁷

Judge Miller based his dissent from the *Bergy II* majority's broad interpretation of the scope of patentable subject matter on the policy language in *Parker v. Flook* and on the Plant Patent Act.⁶⁸ The dissenting opinion proposed that, under *Flook*, courts must defer any expansive reading of patent law to Congress if a basis for substantial doubt exists as to Congress' intent regarding the language in the statute.⁶⁹ Judge Miller contended that the Plant Patent Act established this substantial basis of doubt, and thus called for congressional action defining the law in this area.⁷⁰

Only Judge Baldwin's concurring opinion recognized any potential relationship between the Supreme Court's discussion of phenomena of nature in *Flook* and the questions raised by Bergy's and Chakrabarty's patent claims.⁷¹ Based upon a narrow interpretation of the rules suggested in *Flook* and on a broad definition of the phenomena associated with Bergy's and Chakrabarty's patent claims, Judge Baldwin concluded, however, that the phenomena of nature rules did not affect Bergy's and Chakrabarty's claims.⁷² Citing lengthy passages from the cases cited in *Flook*, Judge Baldwin suggested that the cases stood solely for the rule that an inventor may not wholly preclude others from using a phenome-

permit the first patenting of animate matter. *Id.* at 1000-01. The majority found, however, that the Act was designed to stimulate plant breeding by overruling cases holding plants unpatentable under the product of nature rules, and to change the description requirements for plants. *Id.* at 982-84.

⁶⁵ *Id.* at 982; see text accompanying notes 109-15 *infra*.

⁶⁶ 596 F.2d at 982-83; see *Ex parte Latimer*, 1889 C.D. 123, 125, 46 O.G. 1638 (Commr. 1889) cited in *Bergy II*, 596 F.2d 952, 982 (C.C.P.A. 1979); Thorne, *Relation of Patent Law to Natural Products*, 6 J. PAT. OFF. SOC'Y, 23, 25 (1923) (courts generally regard plants as natural products, not "discoveries" within context of patent statutes). See also note 41 *supra*.

⁶⁷ 596 F.2d at 999 (Miller, J., dissenting); see text accompanying notes 63-67 *supra*.

⁶⁸ 596 F.2d at 999 (Miller, J., dissenting). Judge Miller contended that by concentrating on the literal meaning of the policy language in *Flook*, the majority in *Bergy II* missed the essential thrust of the *Flook* opinion. *Id.* The majority held that *Flook* only proscribed judicial expansion of patent rights when established interpretations of patent law are modified. *Id.* at 966-67; see text accompanying notes 19-22 & 53-56 *supra*. Judge Miller argued that the language established a general policy limiting expansion of patent privileges where the subject matter was not foreseen by Congress. 596 F.2d at 999 (Miller, J., dissenting).

⁶⁹ 596 F.2d at 999 (Miller, J., dissenting). Judge Miller argued that the only patentable living matter was covered by the Plant Patent Act. See 35 U.S.C. § 161 (1976); text accompanying notes 63-67 *supra*.

⁷⁰ 596 F.2d at 988-96 (Baldwin, J., concurring); see text accompanying notes 23-38 *supra*.

⁷¹ 596 F.2d at 996-97 (Baldwin, J., concurring).

non of nature.⁷³ Judge Baldwin then defined the phenomenon associated with Bergy's claim as any biological production of a particular antibiotic and defined the phenomenon associated with Chakrabarty's claim as any biological metabolism of hydrocarbons.⁷⁴ Judge Baldwin noted, however, that Bergy and Chakrabarty were not attempting to wholly preclude the use of these phenomena, thereby concluding that the phenomena of nature discussion in *Flook* was inapplicable.⁷⁵

The only conclusion common to the three opinions in *Bergy II* was that the judges saw no relationship between the facts and holding of *Flook* and the patent claims of Bergy and Chakrabarty. This fact, coupled with the judges' three different positions on the dicta in *Flook*, demonstrates the inadequacy of the Supreme Court's order demanding the reexamination of *Bergy I* in light of *Parker v. Flook*. An examination of the positions taken by the judges in *Bergy II* on the relevance of *Parker v. Flook* demonstrates, however, that, while the dissent's interpretation of the policy language in *Flook* may properly express the Supreme Court's attitude towards court expansion of patent law, the policy is inappropriate to the facts of *Bergy II*.⁷⁶ Such examination also reveals that, if properly interpreted and applied to the two cases, the phenomena of nature rules would prevent the patenting of Bergy's pure culture of microorganism,⁷⁷ while being inapplicable to Chakrabarty's man-made organism.⁷⁸

An adoption by the CCPA of the dissent's interpretation of the policy language in *Flook* would have been an improper expansion of that policy. In its original context, the policy only limited judicial expansion of patent rights when prior cases construing the patent statutes would be modified or overruled in the process.⁷⁹ In that context, the policy is warranted by the fact that Congress has the opportunity to modify the patent statutes in order to overrule cases which interpret congressional policy improperly.⁸⁰ Conversely, well established cases construing the patent statutes

⁷³ *Id.* at 996 (Baldwin, J., concurring). *But see* text accompanying notes 23-28 *supra*.

⁷⁴ 596 F.2d at 996 (Baldwin, J., concurring). *But see* text accompanying note 87 *infra*. *See also* note 34 *supra*.

⁷⁵ 596 F.2d at 997 (Baldwin, J., concurring).

⁷⁶ *See* text accompanying notes 79-82 & 116-18 *infra*.

⁷⁷ *See* text accompanying notes 83-100 *infra*.

⁷⁸ *See* text accompanying notes 101-102 *infra*.

⁷⁹ *Parker v. Flook*, 437 U.S. 584, 596 (1978); *DeepSouth Packing Co. v. Laitram Corp.*, 406 U.S. 518, 531 (1972); *see* note 20 *supra*; text accompanying notes 53-56 *supra*.

⁸⁰ Congressional modification of patent law to modify court decisions is exemplified by the 1952 revision and codification of patent law, in which Congress added the statutory requirement that inventions must be non-obvious. 35 U.S.C. § 103 (1976). The legislative history of the new requirement shows that Congress recognized that the requirement was established law, "but only by reason of decisions of the courts," and that Congress codified the court made requirement in order to "minimize great departure [from the rule] which [has] appeared in some cases." S. REP. NO. 1979, 82d Cong., 2d Sess. 6 (1952); H.R. REP. NO. 1923, 82d Cong., 2d Sess. 7, reprinted in [1952] U.S. CODE CONG. & AD. NEWS 2394, 2399-400; *see* *Graham v. John Deere Co.*, 383 U.S. 1, 6 (1966).

Similarly, prior to the Plant Patent Act of 1930, patents were not issued for plants or

are interpretations of patent law which Congress has approved by its acquiescence, and therefore should only be changed by Congress. In *Bergy II*, however, the decision that microorganisms are patentable did not change any prior court interpretations of the patent statutes to which Congress had acquiesced, thus making the policy reiterated by the Supreme Court in *Flook* inapplicable. Furthermore, as the majority emphasized, the decision in *Bergy II* did not expand patent rights, because the cases presented an issue of first impression.⁸¹ Therefore, by holding living matter patentable, the CCPA did not open new doors in the patent law, but merely chose not to close a door through which no one had yet attempted to pass.⁸²

The majority's unexplained holding that Bergy's and Chakrabarty's claims did not involve phenomena of nature⁸³ constituted an insufficient examination of the phenomena of nature rules discussed in *Flook*.⁸⁴ As the concurring opinion recognized, the importance of the microorganisms is based on their inherent properties.⁸⁵ Descriptions of the phenomena, set forth in the concurring opinion as any biological production of a specific antibiotic and any biological metabolism of hydrocarbons,⁸⁶ was, however, too broad. The proper characterizations of the phenomena should have been, in Bergy's case, the ability of the specific microorganism to produce a specific antibiotic, and in Chakrabarty's case, the ability of the specific microorganism to metabolize hydrocarbons.⁸⁷ Therefore, if these phenomena are phenomena of nature, the microorganisms are unpatentable under the rules discussed in *Flook*.⁸⁸ If, however, the properties of the microorga-

plant products because of decisions that plants are products of nature. See *Bergy II*, 596 F.2d 952, 982-83 (C.C.P.A. 1979); text accompanying note 67 *supra*. Congress recognized this problem and asked rhetorically whether a new variety of plant is an invention. S. REP. NO. 315, 71st Cong., 2d Sess. 6 (1930) [hereinafter cited as *Sen. Plant Patent Rep.*]; H.R. REP. NO. 1129, 71st Cong., 2d Sess. 7 (1930) [hereinafter cited as *H.R. Plant Patent Rep.*]. Congress found that the new strains were inventions, because man caused the changes which brought about the new strain of plant. *Sen. Plant Patent Rep., supra*, at 6; *H.R. Plant Patent Rep., supra*, at 7.

⁸¹ 596 F.2d at 966-67.

⁸² Although the question of the patentability of living matter had never been raised in the courts, living matter had been patented. See, *Bergy II*, 596 F.2d 952, 985-86 (C.C.P.A. 1979); Note, *Microbiological Plant Patents*, 10 *IDEA* 87, 94 n.36 (1966). The majority therefore recognized that the decision not only did not expand patent law in the sense that questions of first impression do not open new doors, but also, the decision was in accord with prior practices of the PTO. 596 F.2d at 985-86.

⁸³ *Id.* at 965; see text accompanying note 52 *supra*.

⁸⁴ See text accompanying notes 23-38 *supra*.

⁸⁵ 596 F.2d at 996 (Baldwin, J., concurring); see text accompanying note 30 *supra* (courts look at the underlying value of the subject matter to determine what the phenomenon of nature is in a given case).

⁸⁶ 596 F.2d at 996 (Baldwin, J., concurring); see text accompanying note 74 *supra*.

⁸⁷ See, e.g., *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 132 (1948). The Court defined the phenomenon of nature in the case as "the non-inhibitive quality of certain strains of species of *Rhizobium*." *Id.* This definition contradicts Judge Baldwin's broad definitions which cover any biological production of the antibiotic and any biological metabolism of hydrocarbons. See 596 F.2d at 996 (Baldwin, J., concurring).

⁸⁸ See text accompanying notes 23-38 *supra*.

nisms are the handiwork of Bergy and Chakrabarty, *Flook* does not prevent the patenting of the microorganisms and the only bar to patentability would lie in the PTO contention that living matter is not patentable subject matter.

In *Parker v. Flook*, the Supreme Court relied on *Funk Brothers Seed Co. v. Kalo Inoculant Co.*,⁸⁹ the facts of which are clearly analogous to Bergy's case as precedent for the phenomena of nature issue. In *Funk Brothers*, the Supreme Court relied on the phenomena of nature rules to invalidate a patent for a mixture of microorganisms.⁹⁰ Scientists had known that a certain class of bacteria acted as a fertilizer, and that each strain of the bacteria only fertilized specific strains of a general class of plants.⁹¹ When mixed, however, the bacteria would not function in their normal capacity, because the strains of bacteria present in the mixture mutually inhibited the fertilizing properties of each other.⁹² The patented mixture of bacteria in question in *Funk Brothers* resulted from the discovery that certain strains of the bacteria were not mutually inhibitive.⁹³ Given this discovery, a multi-strain bacterial fertilizer was produced which could be used to fertilize a greater variety of plants than previously used monoculture fertilizers.⁹⁴ The Supreme Court held, however, that the bacteria's inherent property of functioning as a fertilizer without inhibiting the other bacteria was a phenomenon of nature⁹⁵ and that the patenting of the mixture would thus be tantamount to patenting a phenomenon of nature.⁹⁶ Furthermore, the Court held that the mixing of the bacteria in accordance with the discovery of their inherent properties was not a sufficiently inventive application of the phenomenon of nature to warrant patent protection.⁹⁷

In *Bergy II*, Bergy sought patent protection for a pure culture of a microorganism which has the inherent capacity to produce an antibiotic when subjected to certain fermentation conditions.⁹⁸ Despite the fact that the microorganism only produces the antibiotic when in a man-made pure culture, this inherent property, like the inherent properties of the fertilizing bacteria in *Funk Brothers*, is a phenomenon of nature⁹⁹ and is unpatentable. Furthermore, as in *Funk Brothers*, the patenting of the pure culture of microorganism would be tantamount to patenting the phenomenon of nature, because the microorganism must be in a pure culture in order

⁸⁹ 333 U.S. 127 (1948).

⁹⁰ *Id.* at 131-32.

⁹¹ *Id.* at 128-30.

⁹² *Id.* at 129-30.

⁹³ *Id.* at 130.

⁹⁴ *Id.*

⁹⁵ *Id.*

⁹⁶ *Id.*

⁹⁷ *Id.* at 130-31.

⁹⁸ 596 F.2d at 967.

⁹⁹ See *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130-31 (1948); text accompanying notes 89-97 *supra*.

to produce the antibiotic.¹⁰⁰ Therefore, by ordering the reexamination of *Bergy I* in light of *Parker v. Flook*, the apparent intention of the Supreme Court was that the CCPA should decide the case on the basis of the phenomenon of nature rules and thus avoid the issue of the patentability of living matter.

Unlike the microorganism in *Bergy I* and *Funk Brothers*, the microorganisms in *Chakrabarty* do not occur in nature in any manner.¹⁰¹ Therefore, the inherent properties of this man-made bacterium should not be considered phenomena of nature,¹⁰² and the question of patenting living matter must be addressed.

The Supreme Court granted the PTO writ of certiorari in *Bergy II*.¹⁰³ Shortly thereafter, however, Bergy abandoned his patent claim.¹⁰⁴ Thus, only *Chakrabarty* is before the Court, with the issue remaining whether living organisms are statutory patentable subject matter. If *Chakrabarty* had not created a new strain of a microorganism by altering the genetic structure of a naturally occurring bacterium, but instead had synthesized a living bacterium entirely from inanimate chemical matter, the issue before the Supreme Court would be placed in a different posture. Under the PTO's proposed rule excluding living things from patentable subject matter, this hypothetical microorganism would be unpatentable, even though its very existence would be attributable to its inventor. However, the hypothetical microorganism falls directly within the category of patentable subject matter described by Congress as "anything under the sun that is made by man."¹⁰⁵

Seen in this light, the PTO has apparently confused the issue of micro-

¹⁰⁰ Cf. *Gottschalk v. Benson*, 409 U.S. 63, 71-72 (1972) (computer program not patentable as phenomenon of nature because only practical use of equation was in relation to the program); see text accompanying note 31 *supra*. In *Bergy II*, the only practical use of the inherent capacity of the microorganism to produce the antibiotic is when the microorganism is in a pure culture.

¹⁰¹ *Bergy II*, 596 F.2d 952, 968-70 (C.C.P.A. 1979). Although Bergy only claimed patent protection for a pure culture of microorganism, and the pure culture does not exist in nature, the natural phenomenon is the property of the individual microorganism, which does occur in nature. *Id.* at 967. Therefore, even though the phenomenon only occurs when the microorganism is in a man-made pure culture, the production of the antibiotic is an inherent quality of the naturally occurring microorganism. Consequently, the claim should be barred by the phenomena of nature rules. See text accompanying notes 34-35 *supra*.

¹⁰² In *Chakrabarty*, the subject matter of the patent claim has been synthesized, and therefore the properties inherent to the subject matter have also been synthesized. Conversely, in *Bergy*, while the pure culture of the microorganism has been synthesized and does not exist in nature, the basic unit of the subject matter, the individual microorganisms, do exist in nature. Therefore the properties of the pure culture, which are actually properties of the individual microorganisms, are phenomena of nature, despite the fact these properties are only seen in the unnatural circumstance of a pure culture. See text accompanying notes 34-35 *supra*.

¹⁰³ *Parker v. Bergy*, 100 S. Ct. 261 (1979).

¹⁰⁴ [1980] Patent, Trademark & Copyright J. (BNA) No. 462, A-11 (Jan. 17, 1980).

¹⁰⁵ S. REP. No. 1979, 82d Cong., 2d Sess. 5 (1952); H.R. REP. No. 1923, 82d Cong., 2d Sess. 6 reprinted in [1952] U.S. CODE CONG. & AD. NEWS 2394, 2399.

organisms being unpatentable because they are alive with the issue of microorganisms being unpatentable because they are not created by man. The fact that Chakrabarty has created a new strain of microorganism cannot be challenged. The question which should control the patentability of this microorganism is not whether the creation is alive, but whether it satisfies the invention requirements of patent law. One commentator has suggested that because "the essential nature of every living organism is that it is alive," an organism is not a patentable invention unless its life is created by the patent applicant.¹⁰⁶ This suggestion creates a policy which has no basis in the patent statutes. The patent statutes provide protection for "inventions and discoveries."¹⁰⁷ Chakrabarty restructured the genetic makeup of a microorganism to create a microorganism which does not exist in nature, which has different properties than the original microorganism or any other naturally occurring microorganism, and which asexually reproduces the genetically engineered strain of microorganism.¹⁰⁸ This man-made bacterium is clearly an invention, despite the fact that Chakrabarty did not create its life, and is therefore within the scope of patentable subject matter.

Furthermore, the dissent's contention that the Plant Patent Act provides the statutory basis for the PTO's position¹⁰⁹ is clearly erroneous. The dissent's contention rests on the idea that all animate matter was unpatentable until the Plant Patent Act was passed, and that the Act was passed in order to extend the scope of patentable subject matter to include limited varieties of plants.¹¹⁰ Neither the Act nor its legislative history, however, support the position that living things were not, at the time, patentable subject matter. As described by Congress, the express purpose of the Act was to "remove the existing discrimination between plant developers and industrial inventors."¹¹¹ The discrimination which existed between plant developers and industrial inventors was not, however, based on the fact that plants are alive, but rather on two technical barriers which prevented the patenting of plants. First, plants could not be described to the degree required by patent law, therefore leaving patent law inadequate in practice to include plants.¹¹² Consequently, Congress

¹⁰⁶ Comment, *The Patentability of Living Organisms Under 35 U.S.C. § 101*: In re Bergy, 91 HARV. L. REV. 1357, 1362 (1978). The note framed the issue as whether § 101 authorizes patents for modified living organisms. *Id.* at 1362-63. The commentator reasoned, however, that the modification of a microorganism may remove the microorganism from the category "product of nature," but "because the organism's life itself has not been created by the applicant, it must be concluded that no new manufacture or composition of matter has been invented." *Id.* at 1362.

¹⁰⁷ 35 U.S.C. § 101 (1976).

¹⁰⁸ 596 F.2d at 968-71.

¹⁰⁹ 596 F.2d at 999 (Miller, J., dissenting); see text accompanying notes 63-70 *supra*.

¹¹⁰ 596 F.2d at 999 (Miller, J., dissenting); see text accompanying note 65 *supra*.

¹¹¹ *Sen. Plant Patent Rep.*, *supra* note 80, at 1; *H.R. Plant Patent Rep.*, *supra* note 80, at 1.

¹¹² *Sen. Plant Patent Rep.*, *supra* note 80, at 4-5; *H.R. Plant Patent Rep.*, *supra* note 80, at 5.

reduced the description requirement for plants in the Plant Patent Act.¹¹³ Second, courts had denied patents for plants on the grounds that plants are products of nature.¹¹⁴ In the Act's legislative history, Congress explained why strains of plants made under the supervision of man are not products of nature, thereby recognizing and implicitly overruling these decisions.¹¹⁵ Therefore, the Plant Patent Act does not preclude the patentability of microorganisms.

The Supreme Court should reject the dissent's restrictive interpretation of the policy language in *Parker v. Flook*. The policy suggested by the dissent would permit the patenting of products of technologies which are "within the mental reach of ordinary lawmakers,"¹¹⁶ while limiting patents for new technologies which were not contemplated by Congress. The result of this policy would, therefore, contradict the fundamental purpose of patent law¹¹⁷ by removing the economic incentive for investment of research money. Furthermore, companies will attempt to reap the economic benefits of new discoveries by maintaining absolute secrecy, rather than educating the competition through patent applications and having courts invalidate the patents on the basis of a policy restricting patents for unforeseen technologies. Thus, the restrictive policy would further contradict the thrust of patent law by hampering the dissemination of new discoveries through the disclosure requirements of patent law.¹¹⁸

The Court should also reject the proposal that living things are not patentable subject matter. The Court should instead focus on the question of whether the microorganisms satisfy the invention requirements of the Patent Act.¹¹⁹ Although difficult to apply and badly in need of definition, the phenomenon of nature and product of nature rules answer the question of adequacy of invention. Given the confusion surrounding these rules and the difficulty of clarifying the rules on a case by case basis, Congress should establish guidelines for determining what is a phenomenon of nature and what is a patentable application of a phenomenon of nature. Furthermore, the patenting of living things raises policy questions which may require the attention of Congress. The Supreme Court should not, however, refuse to patent microorganisms because of policy matters which Congress must answer. The Court's only duty in determining the patentability of microorganisms is to decide whether the patent law excludes microorganisms because they are alive. The patent statutes give no

¹¹³ Plant Patent Act of 1930, Pub. L. No. 71-245, § 2, 46 Stat. 376 (codified at 35 U.S.C. § 162 (1976)).

¹¹⁴ See note 67 *supra*.

¹¹⁵ *Sen. Plant Patent Rep.*, *supra* note 80, at 6-9; *H.R. Plant Patent Rep.*, *supra* note 80, at 7-10.

¹¹⁶ Kiley, *Common Sense and Uncommon Bacterium—Is "Life" Patentable?*, 60 J. PAT. OFF. SOC'Y. 468, 474 (1978).

¹¹⁷ See U.S. CONST. art I; § 8, cl. 8; 35 U.S.C. § 154 (1976); text accompanying notes 1 & 3 *supra*.

¹¹⁸ See 35 U.S.C. §§ 10, 11, 13 & 111-114 (1976); text accompanying note 5 *supra*.

¹¹⁹ See 35 U.S.C. §§ 102-103 (1976); text accompanying notes 6 & 7 *supra*.

indication that microorganisms are excluded because they are alive, therefore, the Court should not create such a barrier.

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