ARTICLE

ASSAULT ON THE CITADEL: JUDGE RICH AND COMPUTER-RELATED INVENTIONS

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I. INTRODUCTION

Judge Giles Sutherland Rich served on the federal appellate bench for just a few days short of forty-three years. First he

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My interest in and admiration for the jurisprudence of Judge Giles Sutherland Rich in the area of patent law antedates by many years my appointment to the Giles Sutherland Rich Chair at the University of Akron. In my first law review article, I quoted, at the beginning of the article, a portion of his testimony during a congressional hearing on the 1952 Patent Act. *See* A. Samuel Oddi, *Contributory Infringement/Patent Misuse: Metaphysics and Metamorphosis*, 44 U. PITT. L. REV. 73, 74 (1982). His long struggle for a broad interpretation of patentable subject matter has been inspirational. In line with his thinking, I have argued for a broad interpretation so that "revolutionary" inventions, those that result in significant changes in consumption or production and do not fit neatly into established markets, are not foreclosed from the patent system. Such inventions are highly important to society and need the patent system to induce investment in their development. *See* A. Samuel Oddi, *Beyond Obviousness: Invention Protection in the Twenty-First Century*, 38 AM. U. L. REV. 1097, 1117–19, 1129–30 (1989) (elaborating on the statutory requirements necessary for an invention to qualify as protectable and patentable subject matter).

served on the Court of Customs and Patent Appeals (CCPA) beginning July 24, 1956, and then on its successor court, the Court of Appeals for the Federal Circuit (CAFC) from October 1, 1982, until his death on July 9, 1999.[1] During his long tenure, he was impaneled in over three thousand cases[2] and was the author of at least 892 opinions.[3] These opinions reflect Judge Rich's monumental contributions to intellectual property law during the second half of the twentieth century. In this Article, I wish to focus only on his contributions to the law related to the

1. Among the many tributes upon the passing of Judge Rich, see generally Tom Arnold, *My Friend, Giles Rich*, 9 FED. CIR. B.J. 39 (1999); Raymond C. Clevenger, III, *Farewell*, 9 FED. CIR. B.J. 27 (1999) (Circuit Judge, U.S. Court of Appeals for the Federal Circuit); James F. Davis, *Interview with Judge Giles S. Rich*, 9 FED. CIR. B.J. 55 (1999); James F. Davis, *Judge Giles S. Rich: A Personal Remembrance*, 9 FED. CIR. B.J. 51 (1999); Donald R. Dunner, *Giles Sutherland Rich*, 9 FED. CIR. B.J. 71 (1999); Bradford J. Duft, *Fidelity*, 81 J. PAT. & TRADEMARK OFF. SOC'Y 767 (1999); Arthur J. Gajarsa, *Special Session Honoring Judge Giles S. Rich*, 9 FED. CIR. B.J. 29 (1999) (Circuit Judge, U.S. Court of Appeals for the Federal Circuit); *The Honorable Giles Sutherland Rich Circuit Judge, United States Court of Appeals for the Federal Circuit*, 9 FED. CIR. B.J. 1 (1999); Alan D. Lourie, *A Great Judge and a Great Person*, 9 FED. CIR. B.J. 31 (1999) (Circuit Judge, U.S. Court of Appeals for the Federal Circuit); Paul R. Michel, *Recollections of Giles Sutherland Rich, Circuit Judge, United States Court of Appeals for the Federal Circuit*, 9 FED. CIR. B.J. 33 (1999) (Circuit Judge, U.S. Court of Appeals for the Federal Circuit); Janice M. Mueller, *An Interview with Judge Giles S. Rich, U.S. Court of Appeals for the Federal Circuit*, 9 FED. CIR. B.J. 75 (1999); Janice Mueller, *A Rich Legacy*, 81 J. PAT. & TRADEMARK OFF. SOC'Y 755 (1999); Pauline Newman, *In Memory of Judge Giles Sutherland Rich*, 9 FED. CIR. B.J. 35 (1999) (Circuit Judge, U.S. Court of Appeals for the Federal Circuit); S. Jay Plager, *Testimonial for Judge Rich . . .* , 9 FED. CIR. B.J. 37 (1999) (Circuit Judge, U.S. Court of Appeals for the Federal Circuit); *Resolution*, 9 FED. CIR. B.J. 25 (1999); Anthony Shaw, *Giles Sutherland Rich*, 9 FED. CIR. B.J. 85 (1999); Neil A. Smith, *Remembrances and Memorial Judge Giles Sutherland Rich 1904–1999*, 9 FED. CIR. B.J. 87 (1999); Philip C. Swain, *The One Thing Judge Rich Wanted Everybody to Know About Patents*, 9 FED. CIR. B.J. 97 (1999) [hereinafter Swain, *One Thing*]; Philip C. Swain, *A Brief Tribute to Judge Rich*, AM. INTELL. PROP. L. ASS'N BULL. 264 (Spring 1999); Harold C. Wegner et al., *Giles Sutherland Rich, Reflections and Recollections*, AM. INTELL. PROP. L. ASS'N BULL. 287 (Spring 1999); John J. Witherspoon, *"Turning the Corner": A Tribute to Judge Giles Sutherland Rich*, 9 FED. CIR. B.J. 103 (1999). Of particular interest are the transcripts of talks by Judge Rich concerning his life, education, and career in patent law that were compiled by Judge Pauline Newman. *See The Giles Sutherland Rich American Inn of Court*, 9 FED. CIR. B.J. 5 (1999).

2. Based upon a Lexis search: File CAFC, search "judges(Rich)," the number is 3189.

3. *See The 892 Published Opinions of Judge Giles Sutherland Rich*, 9 FED. CIR. B.J. 111 (1999) (listing and categorizing these opinions). Based upon a Lexis search: File CAFC, search "opinionsby(rich)," the number of opinions turned up was 1292—thus, the "at least" qualification. Of course, these were not all written opinions but would also include rulings on matters such as a denial of rehearing. Of his written opinions, eighty-six were dissenting (Lexis search: File CAFC, search "dissentby(Rich)") and sixty-three were concurring opinions (Lexis search: File CAFC, search "concurby(Rich)"). In only one case did he file an opinion concurring in part and dissenting in part (Lexis search: File CAFC, search "concurby(Rich) and dissentby(Rich)"). *See In re* Hume, 346 F.2d 594, 599 (C.C.P.A. 1965) (Rich, J., dissenting in part).

patentability of computer-related inventions and, in particular, to their status as patentable subject matter under 35 U.S.C. § 101.[4]

The invention of the computer has revolutionized technology and, it may be said, society in general. The law must respond to technological revolutions, and patent law finds itself at the barricades as the new technology confronts the established order. In my view, it was most fortuitous that Judge Rich was sitting on the appellate courts that reviewed decisions regarding computer-related inventions during this revolutionary period in patent law. His background and experience, to say nothing of his talent, served the revolution well. After receiving a Bachelor of Science degree from Harvard, he attended and graduated from Columbia Law School. He then practiced patent law for over twenty-five years and taught patent law at Columbia and Georgetown.[5] Technology was no mystery to him, and he had a comprehensive knowledge of patent law when elevated to the bench. Moreover, Judge Rich was a co-author of the 1952 Patent Act,[6] and his understanding of the legislative background of its enactment

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4. "Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title." 35 U.S.C. § 101 (2000).

5. *See Resolution*, *supra* note 1, at 25 (expressing tribute to the Honorable Judge Giles Sutherland Rich for his long and active career in the field of patent law).

6. Judge Rich's involvement in the drafting and enactment of the 1952 Patent Act is related in a short biography published at the time of his ninetieth birthday. *See Giles Sutherland Rich*, 76 J. PAT. & TRADEMARK OFF. SOC'Y 305, 305–06 (1994).

> He was at the same time active in the work of the New York Patent Law Association, and when it undertook, after the virtual destruction of the doctrine of contributory infringement by the Supreme Court in the Mercoid cases in 1944, to introduce and foster legislation to correct the situation, Rich became deeply involved with it. As NYPLA vice president in 1948 and 1949 it was his responsibility to explain this legislation to congressional committees. As a result of bills which the NYPLA wrote and had introduced, and other bills in the patent law field, the House Patents Subcommittee, which was also the committee on the codification of the law, decided to revise and codify the patent statutes, title 35 of the United States Code, and proceeded to do so with the aid of the patent bar and Mr. P.J. Federico, an Examiner-in-Chief of the Patent Office who was loaned to the committee in an advisory capacity. The patent bar organized what was known as the Coordinating Committee—virtually the National Council of Patent Law Associations under another name—under the chairmanship of Henry Ashton of New York, then president of the American Patent Law Association. Ashton appointed Rich to be one of the two-man drafting committee to work with him and Federico in preparing the bills which became, eventually, the Patent Act of 1952. It was this legislative work over a period of some four years that brought Rich to the attention of the patent bar which put him forward as a candidate for nomination to the U.S. Court of Customs and Patent Appeals (CCPA) when the next vacancy came along.

Id.

A bibliography of his publications is also included. *See id.* at 306–07.

proved to be invaluable in reaching decisions in new fields of technology. Importantly, he strongly believed in the instrumental philosophy underlying the patent system as set out in the Patent Clause of the Constitution—to promote the "useful Arts,"[7]—and that this goal could be achieved best by a policy of inclusion, rather than exclusion, of newly evolving technology that did not neatly fit into established historical patterns of patentable subject matter.[8]

This Article will trace the evolution of the protection of computer-related inventions[9] through the judicial and jurisprudential contributions of Judge Rich. The analogy used was originated by Dean Prosser in two seminal articles in the law of torts: *The Assault Upon the Citadel*[10] and *The Fall of the*

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7. U.S. CONST. art. I, § 8, cl. 8.

8. *See, e.g.*, *In re* Bergy, 596 F.2d 952, 973–74 (C.C.P.A. 1979) [hereinafter *Bergy II*]. Writing for the majority, Judge Rich found that for "nearly 200 years . . . [the Patent Act has] been liberally construed to include the most diverse range imaginable of unforeseen developments in technology. . . . We believe § 101 and its predecessor statutes were broadly drawn in general terms to broadly encompass unforeseeable future developments." *Id.*

9. The literature relevant to the protection of computer-related inventions is prodigious. Rather than providing a string citation of these articles, I will here refer the reader to the following cited articles that provide this compilation. *See generally* Donald S. Chisum, *The Patentability of Algorithms*, 47 U. PITT. L. REV. 959 (1986) (arguing algorithm-related inventions should be patentable subject matter); Robert A. Kreiss, *Patent Protection for Computer Programs and Mathematical Algorithms: The Constitutional Limitations on Patentable Subject Matter*, 29 N.M. L. REV. 31, 32–36, 33 n.11 (1999) (discussing the lack of precise methodology used by the courts in determining the patentability of computer-related and algorithm-related subject matter and the need to reconsider the complex issue in light of more recent case decisions); Gregory J. Maier & Robert C. Mattson, State Street Bank *in the Context of the Software Patent Saga*, 8 GEO. MASON L. REV. 307 (2000) (reviewing judicial opinions which address patenting of computer-related processes such as software, programs, and mathematical algorithms); A. Samuel Oddi, *An Uneasier Case for Copyright than for Patent Protection of Computer Programs*, 72 NEB. L. REV. 351 (1993) [hereinafter Oddi, *Uneasier Case*] (analyzing the issue of protectability, the economic concerns related to patenting computer and algorithm-related inventions, and the legal and policy issues regarding copyright and patent protection); Pamela Samuelson, Benson *Revisited: The Case Against Patent Protection for Algorithms and Other Computer Program-Related Inventions*, 39 EMORY L.J. 1025 (1990) [hereinafter Samuelson, Benson *Revisited*] (elaborating on policy issues involving algorithms and computer program-related inventions in relation to the Supreme Court decision in *Gottschalk v. Benson*, 409 U.S. 63 (1972)); Pamela Samuelson et al., *A Manifesto Concerning the Legal Protection of Computer Programs*, 94 COLUM. L. REV. 2308 (1994) (commenting on the characteristics of computer programs and the issues involved in debating whether computer-related inventions should be legally protected and patentable); John R. Thomas, *The Patenting of the Liberal Professions*, 40 B.C. L. REV 1139, 1148–58, 1148 n.64 (1999) (discussing the long debate over the patentability of computer programs that can perform "newly invented mathematical algorithms" and how case law has addressed this issue over the years).

10. William L. Prosser, *The Assault Upon the Citadel (Strict Liability to the Consumer)*, 69 YALE L.J. 1099, 1099 (1960) [hereinafter Prosser, *Assault*].

Citadel.[11] The "Citadel" to which Dean Prosser referred was the doctrine of privity of contract that prevented a consumer who was injured by a negligently made or defective product from proceeding directly against its producer.[12] The privity doctrine can be traced to the case of *Winterbottom v. Wright*, decided in 1842, where the driver of a mail coach was barred from proceeding directly against the defendant who had contracted with the Postmaster to repair the mail coach but negligently failed to do so.[13] As a consequence of the failure to repair the coach, the driver was injured when the coach broke down.[14] The court held that the contract for repair was solely between the Postmaster and the defendant.[15] The injured driver could not recover against the defendant because there was no privity between them.[16] The Citadel of privity was subsequently extended from the negligent failure to repair, as in *Winterbottom*, to active negligence in the manufacture of a product.[17] In these articles, Dean Prosser first analyzed the assault upon privity and its eventual fall in the landmark cases of *MacPherson v. Buick Motor Co.*,[18] with respect to negligence, and *Henningsen v. Bloomfield Motors, Inc.*[19] and *Greenman v. Yuba Power Products, Inc.*[20] with respect to strict products liability.[21]

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11. William L. Prosser, *The Fall of the Citadel (Strict Liability to the Consumer)*, 50 MINN. L. REV. 791 (1966) [hereinafter Prosser, *Fall*].

12. Prosser, *Assault*, *supra* note 10, at 1099–1100; Prosser, *Fall*, *supra* note 11, at 791–93.

13. 152 Eng. Rep. 402, 403 (Ex. 1842).

14. *Id.* at 402.

15. *Id.* at 402–04.

16. *Id.* at 403–04.

17. *See* VICTOR E. SCHWARTZ ET AL., PROSSER, WADE & SCHWARTZ'S TORTS 403 (10th ed. 2000).

> Although the principal case [*Winterbottom v. Wright*] involved nonfeasance, it was universally interpreted as applying to any negligence of the defendant, including misfeasance; and this resulted in many decisions holding that the seller of chattel was under no liability, in contract or tort, to anyone other than his immediate buyer.

Id.

18. 111 N.E. 1045 (1916) (holding a manufacturer liable for injuries caused by a finished product to the purchaser, regardless of the lack of privity between the parties); *see* John C.P. Goldberg & Benjamin C. Zipursky, *The Moral of* MacPherson, 146 U. PA. L. REV. 1733, 1745–53 (1998) (evaluating the impact of Prosser in his analysis of *MacPherson*).

19. 161 A.2d 69 (1960) (holding that a manufacturer's breach of its express warranty that an automobile was free from defects extended to injuries sustained by the ultimate purchaser).

20. 377 P.2d 897, 900–01 (1963) (stating the requirement that a "buyer give seller notice of breach of warranty" does not require that the breach occur between the parties of a contract, thus allowing a purchaser to recover damages from the manufacturer).

21. Prosser, *Assault*, *supra* note 10, at 1100–02 (analyzing *MacPherson*); Prosser,

In the present context, the Citadel is conceived as the exclusion of computer-related inventions from classification as patentable subject matter under 35 U.S.C. § 101, and hence from patent protection, even though it satisfies the other statutory requirements of novelty,[22] nonobviousness,[23] and utility.[24] The Citadel case analogous to *Winterbottom* is *Gottschalk v. Benson*,[25] decided in 1972 by the Supreme Court, which denied patentability to claims that "would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself."[26] *Benson* was seen as erecting a significant, if not impenetrable, barrier to the patentability of computer-related inventions and created considerable uncertainty in the law.[27] The CCPA did not take kindly to *Benson*, which it immediately categorized as a very narrow decision.[28] Judge Rich did not agree,[29] and proceeded undeterred to hold a variety of computer-related inventions to be patentable subject matter.[30] However, in 1978, the Supreme Court in *Parker v. Flook* raised and reinforced the walls of the *Benson* Citadel by holding that process claims limited to a specific technology (catalytic conversion of hydrocarbons) and providing a useful output result (adjusting an alarm limit) still did not pass muster as statutory subject matter.[31]

Fall, *supra* note 11, at 791–94, 803–04 (discussing *MacPherson*, *Henningsen*, and *Greenman*).

22. *See* 35 U.S.C. § 102 (2000).

23. *See id.* § 103.

24. *See id.* § 101.

25. 409 U.S. 63 (1972).

26. *Id.* at 72.

27. Samuelson, Benson *Revisited*, *supra* note 9, at 1025–26, 1103–05 (arguing that *Benson* should be overruled and that the recent distinction between "mathematical" and "non-mathematical" algorithms should be reconsidered in ruling on the patentability of computer-related inventions).

28. In the first CCPA opinion construing *Benson*, Judge Lane stated: "The issue considered by the Supreme Court in *Benson* was *a narrow one*, namely, is a formula for converting binary coded decimal numerals into pure binary numerals by a series of mathematical calculations a patentable process?" *In re* Christensen, 478 F.2d 1392, 1394 (C.C.P.A. 1973) (emphasis added). Refer to notes 131–42 *infra* and accompanying text (discussing *Christensen*, including Judge Rich's concurring opinion).

29. Refer to notes 140–43, 150–60, and 173–81 *infra* and accompanying text (discussing Judge Rich's opposing view, which allows a broad reading of *Benson* to include algorithm formulas as patentable under § 101).

30. *See, e.g.*, *In re* Diehr, 602 F.2d 982, 988–89 (C.C.P.A. 1979) (holding an invention that recited a process for molding rubber articles patentable even though it involved a computer program), *aff'd sub nom.* Diamond v. Diehr, 450 U.S. 175 (1981); *In re* Benson, 441 F.2d 682, 668 (C.C.P.A. 1971) (holding that computers are "useful arts" and that claims related to data processing systems were erroneously rejected as nonpatentable subject matter), *rev'd sub nom.* Gottschalk v. Benson, 409 U.S. 63 (1972).

31. 437 U.S. 584, 596 (1978).

The subsequent history is that of the "assault" on these Citadel cases. The CCPA, of course, was at the forefront in its reviewing capacity of Patent Office decisions. With the Citadel of *Benson* being strengthened by *Flook*, the Patent Office continued its exclusionary policy toward the patentability of computer-related inventions. The CCPA continued its narrow interpretation of the scope of these cases and struggled with appeals barring patentability of computer-related inventions by the Patent Office.[32] Then the CCPA, with increasing frustration, initiated an offensive that took two fronts. Judge Rich led the charge in both. The first front was not computer-related, but was in the equally new technology of microbiology, and particularly addressed the question of whether living matter constituted patentable subject matter under § 101.[33] Not unexpectedly, the Patent Office's answer was "no," and that of the CCPA was "yes," in opinions by Judge Rich.[34] Surprisingly, at that time, in what may be considered a sea change in attitude and approach, the Supreme Court also answered affirmatively in the landmark case of *Diamond v. Chakrabarty*.[35]

The second front was computer-related and dealt with the question of whether a computer-controlled process for molding rubber products fell within § 101.[36] In an opinion by Judge Rich, the CCPA again reversed the Patent Office's negative decision.[37] With the enlightenment of *Chakrabarty*, the Supreme Court, in the following term, affirmed the CCPA in *Diamond v. Diehr*.[38] In both *Chakrabarty* and *Diehr*, the Supreme Court closely traced

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32. *See* Samuelson, Benson *Revisited*, *supra* note 9, at 1083–92 (summarizing the CCPA's decisions between *Flook* and *Diamond v. Diehr*).

33. *See Bergy II*, 596 F.2d 952 (C.C.P.A. 1979), *vacated in part sub nom*. Diamond v. Chakrabarty, 444 U.S. 1028, *aff'd sub nom*. Diamond v. Chakrabarty, 447 U.S. 303 (1980); *In re* Bergy, 563 F.2d 1031 (C.C.P.A. 1977) [hereinafter *Bergy I*] (considering the patentability of a biologically pure culture of microorganism), *vacated sub nom*. Parker v. Bergy, 438 U.S. 902 (1978); *In re* Chakrabarty, 571 F.2d 40 (C.C.P.A. 1978) (considering the patentability of genetically altered bacteria), *vacated in part sub nom*. Diamond v. Chakrabarty, 444 U.S. 1028 (1980), *aff'd sub nom*. Diamond v. Chakrabarty, 447 U.S. 303 (1980).

34. *Bergy II*, 596 F.2d at 955, 987; *In re* Chakrabarty, 571 F.2d at 41–43; *Bergy I*, 563 F.2d at 1032, 1038–39. Refer to notes 243–83 *infra* and accompanying text (discussing *Bergy I* and *Chakrabarty*, in which Judge Rich rejected the Patent Office's claim that microorganisms are not patentable and refused to strictly construe § 101).

35. 447 U.S. 303 (1980) (holding that live, human-made microorganisms are patentable).

36. *See In re* Diehr, 602 F.2d 982 (C.C.P.A. 1979), *aff'd sub nom*. Diamond v. Diehr, 450 U.S. 175 (1981).

37. *Id*. at 983, 989. Refer to notes 302–14 *infra* and accompanying text (discussing Judge Rich's opinion in *In re Diehr* that any rejection of patentability by the Patent Office, based solely on the patent's relation to a computer-related program, should be reversed).

38. 450 U.S. 175, 192–93 (1981).

Judge Rich's analysis.[39] The Citadel now was under heavy siege with the CCPA, under the intellectual leadership of Judge Rich, assessing the impact of these decisions.

With these victories under its belt, the CCPA and the newly created CAFC, while still wary of the Supreme Court's ambivalence in this area, especially with the definition of process given in *Diehr*, proceeded cautiously but persistently to expand the scope of protection afforded computer-related inventions. The final phase of this assault on what remained of the Citadel was again led by Judge Rich in *In re Alappat*,[40] where the *en banc* CAFC affirmed the dominance of *Chakrabarty* and *Diehr* over the remnants of *Benson* and *Flook*, and in *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*,[41] where *Alappat* was applied and extended and the "business methods" exception was put to rest.[42]

Following this brief overview of the historical assault on the Citadel against protecting computer-related inventions, Part II of this Article will address pre-Citadel doctrines—"function of the machine," "mental steps," and "point of novelty"—and the definition of "process" that stood in the way of protecting such inventions. Part III considers the Citadel cases of *Benson* and *Flook* and the CCPA's reaction to them. In Part IV, the assault, as reflected in *Chakrabarty* and *Diehr*, will be recounted, and in Part V, the final stages of the assault, as seen in Judge Rich's opinions in *Alappat* and *State Street*, will be analyzed. Throughout the Article Judge Rich's judicial style, his legal and policy-based reasoning, and his underlying judicial philosophy will be illustrated. Finally, Part VI summarizes Judge Rich's contributions to patent law, particularly in the area of computer-related inventions, which established his legacy and preeminence in the field that will long be remembered and hopefully will be emulated in this century.

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39. *Compare Diamond v. Chakrabarty*, 447 U.S. at 306, 318, *with Bergy II*, 596 F.2d at 952, *and Diamond v. Diehr*, 450 U.S. at 182, 184, 191–93, *with Chakrabarty*, 571 F.2d at 40.

40. 33 F.3d 1526, 1530 (Fed. Cir. 1994). Refer to notes 388–410 *infra* and accompanying text (emphasizing that a patent in a machine format should not be included in the "mathematical algorithm" exception to patentability without first looking at the subject matter as a whole to determine if there is a "useful, concrete and tangible result").

41. 149 F.3d 1368 (Fed. Cir. 1998). Refer to notes 415–49 *infra* and accompanying text (discussing the issues and holding in *State Street* and Judge Rich's view on how subsequent cases have dealt with the patentability of certain subject matter by developing various "tests").

42. *State Street*, 149 F.3d at 1375.

II. PRE-*BENSON* BASTIONS

A narrow definition and three long-standing doctrines from the pre-computer era acted as impediments to the patentability of computer-related inventions in the early stages of their development. The definition of a "process," or "art" in its original statutory formulation, has been a continuing source of controversy. Early on, questions were even raised concerning the patentability of any "art" that did not comprise a chemical process. This problem was exacerbated by the introduction of computer-related inventions that were claimed as a process including steps where data were inputted and manipulated to provide an output solution according to an algorithm.

Historically, processes were of the physical transformation-type, which started with one substance that was transformed into another substance through the steps in the process, such as in the classic formulation of *Cochrane v. Deener*,[43] decided in 1876: "[A process] is an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing."[44] This definition carried through into the computer era and was recited, with evident approval, by the Supreme Court in *Benson*, where there was no physical transformation,[45] and then in *Diehr*, where there was.[46] The non-physical transformational, number-to-number type of processes, however, did not fit nicely into this formulation, and their acceptance into statutory subject matter was significantly delayed by the *Benson*/*Flook* Citadel, as will be considered below.[47]

Three doctrines also impeded the patentability of computer-related inventions. These were: (1) the "function of the apparatus (machine)" doctrine; (2) the "mental steps" doctrine; and (3) the "point of novelty" doctrine.[48] The first two doctrines applied to

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43. 94 U.S. 780 (1876).

44. *Id.* at 788.

45. *See* Gottschalk v. Benson, 409 U.S. 63, 70 (1972) (considering the patentability of "converting binary-coded decimal numbers into pure binary numerals").

46. *See* Diamond v. Diehr, 450 U.S. 175, 183 (1981) (considering the patentability of a process of curing synthetic rubber).

47. Refer to notes 113–30 and 198–206 *infra* and accompanying text (noting that *Benson* stated that an algorithm is not itself patentable, even though its application requires a computer, and that *Flook* used the flawed reasoning in *Benson* to decide that "the process itself, not merely the mathematical algorithm, must be new and useful" in order to be patentable).

48. Irah H. Donner, *Two Decades of* Gottschalk v. Benson*: Putting the "Rithm" Back Into the Patenting of Mathematical Algorithms*, 5 SOFTWARE L.J. 419, 424–28 (1992) (discussing the "early statutory subject matter theories").

computer-related inventions claimed as a process.[49] The third applied to such inventions, whether claimed as a process or a machine, where the novelty of the claimed process or apparatus was seen as residing in a computer program rather than in the claimed combination of steps or elements taken as a whole.[50]

In three seminal opinions by Judge Rich, decided by the CCPA between 1968 and 1970, the definitional and doctrinal problems were addressed. The definition of process was given an expansive meaning, and the three doctrines were clarified and essentially eliminated, which opened the path for the protection of substantially all computer-related inventions from the standpoint of § 101.

The first of these cases was *In re Tarczy-Hornoch*,[51] decided in 1968, dealing with the "function of the machine" doctrine.[52] More detail concerning this case will be provided here than might otherwise be warranted because this case provides a paradigm of Judge Rich's judicial approach and style. The *Tarczy-Hornoch* application contained both apparatus and method claims directed to sorting or counting electrical pulses.[53] The examiner had allowed all of the apparatus claims but had rejected all of the method claims "on the ground that they merely defined the function of appellant's apparatus."[54] The Patent Office Board of Appeals (Board) affirmed the examiner's rejection, except with respect to two method claims, because they "were capable of performance by apparatus other than that disclosed."[55] Judge Rich stated the issue to be "whether a process claim, otherwise patentable, should be rejected because the application, of which it is a part, discloses apparatus which will inherently carry out the recited steps."[56] (It may be noted at this point that the "function of the apparatus" doctrine would condemn many computer-related inventions claimed as methods because the computer would perform its inherent functions in carrying out the steps of the process.) Judge Rich then concluded that this rejection was

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49. *Id.* at 424–25 (noting that a process was unpatentable if it was solely a description of a function of a machine or mental operations such as a computer program).

50. *Id.* at 426–28 (discussing cases that considered the patentability of computer programs based on the novelty of the process or apparatus).

51. 397 F.2d 856 (C.C.P.A. 1968).

52. *See id.* at 867–68. This doctrine is sometimes referred to as the "function of the apparatus" and sometimes prefaced by "mere." *Id.* at 867 (referring to classes of cases that are so termed and are questioned as to whether they fall within the statutory classes of inventions).

53. *Id.* at 856.

54. *Id.* at 856–57.

55. *Id.* at 857.

56. *Id.*

"justified neither by history nor policy," and the court overruled prior decisions sustaining the function of the apparatus rejection.[57]

Judge Rich started with history. He traced the function of the apparatus doctrine to the "[nineteenth] century controversy over the patentability of processes" and then proceeded to discuss "[t]wo notorious examples."[58] The first was Justice Story's holding in *Wyeth v. Stone*,[59] where a claim "to cut ice of a uniform size, by means of an apparatus worked by any other power than human" was held "utterly void" as being "broader than the invention."[60] The second was Chief Justice Taney's decision in *O'Reilly v. Morse*.[61] Of particular interest here, and in the later evolution of the law in this area, is Judge Rich's conclusion with respect to Morse's famous claim 8: "The claim was, of course, held invalid because it did not correspond in scope to Morse's invention."[62] However, as pointed out by Judge Rich, certain broad language by Chief Justice Taney "apparently cast some doubt on the validity of claims for processes generally, whether mechanical or not."[63]

Judge Rich then went on to analyze subsequent cases where the Supreme Court made it clear that mechanical processes as well as chemical ones were patentable, in particular in *The Telephone Cases*[64] upholding Bell's claim 5 directed to both the "method of, and apparatus for, transmitting vocal . . . sounds telegraphically . . . by causing electrical undulations."[65] Doubt was again cast on patents for mechanical processes, however, in the 1895 case of *Risdon Iron & Locomotive Works v. Medart*,[66] in which Judge Rich observed: "It was at this unfortunate time that our predecessor in jurisdiction of appeals from the Patent Office . . . attempted a synthesis of the cases on 'function of an apparatus.'"[67] The case was *In re Weston*,[68] decided in 1901, and the so-called "*Weston* recapitulation" was announced:

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57. *Id.*

58. *Id.*

59. 30 F. Cas. 723 (C.C.D. Mass. 1840) (No. 18,107).

60. *Tarczy-Hornoch*, 397 F.2d at 857 (quoting *Wyeth*, 30 F. Cas. at 727).

61. 56 U.S. (15 How.) 62 (1853).

62. *Tarczy-Hornoch*, 397 F.2d at 858.

63. *Id.*

64. Dolbear v. Am. Bell Tel. Co., 126 U.S. 1 (1888) [hereinafter *The Telephone Cases*].

65. *Tarczy-Hornoch*, 397 F.2d at 860 (quoting *The Telephone Cases*, 126 U.S. at 31).

66. 158 U.S. 68, 71–72 (1895) (discussing the confusion between a patent for a process or article of manufacture and a mechanical process in regard to patentability).

67. *Tarczy-Hornoch*, 397 F.2d at 862.

68. 17 App. D.C. 431 (D.C. Cir. 1901).

> First, that processes involving a chemical or other elemental action, if new and useful, are patentable; second, that a process, which amounts to no more than the mere function of a machine, is not patentable; third, that a process or method of a mechanical nature, not absolutely dependent upon a machine, although perhaps best illustrated by mechanism, may, if new and useful, be the proper subject of a patent, even though it involves no chemical or other elemental action.
>
> In this last class of cases, possibly a very large class, and thus far certainly a very indefinite class, the criterion of patentability, so far as it seems possible yet to state any definite criterion, would seem to be that the process may be performed by hand or by other mechanism than that exhibited, although perhaps not with equal efficiency. That we must at all events recognize the existence of such a class would seem to be beyond doubt.[69]

After reviewing subsequent Supreme Court decisions and various authorities, Judge Rich observed that: "In the Court of Customs and Patent Appeals, the *Weston* views have more than survived, they have flourished."[70] He then reviewed a long line of CCPA cases following the "function of an apparatus" doctrine and found:

> Our present review of the major precedents has persuaded us that the decisions of the Supreme Court have not required the rejection of process claims merely because the process apparently could be carried out only with the disclosed apparatus. These rejections have been the product of decisions in the lower courts and especially in this court. We decide today that we will no longer follow those decisions.[71]

Nonetheless, presumably in deference to stare decisis and a long if undistinguished lineage, Judge Rich applied the *coup de grace*: "Even so, we would leave it undisturbed were it not the product of an essentially illogical distinction unwarranted by, and at odds with, the basic purposes of the patent system and productive of a range of undesirable results from the harshly inequitable to the silly."[72] He then buttressed the policy argument:

> Exceptional treatment for this narrow class of processes is, pro tanto, inconsistent with the broad goal of the patent

69. *Tarczy-Hornoch*, 397 F.2d at 862–63.
70. *Id.* at 865.
71. *Id.* at 866.
72. *Id.* at 867.

> system, the promotion of the useful arts, in that it necessarily denies to certain inventors the exclusive rights to their discoveries and thus defeats the intent which must be presumed of Congress in enacting the Patent Statutes.[73]

Judge Rich then concluded by observing that the illogic of the doctrine was amply demonstrated by the facts of the case at hand, in which the Board had allowed method claims when the process could be carried out by apparatus other than the disclosed apparatus, but had denied claims when the process could be carried out only by the apparatus disclosed by the applicant.[74]

The judicial process employed by Judge Rich thus may be summarized: He stated the issue precisely—the continued validity of the doctrine.[75] He then proceeded with an historical analysis of the genesis of the doctrine and found it to be intrinsically involved with that of excessively broad claiming of inventions (in terms of "results" or "effects"), which led to questions of whether processes themselves were patentable subject matter.[76] The conflation of these separate issues had led to the "function of the machine" doctrine.[77] The distinction between overly broad claiming and patentable subject matter often seems to have been lost by the Supreme Court. Judge Rich carefully evaluated the Supreme Court's decisions to determine whether it had in any of its opinions adopted the "function of the apparatus" doctrine expressly or by implication.[78] He concluded that the Supreme Court had not done so; thus he could then proceed to evaluate prior decisions binding on the CCPA unless overruled.[79] He found these precedents illogical, inequitable, and contrary to instrumental patent policy and thus declined to follow them.[80] In synopsis, his judicial approach was to define the issue, find the genesis and rationale for the doctrine or rule, and if not bound by controlling authority, to test the findings against logic, fairness (treating equals equally), and policy. We shall see this pattern repeated throughout Judge Rich's career.

The second doctrine presented a more significant barrier to the protection of computer-related inventions than the "function of the apparatus" doctrine. The "mental steps" doctrine precluded

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73. *Id.*
74. *Id.* at 868.
75. *See id.* at 857.
76. *See id.* at 857–59.
77. *See id.* at 859.
78. *See id.* at 859–66.
79. *See id.* at 866.
80. *See id.* at 866–67.

from statutory subject matter any method claim in which (1) all of the steps could be performed in the mind of a person, or (2) one or some of the mental steps were at the "point of novelty" of the invention.[81] The doctrine found a ready home in the context of computer-related inventions because of the obvious, if often too facile, analogy between the operation of the human mind and the operation of a computer.[82]

The case of *In re Musgrave*,[83] decided in 1970, provided Judge Rich, writing for a majority of the CCPA, with the opportunity to dispose of the "mental steps" doctrine with one minor concession, as well as to attack the "point of novelty" doctrine and to push the definition of a process to its Constitutional limits. Given the scope of this decision, its importance cannot be overstated in the evolution of the law in this area.

As was his style, Judge Rich stated the issue in *Musgrave* succinctly: "Are some or all of the steps in each claim 'mental' and, if so, is that fatal to patentability?"[84] Judge Rich noted that the mental steps doctrine cannot be "attributed to Congress," but rather is a creature of the case law and is "something of a morass."[85] Not being encumbered by any Supreme Court cases directly on point, he proceeded to dispose of the court-created morass.

Musgrave did not come to the court on a clean platter. There was *In re Prater* (*Prater I*)[86] (opinion by Judge Smith)

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81. *See In re* Musgrave, 431 F.2d 882, 888, 890 (C.C.P.A. 1970).

82. For example, Professor Allen Newell, a computer scientist, posits: "We model what is going on inside the thinking human brain, as the carrying out of computational steps. Therefore, humans think by means of algorithms. Sequences of mental steps and algorithms are the same thing." Allen Newell, *Response: The Models Are Broken, the Models Are Broken*, 47 U. PITT. L. REV. 1023, 1025 (1986) (responding to Chisum, *supra* note 9). For a critique of Professor Newell's model, see Oddi, *Uneasier Case*, *supra* note 9, at 416–27.

83. 431 F.2d 882 (C.C.P.A. 1970).

84. *Id.* at 890.

85. *Id.*

86. 415 F.2d 1378 (C.C.P.A. 1968) [hereinafter *Prater I*], *reh'g granted*, 415 F.2d 1390 (1969) (Rich, J. dissenting), *superceded by* 415 F.2d 1393 (1969) [hereinafter *Prater II*]. Judge Rich was not pleased with the Patent Office's petition for rehearing:

> None of the reasons advanced for granting shows compliance with our rule on rehearings. In effect, as hereinafter explained, our four-to-nothing opinion is the result of a careful reconsideration of an earlier opinion, which is equivalent to a rehearing.
>
> Rehearing at this time can serve only to foster uncertainty in the law, to encourage the Patent Office in its policy of refusing to follow what this reviewing court has now declared the law to be and to have been, at least since 1952, and to prolong the controversy about what the law is.

415 F.2d at 1390. In its petition the Patent Office also raised for the first time a First

and *Prater II*[87] (on rehearing, opinion by Judge Baldwin), which had been decided during the prior term on substantially the same issue as presented in *Musgrave*. In addition, there was *In re Abrams*,[88]

Amendment argument:

> Finally, the solicitor makes an argument to the effect that we have authorized the granting of a patent which would "confer upon a patentee the right to exclude others from thinking in a certain manner." This, we are told, would make the patent statutes, as we have construed them, unconstitutional as in violation of the First Amendment. This is an entirely new proposition, never suggested before in this case, and is thus entirely improper on a petition for rehearing. . . . We did not sanction claims which would preclude people from thinking, Prater did not ask for such claims, and surely no court would ever place such a construction on the claims which were before us. Their construction by the Patent Office is therefore an improper construction. Prater's statement, in objecting to the petition, is that "There is no such thing as mental infringement" and that "thought is still unpatentable." This is unquestionably true.

Id. at 1391–92 (footnote omitted). The specter of the First Amendment and "infringement by thinking" continues to arise in the context of the "mental steps" doctrine. *See* Kreiss, *supra* note 9, at 86 ("[T]he First Amendment also prevents government from interfering with freedom of thought."); Samuelson, Benson *Revisited*, *supra* note 9, at 1108–09, 1123–28 (stating that Professor Newell finds troubling "the possibility that one may infringe a patent merely through the act of thinking"). Judge Rich would seem to resolve any controversy at the infringement level rather than by exclusion under § 101. *See also* Oddi, *Uneasier Case*, *supra* note 9, at 420–21 ("If the individual is commercially exploiting the claimed invention by thinking and reaps profits from its use, it is not apparent why the result should be any different whether a computer or other machine or the brain is involved.").

Perhaps Judge Rich's most famous outrage at the conduct of his colleagues on the bench is found in *Atlantic Thermoplastics Co. v. Fatex Corp.*, 974 F.2d 1279, 1281 (1992), which strongly objects to the grant of an *in banc* hearing to a panel decision inconsistent with another panel:

> The most egregious act of the *Atlantic* panel, however, is its defiant disregard, for the first time in this court's nearly ten-year history, of its rule that no precedent can be disregarded or overruled save by an *in banc* court, on the stated but feeble ground that the authors of the precedential opinion "ruled without reference to the Supreme Court's previous cases involving product claims with process limitations." The *Atlantic* panel continued:
>
> > A decision that fails to consider Supreme Court precedent does not control if the court [i.e. the *Atlantic* panel] determines that the prior panel [in the *Scripps* case] would have reached a different conclusion if it had considered controlling precedent.
>
> This is not only insulting to the *Scripps* panel (Chief Judge Markey, Judge Newman and a visiting judge), it is mutiny. It is heresy. It is illegal.

Id. at 1281. The controversy even reached the American Bar Association Journal. *See* Don J. DeBenedictis, *Inconsistent Patent Rulings: Federal Circuit Judge Laments "Mutiny" By Panel in Call for En Banc Hearing*, 78 A.B.A. J. 36 (1992) ("The usually mild-tempered Rich, now eighty-eight, castigated the Atlantic panel . . . .").

87. 415 F.2d 1393 (C.C.P.A. 1969); *see also In re* Bernhart, 417 F.2d 1395, 1401 (C.C.P.A. 1969) ("To find that the claimed process could be done mentally would require us to hold that a human mind is a digital computer or its equivalent, and that a draftsman is a planar plotting apparatus or its equivalent. On the facts of this case we are unwilling so to hold.").

88. 188 F.2d 165 (C.C.P.A. 1951).

decided by the CCPA in 1951, the leading case on the mental steps doctrine relied upon by the Patent Office in this appeal.

Judge Rich proceeded directly against *Abrams* and determined, as had the court in *Prater I*, that these rules had "never enjoyed the approval of this court," but rather were "'rules' formulated and proposed by Abrams' attorney":[89]

> 1. If all the steps of a method claim are purely mental in character, the subject matter thereof is not patentable within the meaning of the patent statutes.
>
> 2. If a method claim embodies both positive and physical steps as well as so-called mental steps, yet the alleged novelty or advance over the art resides in one or more of the so-called mental steps, then the claim is considered unpatentable for the same reason that it would be if all the steps were purely mental in character.
>
> 3. If a method claim embodies both positive and physical steps as well as so-called mental steps, yet the novelty or advance over the art resides in one or more of the positive and physical steps and the so-called mental step or steps are incidental parts of the process which are essential to define, qualify or limit its scope, then the claim is patentable and not subject to the objection contained in 1 and 2 above.[90]

These "rules" were characterized by Judge Rich as "so-called rules"[91] and, later, as "non rules."[92] Moreover, the court refused to adopt rules 2 and 3 at this time because they were "logically unsound."[93] Judge Rich reasoned that patentable subject matter cannot be based on whether a step is novel or not, regardless of whether it is a physical or mental step, because novelty is an irrelevant consideration to the determination of statutory subject matter.[94] According to the "rules," a claim would constitute statutory subject matter if the physical steps were novel at the time of the application but not so when they became part of the prior art, which "would be an absurd result."[95] Judge Rich, however, did make a concession with respect to the first "rule"—that it "would lead to a correct result," provided "purely mental"

89. *Musgrave*, 431 F.2d at 889.
90. *Id*. at 888 n.3 (quoting *In re* Abrams, 188 F.2d 165, 166 (C.C.P.A. 1951)).
91. *Id*. at 888–89.
92. *Id*. at 892.
93. *Id*. at 889.
94. *Id*.
95. *Id*.

was "so construed as to encompass only steps incapable of being performed by a machine or apparatus."[96]

Judge Rich also took pains to point out two errors being made by the Patent Office. First, it was a "misconstruction [of the dictum in *Cochrane v. Deener*] to assume that 'all processes, to be patentable, must operate physically upon substances,'"[97] as confirmed by later Supreme Court opinions. Second, the reasoning of the Patent Office was unsound in relying upon the "point of novelty" doctrine in categorizing statutory subject matter on the basis of the novelty of individual steps in the claims or on the basis of whether or not the individual steps themselves constituted statutory subject matter.[98] Judge Rich's determination to rid the law of these two heresies was not entirely successful at that time, and the "point of novelty" doctrine and a physical transformational requirement in the definition of a process continued to infect the jurisprudence of computer-related inventions.

Finally, in *Musgrave*, and quite important to the evolution of the law with respect to computer-related invention, Judge Rich unambiguously pushed the definition of a process to its evident constitutional limit: "All that is necessary, in our view, to make a sequence of operational steps a statutory 'process' within 35 U.S.C. § 101 is that it be in the *technological arts* so as to be in consonance with the Constitutional purpose to promote the progress of 'useful arts.'"[99]

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96. *Id.* at 889–90.

97. *Id.* at 893 (referring to Cochrane v. Deener, 194 U.S. 780 (1876)).

98. *See id.*

99. *Id.* (emphasis added). In a concurring opinion, Judge Baldwin expressed concern after quoting the sentence quoted in the text above: "No limitations are placed upon this holding. In effect it is a pronouncement of new law." *Id.* at 894. He continued:

> Academically, intellectually, perhaps, the majority's new proposal—to throw out entirely the "mental steps" doctrine and replace it with a new rule—may sound appealing. Any process which is drawn to a technological art is now held to come within the ambit of the Patent Laws. I submit, however, that this court should concern itself only with realities and let the law professors worry about academic problems. The realities here are that "mental steps" are no longer a serious problem.

Id. As might be expected, the academic responses were mixed. For example, Professor Chisum gave the highest praise: "*Musgrave* was the high water mark of rationality in this area of the law." Chisum, *supra* note 9, at 970. On the other hand, Professor Samuelson found considerable ambiguity in the decision:

> *Musgrave* left open an issue of considerable significance to the breadth of its ruling: whether the field of application itself has to be technological for the process to be patentable, or whether it is enough to make a process "technological" so that it can be carried out by machine. While the CCPA's *Benson* decision can reasonably be read to support the latter interpretation, it contains some statements that raise questions as to how broad an interpretation

Musgrave thus set the stage for Citadel *Benson*. Both the "mental steps" and the "point of novelty" doctrines had been eliminated, and a broad definition of a process had been adopted, limited only by falling within the "technological arts." The next step was claiming the solution to a mathematical algorithm as a process. Clearing the landscape of these pre-Citadel obstacles to patentable subject matter proved to be too audacious an undertaking at this early stage of computer development.

III. THE CITADEL ARISES

In re Benson[100] came before the CCPA in 1971. The Patent Office had rejected both method claims (8 and 13) on appeal as being non-statutory subject matter under § 101.[101] Claim 8 was directed to a "method of converting signals from binary coded decimal form into binary," with the first step being "storing the binary coded decimal signals in a *reentrant shift register*."[102] The remaining steps were directed to the manipulation of these signals in the register to achieve the conversion.[103] With some deference to Judge Baldwin, who had concurred in result but not in the scope of *Musgrave*, Judge Rich quoted Judge Baldwin's question: "[W]ould a reasonable interpretation of the claims include coverage of the process implemented by the human mind?"[104] The answer here was "no," as in *Musgrave* and *Prater II*.[105] This appears eminently clear in claim 8 because of the recitation of the italicized "hardware." Claim 13, however,

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> should be given to it. The CCPA observed, for example, that the only practical implementation of the *Benson* method was in a programmed computer and that the *Benson* method enhanced the internal operations of a computer. Were these, then, the "true" tests for patentability? Among the other unanswered questions from *Benson* and *Musgrave* is what should be done with claims for an algorithm making a contribution to arts other than the technological arts and having a practical implementation without the use of computers.

Samuelson, Benson *Revisited*, *supra* note 9, at 1125 (footnotes omitted). Compare Maier & Mattson, *supra* note 9, at 314:

> The most far-reaching portion of *Musgrave*, however, was the court's rejection of the Board's determination that the claims were non-statutory because some or all of the claimed steps could be carried out with or without the aid of the human mind. Using broad language, the court discarded that notion, stating the only thing necessary to make a sequence of operational steps a statutory process within [§] 101 "is that it be in the technological arts . . . ."

Id.

100. 441 F.2d 682 (C.C.P.A. 1971).

101. *Id*. at 684.

102. *Id*. at 683 (emphasis added).

103. *Id*.

104. *Id*. at 687.

105. *Id*.

presents a more significant problem as recognized by Judge Rich: "This claim was rejected on the same ground as claim 8 from which it differs in containing no reference to any apparatus and in referring to the thing operated upon not as 'signals' but as 'representations.'"[106] This, however, did not give Judge Rich pause, for he concluded: "The supporting disclosure against which the claim must be reasonably interpreted is the identical programmed digital computer system which supports claim 8."[107] Judge Rich then asserted:

> It seems beyond question that the machines—the computers—are in the technological field, are a part of one of our best-known technologies, and are in the 'useful arts' rather than the 'liberal arts,' as are all other types of 'business machines,' regardless of the uses to which their users may put them.[108]

In re Benson extended *Musgrave* and related cases in a significant way. As rhetorically asked by Judge Rich: "How can it be said that a process having no practical value other than enhancing the internal operation of those machines is not likewise in the technological or useful arts?"[109] With this line of reasoning following in the aftermath of *Musgrave*'s elimination of the mental steps doctrine and the broad non-transformational definition of process, the only requirement left was that the invention be in a technological field as broadly interpreted in *In re Benson*. Nonetheless, in hindsight, problems seemed preordained when considering the breadth of claim 13 and the consequent relevance of *O'Reilly v. Morse*.[110] Judge Rich was, of course, well familiar with *Morse*, having discussed it extensively in the *Tarczy-Hornoch* case.[111] His restatement of the holding in *Morse* comes to mind: "The claim was, of course, held invalid because it did not correspond in scope to Morse's invention."[112] The question thus arises whether the scope of claim 13 in the *Benson* application corresponded to what had been invented. Nonetheless, had this question been seriously elaborated upon in *In re Benson*, it is far from apparent that the outcome in the Supreme Court would have been different. The opinion of Justice

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106. *Id.*

107. *Id.*

108. *Id.* at 688.

109. *Id.*

110. 56 U.S. (15 How.) 62 (1853).

111. Refer to notes 61–63 *supra* and accompanying text (describing Judge Rich's conclusions regarding *Morse*).

112. *In re* Tarczy-Hornoch, 397 F.2d 856, 858 (C.C.P.A. 1968).

Douglas in *Gottschalk v. Benson*[113] can hardly be considered a masterpiece of reasoned elaboration;[114] however, the unrestricted patentability of computer-related inventions as may be envisioned by *In re Musgrave* and *In re Benson* was repelled, and an obstructive Citadel erected of an ill-defined strength. While the scope of the decision and its *ratio decidendi* remain obscure, Justice Douglas stated the issue precisely: "The question is whether the method described and claimed is a 'process' within the meaning of the Patent Act."[115] The question is answered in the negative without ever providing us with a definition of "process."[116] Perhaps fortuitously, as it turned out, a definition was provided for "algorithm": "A procedure for solving a given type of mathematical problem."[117] The conclusion was then drawn by Justice Douglas: "The procedures set forth in the present claims are of that kind; that is to say, they are a generalized formulation for programs to solve mathematical problems of converting one form of numerical representation to another."[118] With this categorization the case ends, and ipso facto such algorithms do not constitute processes within § 101.[119]

Justice Douglas, however, then went on to identify historical exclusions from patentable subject matter and stated his rationale for their exclusion: "Phenomena of nature, though just

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113. 409 U.S. 63 (1972).

114. My critique would seem to lie somewhere between Professor Chisum's ("The reasoning in *Benson* is monstrously bad." Chisum, *supra* note 9, at 977–78) and Professor Samuelson's ("Although the Supreme Court's *Benson* decision is not a model of clarity, it is, in the author's view, supported by patent law." Samuelson, Benson *Revisited*, *supra* note 9, at 1053), and in full agreement with Professor Thomas's categorization of *Benson* as "a cryptic opinion." Thomas, *supra* note 9, at 1148. Professor Chisum also concluded that *Benson* not only was "poorly reasoned," but "stemmed from an antipatent judicial bias that cannot be reconciled with the basic elements of the patent system established by Congress." Chisum, *supra* note 9, at 960. Professor Samuelson disagrees on the antipatent bias because, after all, it was a unanimous opinion. *See* Samuelson, Benson *Revisited*, *supra* note 9, at 1053. Subsequent history would seem to support Professor Samuelson. Refer to notes 224–33 and 247–64 *infra* and accompanying text (discussing the Supreme Court's change of attitude commencing with *Chakrabarty*).

115. *Gottschalk*, 409 U.S. at 64.

116. Refer to text accompanying notes 109–11 *infra* (considering Judge Rich's frustration with this failure).

117. *Gottschalk*, 409 U.S. at 65. As pointed out by Professor Samuelson:

> A curious thing about these eight pre-*Benson* cases is that none of them, not even the CCPA's decision in the *Benson* case, makes any more than an incidental use of the word "algorithm" in discussing the patentability issue. Hence, none of the analysis contained in these lower court decisions focused on the patentability of "algorithms." It was the Supreme Court's decision in *Benson* that shifted the focus of attention to "algorithms."

Samuelson, Benson *Revisited*, *supra* note 9, at 1042–43 (footnotes omitted).

118. *Gottschalk*, 409 U.S. at 65.

119. *See id.* at 71–73.

discovered, mental processes, and abstract intellectual concepts are not patentable, as they are the basic tools of scientific and technological work."[120] He then seems to have included the present claims within these exclusions, stating: "Here the 'process' claim is so abstract and sweeping as to cover both known and unknown uses of the BCD to pure binary conversion."[121]

Justice Douglas then seemed to search for a definition of process. He considered and included long excerpts from the classic cases (the same ones that had been reviewed by Judge Rich in *Tarczy-Hornoch*)[122] and lighted on *Cochrane v. Deener*: "Transformation and reduction of an article 'to a different state or thing' is the clue to the patentability of a process claim that does not include particular machines."[123] But then he took that away and advised us what was not being held:

> It is argued that a process patent must either be tied to a particular machine or apparatus or must operate to change articles or materials to a "different state or thing." We do not hold that no process patent could ever qualify if it did not meet the requirements of our prior precedents. It is said that the decision precludes a patent for any program servicing a computer. We do not so hold.[124]

The famous "nutshell" is then announced:

> It is conceded that one may not patent an idea. But in practical effect that would be the result if the formula for converting BCD numerals to pure binary numerals were patented in this case. The mathematical formula involved here has no substantial practical application except in connection with a digital computer, which means that if the judgment below is affirmed, the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself.[125]

The relative importance of the "nutshell" or even its consistency with the "we do nots" is not transparent, at least to me.

The policy reason undermining this decision is finally given, with evident deference to the President's Commission on the

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120. *Id.* at 67.

121. *Id.* at 68.

122. *See In re* Tarczy-Hornoch, 397 F.2d 856, 857–68 (1968). Refer to text accompanying notes 51–82 *supra* (discussing Judge Rich's examination of the precedential cases in *Tarczy-Hornoch*). Judge Rich's analysis of the cases is more comprehensive, and includes more cases, while also placing them in historical context.

123. *Gottschalk*, 409 U.S. at 70 (citing Cochrane v. Deener, 94 U.S. 780 (1876)).

124. *Id.* at 71.

125. *Id.* at 71–72.

Patent System, to the effect that, basically, it was too difficult for the Patent Office to examine these computer-related cases, and it was up to Congress to resolve any controversy.[126] So it appeared that *Benson*, at least, held that a patent may not be obtained on an algorithm itself, even though the only practical way to solve the algorithm was by means of an appropriately programmed digital computer. The rationale for this holding remains obscure. Claims 8 and 13 were lumped together, even though claim 8 recites in the first step "a reentrant shift register" and then in other steps determines how the shift register is to operate to complete the solution.[127] Is this claim an idea, a natural law, too broad, or perhaps just contrary to what these justices consider sound public policy?

Finally, and perhaps most distressing, at least to the judges on the CCPA, is the failure of the Supreme Court even to mention *In re Benson* beyond indicating that the Patent Office had rejected the claims and the CCPA had reversed.[128] There is no discussion of how or where the reasoning of *In re Benson* is flawed; nor is there any mention of the "mental steps" or "point of novelty" doctrines, which were an integral part of the reasoning in *In re Benson*, along with its expansive view of "process."[129] Hence, it may be understandable that the CCPA did not receive *Benson* with open arms. It is one thing to be reversed by the Supreme Court, another to be accorded no deference for its expertise as the specialized court charged with supervising the law applied by an administrative agency, and still another not to have the error of its ways explicated.[130] The CCPA hence found

126. *Id.* at 72–73.

127. *Id.* at 73–74.

128. *See id.* at 64.

129. *See, e.g.*, *id.*

130. The consequences of this failure on the part of the Supreme Court provided the CCPA with some flexibility, as observed by Professor Samuelson:

> Although it may have smarted for the CCPA judges to have one of their opinions overturned by the Supreme Court, it must have smarted more not to have their decisions noticed at all. Of course, a decision that did not deign to address and refute the arguments that the CCPA judges had found so persuasive was not likely to be regarded as instructive and persuasive in subsequent cases that would come before the CCPA. On the theory that they could not exactly determine what the Court's holding was in *Benson*, it was natural for the CCPA judges to fasten upon the limiting language of the *Benson* opinion, such as "algorithm" and "wholly preempt," and the Court's observation that *Benson*'s claims were not limited to particular machines or domains. As a result, they could interpret *Benson* as rejecting only this one set of process claims and not as a criticism of the line of cases the CCPA had developed.

Samuelson, Benson *Revisited*, *supra* note 9, at 1060. Judge Rich's irritation with the Supreme Court's failure in *Benson* to consider prior CCPA decisions is reflected in his dissenting opinion in *In re Johnston*, 502 F.2d 765, 772–74 (C.C.P.A. 1974). Refer to text

itself between a determined Patent Office and a recalcitrant Supreme Court. The battle lines were drawn and the CCPA was now confronted with a Citadel, which it considered an ill-conceived barrier to the progress of the technological arts.

At this juncture, it is important to the understanding of the evolution of the law in this area to consider the reaction of the CCPA and Judge Rich, in particular, to *Benson*. In the first case to consider the impact of *Benson*, *In re Christensen*,[131] the CCPA sustained the Patent Office's rejection of claims directed to: "The method of determining the porosity of a subsurface formation *in situ* . . . ."[132] The steps of the method essentially involved collecting data, with the porosity being calculated by a recited formula.[133] The court found that this fell within the rule of *Benson*; however, at the same time, it was not going to retreat from the fray entirely but used the maneuver that many a lower court has taken to deal with disliked decisions of higher courts.[134] As stated by Judge Lane: "The issue considered by the Supreme Court in *Benson* was *a narrow one*, namely, is a formula for converting binary coded decimal numerals into pure binary numerals by a series of mathematical calculations a patentable process?"[135] Then he stated:

> The issue before us in the instant case is also a narrow one, namely, is a method claim in which *the point of novelty* is a mathematical equation to be solved as the final step of the method, a statutory method? We follow the Supreme Court in concluding that the answer is in the negative.[136]

How easy it was for the "point of novelty" heresy to arise from the ashes of *Musgrave*.[137] Nonetheless, Judge Lane added an

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accompanying notes 150–60 *infra* (discussing Judge Rich's dissent in *Johnston*).

131. 478 F.2d 1392 (C.C.P.A. 1973).

132. *Id.* at 1392 (claim 4).

133. *Id.* at 1392–93.

134. *Id.* at 1394.

135. *Id.* (emphasis added).

136. *Id.* (emphasis added).

137. The heresy was again suppressed in *In re Taner*, 681 F.2d 787, 791 (1982), on the basis of *Diehr*:

> The Court in *Diehr* rejected the "point of novelty" analysis saying "(t)he 'novelty' of any element or steps in a process . . . is of no relevance in determining whether the subject matter of a claim falls within the § 101 categories of possibly patentable subject matter," and went on to explain that "when a claim containing a mathematical formula implements or applies that formula in a structure or process, which, when considered as a whole, is performing a function which the patent laws were designed to protect (e.g., transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101." Accordingly, to the extent that it conflicts with what we say here, *Christensen* is overruled.

important insight: "Given that the method of solving a mathematical equation may not be the subject of patent protection, it follows that the addition of the old and necessary antecedent steps of establishing values for the variables in the equation cannot convert the unpatentable method to patentable subject matter."[138]

Judge Rich concurred in *Christensen*'s result, which provided him an opportunity to adumbrate the Supreme Court's reasoning (or lack thereof) in *Benson*.[139] He began by pointing out the failure of the Court to answer its own basic question of "whether the method described and claimed is a 'process' within the meaning of the Patent Act."[140] He continued: "Unfortunately, after stating that to be the question, the Supreme Court opinion does not again advert to it and never decides it, except inferentially by reversing our decision that the claims *were* directed to statutory processes."[141] With considerable reluctance, it would seem, he then tried to provide some insight into the obscurity of the *Benson* opinion:

> According to the reasoning of the Supreme Court, this appears to be a question of *scope*, or at least the *abstract* nature of the claims, not a question of what the Patent Act means by "process." I can read the opinion only as saying that the abstraction or undue scope of the claims is the result of their assumed pre-emption or exclusion from the use of a formula, algorithm, or "generalized formulation," though for a specific application in a useful art. "Algorithm" has been used in the sense of a "procedure for solving a given type of mathematical problem" and "formula" is used in the sense of a mathematical formula. The Supreme Court in *Benson* appears to have held that claims drafted in such terms are not patentable—for what reason remaining a mystery. Under the rules of the legal game, we are obliged to follow its lead as best we can.[142]

Judge Rich persisted in this broad reading of *Benson* until his apparent conversion in *In re Flook*,[143] as will be discussed below.[144]

Id. (citations omitted).

138. *Christensen*, 478 F.2d at 1394.

139. *See id*. at 1395–96 (Rich, J., concurring).

140. *Id.* at 1395 (Rich, J., concurring).

141. *Id.* (Rich, J., concurring).

142. *Id.* at 1396 (Rich, J., concurring).

143. 559 F.2d 21 (C.C.P.A. 1977) (joining in the court's unanimous opinion).

144. Refer to text accompanying notes 187–98 *infra* (chronicling the cases leading up to *Flook*).

In the next case to test the scope of *Benson*, *In re Johnston*,[145] Judge Baldwin put *Christensen*'s narrow interpretation of *Benson* into operation. Immediately following the quote from *Christensen* describing the issue in *Benson* as "narrow,"[146] Judge Baldwin continued: "Furthermore, the instant claims, in apparatus form, do not claim or encompass a law of nature, a mathematical formula, or an algorithm. For these reasons, we do not find the holding of *Benson* to be applicable to claims of the type now before us."[147] In addition to the reversal of the Patent Office's § 101 rejection of the claims, the majority in *Johnston* also reversed the Patent Office's obviousness rejection under § 103.[148] Chief Judge Markey dissented from the majority's § 103 holding and hence found it unnecessary to deal with the § 101 issue.[149]

Judge Rich, however, dissented specifically on the § 101 issue.[150] While he, along with the other judges, strongly disagreed with the Supreme Court's holding in *Benson*, Judge Rich believed that *Benson* was controlling and should be applied in this case.[151] In his view, the difference between claiming the invention as an "apparatus" rather than as a "process" did not escape the scope of *Benson*.[152] While not denying the "validity" of the "principle" that programming a computer with a new program transforms it into a new machine, Judge Rich maintained such a principle "partakes of the nature of a legal fiction when it comes to drafting claims."[153] But even accepting this legal fiction did not, in his view, take these apparatus claims out of the purview of *Benson*, and he concluded:

> I am probably as much—if not more—confused by the wording of the *Benson* opinion as many others. What the Court did in its decision reversing the holding of this court that Benson and Tabbot's method claims were patentable subject matter under [§] 101 contains a message that is

145. 502 F.2d 765 (C.C.P.A. 1974).

146. Refer to text accompanying note 135 *supra*.

147. *Johnston*, 502 F.2d at 771.

148. *Id.* at 771–72.

149. *Id.* at 772 (Markey, C.J., dissenting).

150. *Id.* (Rich, J., dissenting).

151. *Id.* at 774 (Rich, J., dissenting) (conceding that "the *Benson* decision requires us to affirm the rejection of claims 20–24 as directed to non-patentable subject matter under 35 U.S.C. [§] 101").

152. "The point is that the machine or apparatus and process claims are really directed to the same invention . . . ." *Id.* at 773 (Rich, J., dissenting).

153. *Id.* (Rich, J., dissenting). This "fiction" can be traced back to *In re Bernhart*, 417 F.2d 1395, 1400 (C.C.P.A. 1969) ("To this question we say that if a machine is programmed in a certain new and unobvious way, it is physically different from the machine without that program; its memory elements are differently arranged.").

> loud and clear. If those claims are not patentable subject matter, neither, in my view, are the claims here, regardless of difference in form.[154]

Judge Rich then made an important explicit statement of his judicial philosophy: "It seems to me important to focus on what the Supreme Cohrt [sic] did in *Benson*, rather than on the specifics of its explanation of why it did it."[155] He was well aware of the realpolitik of the marketplace and appropriately, I would say, used a battle metaphor: "I find it more significant to contemplate the identities of the troops lined up for battle in *Benson* and observe which side obtained the victory."[156] He identified the combatants as the government and the economically interested hardware manufacturers on one side, and those "who were in favor of patent protection for programs or software" on the other.[157] Judge Rich admitted the "anti-patenting forces" had won the "victory," but ominously observed that it was not "an altogether clear one."[158]

Judge Rich also felt compelled to defend himself against the charge (evidently by one or more of the judges in the majority) that he was being inconsistent by dissenting in this case. He observed, I would imagine with some chagrin and perhaps some bitterness, that *none* of the "many carefully reasoned opinions of this court on the statutory subject matter . . . which led to *Benson*, none of which was discussed or even recognized in the Supreme Court's *Benson* opinion."[159] Nonetheless, his judicial philosophy and integrity demanded deference to binding precedents of the Supreme Court which he, in his own mind, considered erroneous: "*[I]t is the duty of a judge of a lower court to try to follow in spirit decisions of the Supreme Court—that is to say, their 'thrust.'*"[160] As I will attempt to show, this was a consistent philosophy of Judge Rich, which, as fate would have it, became an important weapon in his arsenal for the future attack on the Citadel.

The Supreme Court accepted certiorari in *Dann v. Johnston*[161] but, rather than becoming an arbitrator in the battle, it avoided the § 101 statutory subject matter issue and reversed

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154. *Johnston*, 502 F.2d at 773 (Rich, J., dissenting).
155. *Id*. at 774 (Rich, J., dissenting).
156. *Id*. (Rich, J., dissenting).
157. *Id*. (Rich, J., dissenting).
158. *Id*. (Rich, J., dissenting).
159. *Id*. (Rich, J., dissenting).
160. *Id*. (Rich, J., dissenting) (emphasis added).
161. 421 U.S. 962 (1975).

the CCPA solely on the § 103 obviousness issue.[162] The unanimous opinion was written by Justice Marshall, with Justices Blackmun and Stevens taking no part in the consideration of the case.[163] It is interesting to note that only one sentence makes reference to *Gottschalk v. Benson*: "Our limited holding was that respondent's method was not a patentable 'process' as that term is defined in 35 U.S.C. § 100(b)."[164] The CCPA, as might be anticipated, was quick to latch on to the characterization of *Benson* as a "limited holding."[165]

The CCPA was then faced with the issue of how to deal with method claims post-*Benson*. The claims appealed in *In re Chatfield*[166] were directed to: "A method of operating a computing system upon more than one processing program concurrently for improving total resource utilization . . . ."[167] The apparatus distinction of *Johnston* thus did not apply and the direct issue was whether these claims would qualify as a process.[168] Chief Judge Markey, who was silent in *Johnston*, joined the majority and construed *Benson* narrowly: "[T]he fundamental rationale we glean from *Benson* is that a patent containing Benson's claims would have preempted all practical use of both the underlying mathematical formula and the involved algorithm."[169] To support this, Chief Judge Markey referred to the characterization of *Benson* by a unanimous Supreme Court in *Dann v. Johnston* as a "limited holding."[170] He then distinguished *Christensen* ("The claimed process does not end with [a] solution of a particular equation . . . .")[171] and *Benson* ("Nor are the appealed claims so 'abstract and sweeping . . . .'").[172]

Judge Rich again dissented in *Chatfield*, and this time Judge Lane joined with him even though he had been with the majority in *Johnston*.[173] Judge Rich saw the issue broadly: "Are programs

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162. Dann v. Johnston, 425 U.S. 219, 220 (1976).

163. *Id.*

164. *Id.* at 224 (citation omitted).

165. *See In re* Chatfield, 545 F.2d 152, 156 (C.C.P.A. 1976) (relying on the Court's unanimous holding in *Dann v. Johnston* characterizing *Benson* as "limited" to find a computing system patentable).

166. 545 F.2d 152 (C.C.P.A. 1976).

167. *Id.* at 154 (claim 1).

168. *Id.* at 157 (recognizing that "a claim to a 'method' or 'process' may fall within the literal terms of the statute and yet not define proper subject matter for patent protection").

169. *Id.* at 156.

170. *Id.*

171. *Id.* at 159.

172. *Id.*

173. *See id.* at 159–60 (Rich, J., dissenting).

for general-purpose digital computers patentable subject matter under 35 U.S.C. § 101?"[174] This is, of course, exactly the issue that the Supreme Court had expressly refused to resolve in *Benson* and *Johnston*.[175] Judge Rich was troubled by the Court's "brief observation" in *Johnston* characterizing *Benson* as "add[ing] considerably to the already existing ambiguity inherent in the *Benson* opinion."[176] He was referring not only to the "limited holding" characterization relied upon by the majority in *Chatfield*, but also to the following characterization from *Johnston*: "As we observed, '[t]he claims were not limited to any particular art or technology, to any particular apparatus or machinery, or to any particular end use.'"[177] He asked, perhaps rhetorically: "Does it say Benson's two claims were held non-statutory only because they were not limited to any particular technology, apparatus, or end use?"[178]

Judge Rich hence found himself unable to distinguish *Chatfield* from *Benson* "even when the narrowest possible view of that decision is taken."[179] Just how limited was the holding of *Benson* supposed to be? He then gave a much broader interpretation to the holding in *Benson* compared to that of the majority of the CCPA: "[P]rograms for general-purpose digital computers, at least when claimed as a 'process,' are not within the meaning of that category of inventions in the statute."[180] He also would eliminate any dichotomy between apparatus and methods: "It is my own view that claiming as a 'machine' instead of as a 'process' is no distinction at all because it is merely a drafter's choice."[181]

In conclusion, Judge Rich vented his frustration with the continuing battle between the CCPA and the Patent Office over the broad question of patentability of computer-related inventions and pleaded for a higher authority to step in and resolve it. He lamented that the CCPA had been reversed twice by the Supreme Court and feared these reversals might well continue.[182] He proved prescient in this regard.

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174. *Id.* at 159 (Rich, J., dissenting).

175. *See id.* at 160 (Rich, J., dissenting) (noting that "nothing was said in *Dann v. Johnston* to clear up the ambiguity because the Court avoided discussing the § 101 patentable subject-matter issue which was before it").

176. *Id.* at 161 (Rich, J., dissenting).

177. *Id.* (Rich, J., dissenting) (quoting Gottschalk v. Benson, 409 U.S. 63, 64 (1972)).

178. *Id.* (Rich, J., dissenting).

179. *Id.* (Rich, J., dissenting).

180. *Id.* (Rich, J., dissenting).

181. *Id.* (Rich, J., dissenting).

182. *See id.* at 161–62 (Rich, J., dissenting) (citing "an urgent need to settle the question of patent protection for software by higher authority than this court so that the

In re Noll[183] was decided the same day as *Chatfield*. Judge Baldwin found this an easy case: "Unlike the method claims in *In re Chatfield*, . . . appellant's claims are drawn to apparatus for scan-converting a sequence of first data signals into a sequence of second signals. This apparatus is a 'machine' or an 'improvement thereof' within the meaning of 35 U.S.C. § 101."[184] The majority again took a narrow view of *Benson*, in particular distinguishing on the ground that, "[u]nlike the invention claimed in *Benson*, the instant claims are limited to a particular technology (computer graphics systems and scan-conversion of graphic information)."[185]

Judge Lane wrote a dissenting opinion in which Judge Rich joined. Judge Lane disagreed with the majority's narrow reading of *Benson*, stating: "I cannot agree with the majority's reliance on terse, cryptic excerpts found in *Benson* and in *Dann v. Johnston* which allegedly undercut any broad construction of *Benson*. On the contrary, I believe that *Benson* has broad ramifications."[186]

Chatfield and *Noll* thus set the stage for *In re Flook*,[187] which is an unusual decision for several reasons. First, the opinion is only three paragraphs long,[188] and second, somewhat enigmatically after *Johnston*, *Chatfield*, and *Noll*, Judge Rich joined in a unanimous opinion holding as patentable subject matter claims for: "A method for updating the value of at least one alarm limit on at least one process variable involved in a process comprising the catalytic chemical conversion of hydrocarbons . . . ."[189] The claim recited a mathematical equation that was solved for "adjusting said alarm limit to said updated alarm limit value," which was the final step in the process.[190] The claim the Court rejected in *Christensen* was limited to gathering data before a solution where the end-result was the solution of the mathematical algorithm.[191] Here, there was a post-solution

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Patent and Trademark Office, the Federal judiciary as a whole, and the data-processing industry (hardware and software both) may know what the law of software patentability is").

183. 545 F.2d 141 (C.C.P.A. 1976).

184. *Id.* at 147 (citation omitted).

185. *Id.* at 148.

186. *Id.* at 151–52 (Lane, J., dissenting) (citations omitted).

187. 559 F.2d 21 (C.C.P.A. 1977).

188. Excluding the four paragraphs describing the invention and the Patent Office's rejection. *See id.* at 22–23.

189. *Id.* at 22 (claim 1).

190. *Id.* This is the fourth and final step in claim 1.

191. *See In re* Christensen, 478 F.2d 1392, 1394 (C.C.P.A. 1973) (holding that "a method claim in which the point of novelty is a mathematical equation to be solved as the final step of the method" is not converted into patentable subject matter with the addition

end-use for the solution: updating the alarm limit.[192] To circumvent *Benson*, the court construed it as requiring preemption of the algorithm, while in *Flook*: "The present claims do not preempt the formula or algorithm contained therein, because solution of the algorithm, per se, would not infringe the claims."[193]

The *Flook* decision is problematic for several reasons. First, it begs the question: Why is a necessary step, such as gathering data before a solution is undertaken, materially different from using the solution, which is equally as necessary—even in the *Benson* claims? Second, the decision is ambiguous, for there is no indication of how much importance was placed on limiting the method to the technical field of catalytic conversion of hydrocarbons.[194] This was one of the ambiguities that Judge Rich found in the *Johnston* characterization of *Benson*. Nonetheless, rather interestingly, a principled reason is finally given for resolving the question of preemption, that is, whether the solution of the algorithm per se would infringe the claims.[195] This "infringement" theory thus would deny statutory subject status to the broad claim (13) in *Benson*, which was not limited by any apparatus but would not resolve the issue of the narrow claim (8), which included the recitation of a hardware element.[196] The broad claim could be infringed by pencil and paper but the narrow claim, of course, could not.

It is not apparent why Judge Rich joined the *Flook* opinion. It may well be related to the questions he asked in *Chatfield* concerning the ambiguities of the *Johnston* characterization of *Benson* with respect to field-of-use limitations and the recitation of an end-use for the solution of the algorithm. If so, his position on *Benson* seems to be somewhat modified. The "thrust" of *Benson* did not extend to exclude the patentability of method claims including mathematical algorithms, provided the claims

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of antecedent steps of establishing variables for the equation).

192. *See Flook*, 559 F.2d at 23 (finding that "*Christensen* does not render the claims before us unpatentable, because these claims include recitation of post-solution activity, a step in which the solution is applied to a control system").

193. *Id*. at 23.

194. *See id*. at 22–23. The court broadly frames the issue in *Flook* as whether a process claim using an algorithm "to modify a conventional manufacturing system" is patentable subject matter, without specific mention of the technological arts. *Id*.

195. *Id*. at 23.

196. *See In re* Benson, 441 F.2d 682, 687 (1971). Claim 8 was "for a method to be practiced in part on particular apparatus specified to be a 'reentrant shift register.'" *Id*. Claim 13 differed in "containing no reference to any apparatus and in referring to the thing operated upon not as 'signals' but as 'representations.'" *Id*.

included a field of use limitation or a post-solution end-use.[197] Nonetheless, Judge Rich underwent an epiphany that carried him through the rest of his long career.

Faced now with unanimous hostility in the CCPA, the Patent Office again found an ally in the Supreme Court who, in *Parker v. Flook*,[198] again reversed the CCPA (the third reversal in a row). However, rather than clarifying the issue of the patentability of computer-related inventions, the Court further muddied the waters. The opinion was written by Justice Stevens, who replaced Justice Douglas and who, as it turned out, had some rather peculiar views on patent law, at least from Judge Rich's perspective. Justice Stevens was joined by Justices Brennan and Marshall and also by Justices Blackmun and Powell, who had not participated in the *Benson* decision.[199] The dissent was written by Justice Stewart, who also had not participated in *Benson*, and was joined by Chief Justice Burger and Justice Rehnquist, both of whom had joined in the unanimous decision in *Benson*.[200] This time the Supreme Court at least acknowledged that the CCPA had written a decision and summarized that court's rationale as follows: "The court reasoned that since the mere solution of the algorithm would not constitute infringement of the claims, a patent on the method would not preempt the formula."[201] However, instead of dealing with the "infringement" test for preemption, Justice Stevens defined the issue as "whether the discovery of this feature [the novel formula] makes an otherwise conventional method eligible for patent protection."[202] This certainly sounds like the "point of novelty" doctrine, which supposedly had been put to rest, at least by the CCPA, in *In re Musgrave*.[203]

Justice Stevens then stated his view on the rationale of the Court's *Benson* decision: "Reasoning that an algorithm, or mathematical formula, is like a law of nature, *Benson* applied the established rule that a law of nature cannot be the subject of a

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197. *See* Gottschalk v. Benson, 409 U.S. 63, 71–72 (1972) ("The mathematical formula involved here has no substantial practical application except in connection with a digital computer . . . the patent would wholly pre-empt the mathematical formula and in practical effect would be a patent on the algorithm itself.").

198. 437 U.S. 584 (1978).

199. *Id*.

200. *Id*. at 598 (Stewart, J., dissenting).

201. *Id*. at 587.

202. *Id*. at 588.

203. 431 F.2d 882 (C.C.P.A. 1970). Refer to text accompanying notes 83–99 *supra* (discussing *Musgrave* and Judge Rich's critique of the "point of novelty" doctrine as irrelevant in determining statutory subject matter).

patent."[204] He next turned to the argument that the post-solution activity of adjusting the alarm limit should place this process within § 101 and disposed of it, explaining: "The notion that post-solution activity, no matter how conventional or obvious in itself, can transform an unpatentable principle into a patentable process exalts form over substance. A competent draftsman could attach some form of post-solution activity to almost any mathematical formula . . . ."[205] Evidently still concerned about the distinction between claiming a principle per se and the application of that principle,[206] and also the fact that the equation claimed in the *Flook* application was novel, Justice Stevens concluded:

> The process itself, not merely the mathematical algorithm, must be new and useful. Indeed, the novelty of the mathematical algorithm is not a determining factor at all. Whether the algorithm was in fact known or unknown at the time of the claimed invention, as one of the "basic tools of scientific and technological work," it is treated as though it were a familiar part of the prior art.[207]

He maintained that this principle was supported by *O'Reilly v. Morse*,[208] which in turn relied upon an English case *Neilson v. Hartford*,[209] decided in 1841. The metaphysical conclusion that something unknown to anyone somehow becomes (or always was) part of the prior art may give us pause.[210] Nonetheless, Justice Stevens, it would seem, threw into the brew the "point of novelty" doctrine, concluding: "Respondent's process is unpatentable under § 101, not because it contains a mathematical algorithm as one component, but because once that algorithm is assumed to be within the prior art, the application, considered as a whole,

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204. *Flook*, 437 U.S. at 589.

205. *Id.* at 590. Judge Rich, of course, had made this same argument a number of times with respect to the interchangeability of apparatus and method claims. *See In re* Johnston, 502 F.2d 765, 773 (1974) (Rich, J., dissenting) (discussing the ease of casting a claim in a different form by noting "every competent patent draftsman knows how to do that"); *see also In re* Chatfield, 545 F.2d 152, 161 (1976) (Rich, J., dissenting) ("A competent patent draftsman can readily define the invention as either a process or a machine, or both.").

206. This is the supposed distinction between *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127 (1948), and *Mackay Radio & Telegraph Co. v. Radio Corp. of America*, 306 U.S. 86 (1939). *See Flook*, 437 U.S. at 591 (noting that "*Mackay Radio* and *Funk Bros.* point to the proper analysis for this case").

207. *Flook*, 437 U.S. at 591–92 (citations omitted).

208. 56 U.S. (15 How.) 62 (1853).

209. 151 Eng. Rep. 1266, 1273 (Ex. 1841), *cited in Morse*, 56 U.S. at 114–15, *and quoted in Flook*, 437 U.S. at 592.

210. Refer to text accompanying notes 271–74 *infra* (considering Judge Rich's reaction).

contains no patentable invention."[211] This conclusion would seem to beg the question: Would this claim ("application as a whole?") without the equation constitute patentable subject matter as a method of adjusting the alarm level in a catalytic converter?

Nonetheless, Justice Stevens then seemingly undercut the detailed reasoning of the opinion and reduced the holding, as set forth in footnote 18: "Very simply, our holding today is that a claim for an improved method of calculation, even when tied to a specific end use, is unpatentable subject matter under § 101."[212] Judge Rich and the CCPA were soon to co-opt this.[213]

To conclude the opinion, Justice Stevens turned to policy: "It is our duty to construe the patent statutes as they now read, in light of our prior precedents, and we must proceed cautiously when we are asked to extend patent rights into areas wholly unforeseen by Congress."[214] He then quoted from Justice White's opinion in *Deepsouth Packing Co. v. Laitram Corp.*,[215] decided shortly before *Benson* in 1972: "We would require a *clear and certain signal* from Congress before approving the position of a litigant who . . . argues that the beachhead of privilege is wider, and the area of public use narrower, than courts have previously thought."[216] Hence, at least through the 1978 term, the evident policy of the majority of the Supreme Court was one of judicial restraint—waiting for a "clear and certain signal from Congress" before extending patentability to new technology.[217]

The Patent Office took its victory in *Flook* as marching orders to continue its policy of refusing the patentability of substantially all computer-related inventions. This campaign was met by the equally adamant policy of the CCPA to view *Benson* narrowly and to make only slight accommodation for *Flook*'s extension of the Citadel. Judge Rich told the story of the conflict in *In re Bradley*,[218] decided in 1979. The examiner, before the Supreme Court's decision in *Flook*, had rejected *Bradley*'s claims based on his interpretation of *Benson*, "that all computer program or program-related inventions are nonstatutory."[219] This

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211. *Flook*, 437 U.S at 594.

212. *Id.* at 595 n.18.

213. *See In re* Bradley, 600 F.2d 807, 811 n.6 (C.C.P.A. 1979) (quoting footnote 18 from *Flook*).

214. *Flook*, 437 U.S. at 596.

215. 406 U.S. 518 (1972).

216. *Flook*, 437 U.S. at 596 (quoting *Deepsouth Packing*, 406 U.S. at 531).

217. *See Deepsouth Packing*, 406 U.S. at 531.

218. 600 F.2d 807 (C.C.P.A. 1979), *aff'd by an equally divided Court sub nom.* Diamond v. Bradley, 450 U.S. 381 (1981).

219. *Id.* at 811.

interpretation was rejected summarily by Judge Rich as "erroneous."[220] The Board, however, took a more sophisticated approach. Being well aware of how the CCPA was limiting *Benson*, and now *Flook*, to mathematical algorithms, the Board argued that because "digital computers operate in some number radix," these claims inherently involved "a mathematical algorithm in the *Benson* and *Flook* sense."[221] Similarly, Judge Rich dismissed this line of reasoning because it "leads to the conclusion that any computer-related invention must be regarded as mathematical in nature, a conclusion which is not compelled by either *Benson* or *Flook*."[222]

The use of the phrase "not compelled by *Benson* or *Flook*" may be contrasted to the "trust of *Benson* and *Flook*" and give us some hint as to Judge Rich's evolving attitude toward these cases. In essence, the fact that a computer program is involved does not automatically resolve the § 101 question as the Patent Office would have it.

Judge Rich then declared that the statutory subject matter issue in *In re Bradley* was governed by the two-part test of *In re Freeman*,[223] which had been devised by the CCPA in response to the Supreme Court's *Benson* decision: "Even though the claimed invention is a machine, we must nevertheless determine whether the claim recites a mathematical algorithm, and, if so, whether it preempts the use of the algorithm."[224] As there was no mathematical algorithm claimed here, there was no need to go to the preemption step of *Freeman*.[225] The Supreme Court again granted the Patent Office's writ of certiorari in *Diamond v. Bradley*.[226]

In the interim, the battle over the scope of *Benson* and *Flook* continued; now Judge Rich was at the front. In *In re Walter*,[227]

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220. *Id.* at 811 n.6.

221. *Id.* at 811.

222. *Id.*

223. 573 F.2d 1237, 1245 (C.C.P.A. 1978). The two-part test was enunciated by the court as follows:

> Determination of whether a claim preempts nonstatutory subject matter as a whole, in the light of *Benson*, requires a two-step analysis. First, it must be determined whether the claim directly or indirectly recites an "algorithm" in the *Benson* sense of that term, for a claim which fails even to recite an algorithm clearly cannot wholly preempt an algorithm. Second, the claim must be further analyzed to ascertain whether in its entirety it wholly preempts that algorithm.

Id.

224. *Bradley*, 600 F.2d at 813.

225. *See id.*

226. 450 U.S. 381 (1981), *aff'd by an equally divided Court.*

227. 618 F.2d 758 (C.C.P.A. 1980).

Judge Rich observed in a footnote that the Patent Office, in its petition for certiorari in the *Bradley* case, had urged that the word algorithm "is not limited to mathematical algorithms, but extends to the general meaning of the word which connotes a step-by-step procedure to arrive at a given result."[228] Judge Rich expressly rejected this view, concluding: "Such a proposition, if accepted, would have the effect of totally reading the word 'process' out of § 101, since any process is a step-by-step procedure to arrive at a given result."[229] He thus adhered to the view that *Benson* and *Flook* related solely to mathematical algorithms and defined the issue as: "not one of computer-related inventions per se; it is one of mathematics-related inventions."[230]

In *Walter*, Judge Rich also strongly rejected the Patent Office's interpretation that *Flook* had adopted a "point of novelty" approach to § 101. He again turned to a consequentialist argument: "If this approach were to be adopted it would immeasurably debilitate the patent system. We do not believe the Supreme Court has acted in a manner so potentially destructive."[231] Moreover, Judge Rich rejoined that the Court in *Flook* gave "explicit instructions that, under § 101, a claim must be considered as a whole."[232] Nonetheless, Judge Rich found that, because *Flook* did not require that a mathematical algorithm be entirely preempted, the second part of the *Freeman* test was inconsistent with *Flook*.[233] The second part of the test was reformulated as follows:

> Once a mathematical algorithm has been found, the claim as a whole must be further analyzed. If it appears that the mathematical algorithm is implemented in a specific manner to define structural relationships between the physical elements of the claim (in apparatus claims) or to refine or limit claim steps (in process claims), the claim being otherwise statutory, the claim passes muster under § 101. If, however, the mathematical algorithm is merely presented and solved by the claimed invention, as was the case in *Benson* and *Flook*, and is not applied in any manner to physical elements or process steps, no amount of post-solution activity will render the claim statutory; nor is it

228. *Id.* at 764 n.4.

229. *Id.*

230. *Id.* at 764.

231. *Id.* at 766.

232. *Id.* at 767.

233. *Id.* ("Since we have noted that *Flook* does not require literal preemption of a mathematical algorithm . . . we thus deem it appropriate to restate the second step of the *Freeman* test in terms other than preemption.").

> saved by a preamble merely reciting the field of use of the mathematical algorithm.[234]

As will be related below, the *Freeman* test, as qualified now by *Walter*, will be further refined before its demise.[235]

For a change, however, the CCPA in *Walter* affirmed the Patent Office, agreeing that the "method" and "means for" apparatus claims "drafted in illusory apparatus format" should be treated the same.[236] Judge Rich concluded: "Here appellant claims the mathematical algorithm itself, even though most of his claims limit its use to a particular art or technology. This may not be done under the patent law as it now exists."[237] The law at this time, after all, was *Benson* and *Flook* and not *In re Musgrave* and *In re Benson*.[238] Thus, the Citadel of *Benson*, as strengthened by *Flook*, was recognized by the CCPA because total preemption was not required (the "infringement" test was rejected) for inventions claiming mathematical algorithms from being excluded from statutory subject matter—even though the exclusions were limited to a particular technological field.

At the end of the decade there still had been no resolution of the conflict and Congress, in its infinite wisdom (or to its credit at least), had not intervened.[239] The Patent Office, relying on a broad reading of *Benson* and *Flook*, insisted that substantially all computer-related inventions were not patentable subject matter.[240] It also insisted that *Flook* had adopted a "point of novelty" approach that would exclude from patentability inventions where a computer program was the only novel contribution to the machine or process.[241] The CCPA now seemed

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234. *Id*. (footnote omitted).

235. Refer to text accompanying notes 351–58 *infra*.

236. *Walter*, 618 F.2d at 768–69.

237. *Id*. at 771.

238. The qualification by Judge Rich—"patent law as it now exists"—may sound prophetic with the subsequent demise, or at least severe limiting, of *Benson* and *Flook*.

239. Suzanne R. Swanson, *The Patentability of Business Methods, Mathematical Algorithms and Computer-Related Inventions After the Decision By the Court of Appeals for the Federal Circuit in* State Street, 8 FED. CIR. B.J. 153, 178 (1999) (explaining that various proposals had been presented by interested parties on how best to solve the problem of protecting software-related inventions, which were often met with criticism as Congress was unlikely to intervene in this area).

240. *See, e.g.*, *Walter*, 618 F.2d at 762, 769. The CCPA observed that in rejecting the claim, the Patent Office "characterized appellant's claims as mathematical exercises," applying the definition of algorithms used by the Supreme Court in *Flook* and *Benson*. *Id*. at 762. Judge Rich posited that the Patent Office's insistence on viewing computer-related claims as mathematical exercises "would suffice to remove all computer-arts inventions from the scope of § 101." *Id*. at 769.

241. *See* Julie E. Cohen & Mark A. Lemley, *Patent Scope and Innovation in the Software Industry*, 89 CAL. L. REV. 1, 9 (2001) ("The *Flook* Court noted that the only novel feature of the

unanimous in limiting *Benson* and *Flook* to mathematical algorithms and in applying the *Freeman* two-part test, as modified by *Walter*, to accommodate *Flook* for determining whether a claim was barred from statutory subject matter.

The struggle would continue as another front was opened by the Patent Office by its refusal to recognize living matter in the form of microorganisms as statutory subject matter.[242] Judge Rich would play a seminal role in the resolution of this question, as well as in the further assault on the Citadel.

IV. THE ASSAULT ON TWO FRONTS

Prior to the Supreme Court's decision in *Flook*, two cases involving microorganisms were appealed to the CCPA. In both cases, *In re Bergy*[243] (*Bergy I*) and *In re Chakrabarty*,[244] the court, in opinions by Judge Rich, reversed the Patent Office's refusal to recognize the patentability of microorganisms.[245] In *Bergy I*, the Patent Office had allowed method claims involving the use of a microorganism for the preparation of an antibiotic; however, it had rejected a claim directed to the microorganism itself on the ground that a living organism was not a statutory subject matter that would qualify as a "composition of matter" or a "manufacture."[246] In reversing the Patent Office, Judge Rich stated the rationale for the court's holding:

> We cannot agree with the board majority's view that § 101 "must be strictly construed." But even a "strict construction," whatever that may entail, fails to lead inexorably to the exclusion of a manufacture or composition of matter because it is alive. The statute makes no distinction between

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invention was a computer program, and that the program itself was not patentable subject matter.").

242. Edmund J. Sease, *From Microbes, To Corn Seeds, To Oysters, To Mice: Patentability of New Life Forms*, 38 DRAKE L. REV. 551, 560 (1989).

> The CCPA rejected the Patent Office's argument that a decision that living organisms were patentable subject matter overextended the patent laws (citing Chicken Little's cry that the sky was falling). The court also noted that prior patents had been routinely issued for bacteria, yeasts, and viruses in compositions which were arguably living subject matter. The court even chastised the Patent Office for supporting its contentions with 'bits and pieces from wholly unrelated plant-patent legislation from nearly half a century ago.'"

Id. (footnotes omitted).

243. 563 F.2d 1031 (C.C.P.A. 1977), *vacated and remanded sub nom.* Parker v. Bergy, 438 U.S. 902 (1978), *vacated as moot*, Diamond v. Chakrabarty, 444 U.S. 303 (1980).

244. 571 F.2d 40 (C.C.P.A. 1978), *vacated and remanded sub nom.* Parker v. Bergy, 438 U.S. 902 (1978), *aff'd sub nom.* Diamond v. Chakrabarty, 447 U.S. 303 (1980).

245. *Id.* at 43; *Bergy I*, 563 F.2d at 1038–39.

246. *Bergy I*, 563 F.2d at 1037.

> manufactures and compositions on the one hand and processes on the other. If the board is right in excluding products because there is life in them, then logic dictates that it should take the same position with regard to processes.[247]

In essence, while there might be a difference in opinion over the scope of § 101, the Patent Office, irrespective of scope, should consistently apply this section to all the categories of that section. *Bergy I* was not a clear-cut decision authorizing the patentability of all living matter. Judge Rich was joined by Chief Judge Markey in the decision; however, perhaps in order to get the third concurring vote of Judge Kashiwa (sitting by designation from the Court of Claims), the following qualification was included in his opinion:

> In other words, we are not deciding whether living things in general, or, at most, whether any living things other than microorganisms, are within § 101. These questions must be decided on a case-by-case basis and anything said herein is to be taken as said in the context of a discussion of the subject matter of claim 5 and § 101.[248]

At this point, rather uncharacteristically, Judge Rich seemed to take off his judicial robes by stating: "We think it is in the public interest to include microorganisms within the terms 'manufacture' and 'composition of matter' in § 101."[249] Judge Miller, in dissent, challenged this on the ground that it was the function of Congress and not the court to state public policy.[250] Judge Rich's statement can be justified on the basis of his consistently broad interpretation of § 101 as implementing the instrumentalist public policy of the Patent Clause of the Constitution. Judge Miller also argued that the Plant Protection Act of 1930[251] and the Plant Variety Protection Act of 1970[252] precluded protection of microorganisms under § 101.[253]

The Supreme Court in *Parker v. Bergy*[254] granted certiorari, then vacated and remanded the case to the CCPA for

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247. *Id*.

248. *Id*. at 1035.

249. *Id*. at 1038.

250. *Id*. at 1041–42.

251. 35 U.S.C. §§ 161–164 (2000).

252. 7 U.S.C. §§ 2321–2582 (2000).

253. Judge Rich did not even mention the Plant Variety Protection Act of 1970 and summarily dismissed the applicability of the Plant Protection Act of 1930: "We are not here concerned with interpretation of the Plant Patent Act as this court was in *In re Arzberger*, which simply held that that act did not encompass bacteria." *Bergy I*, 563 F.2d at 1039.

254. 438 U.S. 902 (1978).

reconsideration in light of its decision in *Flook*.[255] In the meantime, *In re Chakrabarty*[256] was decided on the basis of *Bergy I* as being controlling with respect to the microorganism claimed in *Chakrabarty*.[257]

With the remand of *Parker v. Bergy* for reconsideration, *In re Chakrabarty* was consolidated in *In re Bergy*[258] (*Bergy II*). *Bergy II* is one of Judge Rich's magisterial opinions because of its clarity, comprehensiveness, and, indeed, its audacity. The Supreme Court had already granted certiorari.[259] Thus the CCPA was provided with a rare opportunity to brief the Supreme Court directly. In retrospect, it might be noted that the "thin" opinions in *In re Benson* and *In re Flook* had been ignored by the Court, and the CCPA had seen the consequences of leaving the matter to the litigants and their amici, who had their own axes to grind.

Judge Rich began the opinion: "Clearly, our assigned task is first to determine the bearing of *Flook*, if any, on these two appeals."[260] He then proceeded to lecture, in particular, the Supreme Court on the fundamentals of patent law, starting with the Constitution's Patent Clause, which led to the Patent Act of 1952.[261] Judge Rich also provided a tutorial that he captioned *Anatomy of the Patent Statute*.[262] He justified this "primer" on the statute:

> The reason for our consideration of the statutory scheme in relation to its Constitutional purpose is that we have been directed to review our prior decisions in the light of *Flook* and we find in *Flook* an unfortunate and apparently unconscious, though clear, commingling of distinct statutory provisions which are conceptually unrelated, namely, those pertaining to the *categories* of inventions in § 101 which May be patentable and to the *conditions* for patentability demanded by the statute for inventions within the statutory categories, particularly the nonobviousness condition of § 103.[263]

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255. *See id.*

256. 571 F.2d 40 (C.C.P.A. 1978), *vacated and remanded sub nom.* Parker v. Bergy, 438 U.S. 902, (1978), *aff'd sub nom.* Diamond v. Chakrabarty, 447 U.S. 303 (1980).

257. *See Chakrabarty*, 447 U.S. at 306.

258. 596 F.2d 952 (C.C.P.A. 1979), *vacated as moot*, Diamond v. Chakrabarty, 444 U.S. 1028 (1980).

259. Diamond v. Bergy, 444 U.S. 924 (1979).

260. *Bergy II*, 596 F.2d at 958.

261. *See id.* at 958–59.

262. *Id.* at 959.

263. *Id.*

This admonition would appear to be directed to the majority, and Justice Stevens in particular in *Flook*, for interjecting questions of "novelty" and "invention" into § 101.[264] Judge Rich, now the professor, explained the interrelationship of § 101, § 102, and § 103 by analogy: there is a door for each of these sections and a separate key is required to open them in succession.[265] The first door that must be opened is the one to § 101, statutory subject matter. In Judge Rich's view, this should be a relatively easy door to open because of his broad interpretation of § 101 and the broadly defined categories of "invention."[266] Once this door is opened, the keys must fit to open the doors for "novelty" and "obviousness" before a patent can be issued.[267]

Judge Rich also took this opportunity to hurl a spear into the perceived machinations of the Patent Office, which had attempted to confuse the "anatomy" by requiring two keys to open the § 101 door:

> We have observed with regret that the briefs filed by the Solicitor General for Acting Commissioner Parker in *Parker v. Flook*, a case which, as the Court noted, "turns entirely on the proper construction of § 101," badly, and with a seeming sense of purpose, confuse the statutory-categories requirement of § 101 with a requirement for the existence of "invention."[268]

After setting the record straight with his *Anatomy*, Judge Rich turned to the task at hand to re-decide these appeals "in the light of Flook."[269] In Judge Rich's mind, *Flook* undoubtedly cast

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264. Refer to text accompanying notes 201–11 *supra*.

265. *Bergy II*, 596 F.2d at 960.

266. *Id*.

267. *See id.* at 960–62 (setting forth the door analogy).

268. *Id.* at 962. This was not the first time that the Patent Office had been chastised by the CCPA for confusing this issue. In *In re Freeman*, where Chief Judge Markey did not mince words:

> Considerations of novelty or obviousness are of no effect whatever in determining whether particular claims define statutory subject matter under 35 U.S.C. § 101.
>
> It deserves the need for clarity in the law, and unjustly skews the judicial process, when the issue presented and considered below is muddied by disingenuous presentations relating to new and different issues, and without open admission of that relationship. If the desire to "win" (though the law may lose) be so overwhelming as to impel injection of new and different issues at the appellate level, the candor rightfully expected of all lawyers, government and private, requires that the injection be labeled as such.

573 F.2d 1237, 1243 n.2.

269. *Bergy II*, 596 F.2d at 964.

more of a shadow than any light. The only commonality among the cases he would admit to were that they involved § 101.[270]

Judge Rich then turned to a matter of "principle," which had to be a source of irritation to him and others. This was Justice Stevens's metaphysical view espoused in *Flook*. As put by Judge Rich:

> Another principle stated in *Flook* is that a "mathematical algorithm" or formula is like a law of nature in that it is one of the "'basic tools of scientific and technological work'" and as such must be *deemed* to be "a familiar part of the prior art," even when it was not familiar, was not prior, was discovered by the applicant for patent, was novel at the time he discovered it, and was useful. This gives to the term "prior art," which is a *very* important term of art in patent law, particularly in the application of § 103, an entirely new dimension with consequences of unforeseeable magnitude.[271]

Then the final shot: "The potential for great harm to incentives of the patent system is apparent."[272] This arrow, it would seem, belatedly hit the mark, as will become apparent in Justice Stevens's dissent in *Diehr*.[273]

With some audacity, Judge Rich disposed of the remand: "To conclude on the light *Flook* sheds on these cases, very simply, for the reasons we have stated, we find none."[274] But what a marvelous teaching opportunity it provided.[275]

The opinion then continued to track the reasoning of *Bergy I*, after first discussing the *Bergy* and *Chakrabarty* microbiological inventions in detail.[276] He concluded the opinion with a discussion of the relevance of the Plant Patent Act of 1930[277] and the Plant Variety Protection Act of 1970.[278] After going extensively into the legislative history and purpose behind these enactments, he

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270. *Id.*

271. *Id.* at 965 (footnote omitted). As succinctly phrased by Professor Chisum: "[*Flook*] added an aberrational corollary—treatment of what an inventor had discovered as though it were known prior art. That aberration was so basically antithetical to patent law principles that it would have to be purged." Chisum, *supra* note 9, at 994–95.

272. *Bergy II*, 596 F.2d at 966.

273. Refer to text accompanying notes 337–41 *supra*.

274. *Bergy II*, 596 F.2d at 967.

275. As stated by Mr. Swain: "Giles Sutherland Rich had a wonderful life. To anyone who had any personal contact with him, it was obvious that he loved what he was doing. What he loved the most was teaching people about the patent law." Swain, *One Thing*, *supra* note 1, at 97.

276. *See Bergy II*, 596 F.2d at 967–71.

277. 35 U.S.C. §§ 161–64 (2000).

278. 7 U.S.C. §§ 2321–2582 (2000).

concluded that neither of the Acts was applicable to the issue of whether a microorganism itself constitutes patentable subject matter.[279]

Judge Rich took particular umbrage at the Patent Office's "suggestion" that the court was "'legislating,' [and] deciding these cases on [its] own notions of public policy, *determination* of which should be left to Congress, and that [the court] should not reverse these two board decisions without a positive 'signal' from Congress that it is in accord with its desires."[280]

Of particular importance, after a decade of skirmishing with the Patent Office, Judge Rich dredged from the legislative history of the 1952 Patent Act a metaphor that hits the mark with respect to how Congress intended § 101 to be interpreted: "If we had any doubt about the propriety of giving those words a broad interpretation, it would be dispelled by the identical statement in the House and Senate reports accompanying the 1952 reenactment . . . that 'a machine, or manufacture . . . may include *anything under the sun that is made by man*.'"[281] He then disposed, as the arrow hit, "[a]s for 'wholesale judicious legislation', the assertion [by the Patent Office] falls by the weight of its own extremism."[282]

In concluding his opinion, Judge Rich again turned to the "clear and certain signal" metaphor from *Deepsouth* so heavily relied upon by the Patent Office and retorted: "We think the Supreme Court gave us our 'signal' in *United States v. Dubilier Condenser Corp.* . . . where it said: 'We should not read into the patent laws limitations and conditions which the Legislature has not expressed.'"[283] The "*signal*" from *Dubilier* coupled with the "*anything under the sun*" legislative history proved to be powerful weapons in the arsenal of Judge Rich and the CCPA—not only in this battle over microorganisms, but also in the war against computer-related inventions.

To the surprise of many, the Supreme Court in *Diamond v. Chakrabarty*[284] affirmed the CCPA, holding that microorganisms, even though living matter, were patentable subject matter under § 101 either as a composition of matter or a manufacture.[285] The

279. *See Bergy II*, 596 F.2d at 984.

280. *Id.* at 986–87.

281. *Id.* at 987 (footnote omitted).

282. *Id.*

283. *Id.*

284. 447 U.S. 303, 318 (1980). The *Bergy* appeal had been vacated as moot by the Supreme Court in *Diamond v. Chakrabarty*, 444 U.S. 1028 (1980), leaving Chakrabarty as the sole party on the merits.

285. *Chakrabarty*, 447 U.S. at 318.

majority opinion was written by Chief Justice Burger, who was joined by Justices Rehnquist and Stewart (all three of whom had dissented in *Flook*).[286] Perhaps even more surprisingly, Justice Stevens, who had written the majority opinion in *Flook* and seemed taken to task by Judge Rich in *Bergy II*, quietly joined the majority along with Justice Blackmun.[287] Justices Brennan, Marshall, Powell, and White dissented and continued to harbor a narrow view of patentable subject matter,[288] as they had in the preceding cases.

Chakrabarty is a landmark decision for a variety of reasons. Certainly it opened the door that might otherwise constitute a Citadel against the patentability of bio-tech inventions. Even though this case was supposedly limited to microorganisms, amidst some controversy, patentability was quickly expanded to include animals and plants.[289] Another significant aspect of *Chakrabarty* is the change in philosophy of the Court from *Deepsouth-Benson-Flook*'s requirement of a "clear and certain signal from Congress" to the broad permissibility of "anything under the sun made by man," as introduced by Judge Rich in *Bergy II*.[290]

Chief Justice Burger's opinion was as concise as Judge Rich's was comprehensive. He went directly to the point: "The question before us in this case is a narrow one of statutory interpretation requiring us to construe 35 U.S.C. § 101 . . . ."[291] Chief Justice Burger then recited maxims of statutory construction that proclaim the words of a statute should be given their ordinary meaning and quoted from *United States v. Dubilier*, as did Judge Rich.[292] He then referred to dictionary definitions and concluded in interpreting Congressional intent: "In choosing such expansive terms as 'manufacture' and 'composition of matter,' modified by the comprehensive 'any,' Congress plainly contemplated that the patent laws would be given a wide scope."[293] Buttressing this

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286. *Id*. at 304; *see* Parker v. Flook, 437 U.S. 584, 598–600 (1978) (Stewart, J., dissenting).

287. *Chakrabarty*, 447 U.S. at 305.

288. *Id*. at 318–22. (Brennan, J., dissenting).

289. *See* PAUL GOLDSTEIN, COPYRIGHT, PATENT, TRADEMARK AND RELATED STATE DOCTRINES: CASES AND MATERIALS ON THE LAW OF INTELLECTUAL PROPERTY 395–99 (4th ed. 1999) (providing a concise summary of the patentability of plants and animals); *see also* J.E.M. AG Supply, Inc. v. Pioneer Hi-Bred Int'l, Inc., 534 U.S. 124, 145–46 (2001) (affirming the patentability of plants under 35 U.S.C. § 101, consistent with Patent Office practice).

290. *Bergy II*, 596 F.2d at 961.

291. 447 U.S. at 307.

292. *Id*. at 308.

293. *Id*.

legislative intent from the plain words of the statute, the Chief Justice took the bait laid by Judge Rich to see this intent *expressis verbis* in "anything under the sun that is made by man," gleaned from the Committee Reports.[294] To make clear that this did not lead to an unlimited definition, he restated the exceptions to statutory subject matter as being "laws of nature, physical phenomenon, and abstract ideas."[295]

Chief Justice Burger then dealt with two arguments raised by the Patent Office. First he found that neither the Plant Patent Act of 1930 nor the Plant Variety Protection Act of 1970 precluded living matter from being encompassed by § 101.[296] The second argument was that "micro-organisms cannot qualify as patentable subject matter until Congress expressly authorized such protection."[297] Chief Justice Burger rejected a broad interpretation of the statement in *Flook* that the judiciary "must proceed cautiously when . . . asked to extend patent rights into areas wholly unforeseen by Congress."[298] In short, this was, as the Chief Justice had said at the outset, a simple case of statutory construction.[299] Congress had intended a broad definition of statutory subject matter and the Court was merely performing its constitutional prerogative "in construing the language Congress has employed."[300] The "clear and certain signal" metaphor of *Deepsouth-Benson-Flook* had lost its sting. The new battle cry was "anything under the sun."

Whether this perceived change of philosophy by the Supreme Court (albeit by only one vote) would be felt on the other § 101 front—computer-related inventions—remained to be seen. This issue would not go away as long as the Patent Office and the CCPA were at loggerheads, and neither Congress nor the Supreme Court would act as a peacemaker. Thus, after this diversion on a different front, albeit an important one, the question remained whether this could be translated into the main assault against the Citadel.

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294. *Id.* at 309.

295. *Id.*

296. *See id.* at 310–14. The Court first discusses the significance of the microorganism's manufacture by man-made means. *Id.* at 310–13. It then discounts the petitioner's argument that the 1930 Plant Patent Act, which afforded patent protection to certain asexually reproduced plants, and the 1970 Plant Variety Protection Act, which authorized protection for certain sexually reproduced plants, excludes living things. *Id.* The Court ultimately held that a live, human-made microorganism is patentable subject matter under § 101. *Id.* at 313–14.

297. *Id.* at 314.

298. *Id.* at 314–15 (quoting *Parker v. Flook*, 437 U.S. 584, 596 (1978)).

299. *Id.* at 307.

300. *Id.* at 315.

In the summer of 1979, after the CCPA had decided *Bergy II*, the court decided two appeals involving computer-related inventions—*In re Bradley*[301] and *In re Diehr*.[302] Judge Rich's opinion in *In re Bradley* was discussed above.[303] *In re Diehr* was decided a month later with Judge Rich writing the opinion.[304] The claims in *Diehr* were for a "method of operating a rubber-molding press for precision molding compounds with the aid of a digital computer."[305] A computer program was used to solve the "Arrhenius equation," which was a well-known equation used for calculating the cure time in rubber molding processes.[306] The Patent Office had rejected the claims because they were not directed to patentable subject matter on the basis of *Benson* and *Flook*.[307] In his opinion, Judge Rich wanted to make it conclusively clear to the Patent Office, who persisted in this line of reasoning, that "any rejection which is based solely on the determination that a computer or computer program is involved is insupportable because it is overly broad and must be reversed as being *without basis in the law*."[308] He reiterated that *Benson* and *Flook* were limited to mathematical algorithms, and that the underlying reason for this was that "an abstract principle or idea, or a scientific truth, or its equivalent mathematical expression is nonstatutory."[309] However, beyond that, such "long standing precedent" did not preclude the application of a computer or computer program in a process claim.[310]

Judge Rich again tried to put to rest the "point of novelty" fallacy: "Considerations of novelty and obviousness have no bearing on compliance with § 101," citing his opinion in *Bergy II*.[311] He then applied the two-part *Freeman* test: As the first part was satisfied because the claims included mathematical calculations, the second part of the test must be applied—"whether the claim merely recites a mathematical formula or

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301. 600 F.2d 807 (C.C.P.A. 1979), *aff'd by an equally divided Court sub nom.* Diamond v. Bradley, 450 U.S. 381 (1981).

302. 602 F.2d 982 (C.C.P.A. 1979), *aff'd sub nom.* Diamond v. Diehr, 450 U.S. 175 (1981).

303. Refer to text accompanying notes 169–77 *supra*.

304. *See Diehr*, 602 F.2d at 982.

305. *Id.* at 983 (claim 1).

306. *Id.* at 983 & n.2.

307. *Id.* at 983.

308. *Id.* at 985 (emphasis added).

309. *Id.*

310. *Id.* at 985–86.

311. *Id.* at 987. Judge Rich concluded his opinion with: "The board erred in ignoring all of the old or conventional steps in the claims. Novelty considerations have no bearing on whether claims define statutory subject matter under § 101." *Id.* at 989.

method of calculation as in *Benson* and *Flook*."[312] He concluded that the claim does not—because it is "impermissible" for the Patent Office "[to] separate[] the claim into old and new elements, ignoring the presence of the old elements in its analysis."[313] As the calculations here were "intimately entwined with the rubber molding process," the claimed process was *not* "merely generating a new number by a calculation."[314]

The victory in *Flook* seemed to be a hollow one for the Patent Office, as the CCPA relentlessly limited both *Benson* and *Flook* to mathematical algorithms and often, if not always, found an application of that algorithm.[315] The post-solution application of "opening the press automatically when a said comparison indicates equivalence" was "significant," while *Flook*'s "adjusting an alarm limit" was not.[316] It was becoming increasingly apparent that the skill of the claim drafter may prove to be more than mere form and bear upon the substance of whether or not the appropriate key to the § 101 door was found.

The post-*Chakrabarty* Supreme Court affirmed both *In re Bradley* and *In re Diehr* in *Diamond v. Bradley*[317] (by an equally divided court with Chief Justice Burger not participating) and *Diamond v. Diehr*[318] (five to four, in an opinion by Justice Rehnquist joined by the Chief Justice). Accordingly, it would seem reasonably certain to surmise that the Chief Justice would have sided with the four Justices who found statutory subject matter under § 101 in *Bradley* had he participated.

Diamond v. Diehr was decided in the term after *Chakrabarty*, but it was obvious that the Supreme Court had changed its policy with respect to computer-related inventions. After all, there had been a strong dissent in *Chakrabarty*, which included Justices Brennan, White, Marshall, and Powell, who had consistently voted against protecting computer-related inventions.[319] On the other side, only three Justices (Rehnquist, Stewart, and Chief Justice Burger) consistently sided with a

312. *Id*. at 988 (quoting *In re* Johnston, 589 F.2d 1070, 1077 (1979)).

313. *Id*.

314. *Id.* at 989.

315. *See, e.g.*, *In re* Walter, 618 F.2d 758, 770–71 (C.C.P.A. 1980) (denying applicant's claims for an improved mathematical method for cross-correlation by distinguishing *In re Diehr*).

316. *See Diehr*, 602 F.2d at 984, 986; Parker v. Flook, 437 U.S. 584, 587 (1978).

317. 450 U.S. 381 (1981).

318. 450 U.S. 175 (1981).

319. *See* Diamond v. Chakrabarty, 447 U.S. 303, 318–22 (1980) (Brennan, J., dissenting).

broad construction of § 101.[320] Justices Stevens and Blackmun had been in the majority in *Flook* but were also in the majority in *Chakrabarty*.[321] How they would vote in *Bradley* and *Diehr* was uncertain. If there was a surprise in *Diehr*, it was that Justices White and Powell joined the majority when they had consistently been opposed to an expansive treatment of patentable subject matter prior to that.[322] Nonetheless, in the opinion written by Justice Rehnquist, serious damage was inflicted to the *Benson/Flook* Citadel over a strong dissent by Justice Stevens, who had authored *Flook*.

Justice Rehnquist approached the case as one of statutory construction and, by reference to *Chakrabarty*, reinforced the broad policy with respect to statutory subject matter by quoting from *Chakrabarty*.[323] He then resorted to the legislative history of § 101 and repeated the metaphor: "Congress intended statutory subject matter to 'include anything under the sun that is made by man.'"[324] The die thus seemed to be cast that a broad interpretation of "process" would follow. However, Justice Rehnquist then returned to *Benson*, which had recited the process definition from *Cochrane v. Deener* to the effect that "[t]ransformation and reduction of an article 'to a different state or thing' is the clue to the patentability of a process claim that

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320. *See id*. at 303–18.

321. *Id*. at 303; *cf. Flook*, 437 U.S. at 584.

322. *Chakrabarty*, 447 U.S. at 320 (Brennan, J., dissenting) (joining Justice Brennan's dissent, Justices Powell and White would refuse to extend patent subject matter to cover living organisms); *see also Flook*, 437 U.S. at 590, 594 (rejecting the notion that post-solution activity can render an unpatentable formula patentable, Justices White and Powell jointed the majority); Deepsouth Packing Co. v. Laitram Corp., 406 U.S. 518, 528 (1972) (writing for the majority, Justice White refused to extend patentable subject matter to cover parts that could be assembled in foreign countries to make U.S.-patented machines); Gottschalk v. Benson, 409 U.S. 63, 71–72 (1972) (refusing to extend patentable subject matter to cover formulas that convert binary numerals, Justice White joined the majority but Justice Powell took no part in the decision).

323. Diamond v. Diehr, 450 U.S. 175, 182 (1981) (quoting United States v. Dubilier Condenser Corp., 289 U.S. 178, 199 (1933)).

324. *Id*. Professor Samuelson would reduce the relied-upon legislative intent to "dicta at most":

> Twice in the past decade, the Supreme Court has arguably opened the door to the broadest possible interpretation of patentable subject matter when it has spoken of Congress as having intended to make patentable "'anything under the sun that is made by man.'" However, these statements are dicta at most, far broader than the actual holdings in the cases would warrant, and both cases were decided by five-to-four votes.

Samuelson, Benson *Revisited*, *supra* note 9, at 1131 (footnote omitted). However categorized and however close the vote in 1981, the symbolic importance of "anything under the sun" cannot now be ignored in light of the unambiguous change in the philosophy of at least a majority of the Court with respect to statutory subject matter and its role in interpreting the scope of that subject matter.

does not include particular machines."[325] He then resolved the current controversy narrowly by holding that it was indisputable that the present claims "involve the transformation of an article, in this case raw, uncured, synthetic rubber, into a different state or thing."[326] This did not resolve the far more important issue with respect to computer-related inventions of whether a physical transformation is necessary to satisfy § 101. The resolution of this issue was left to the Court of Appeals for the Federal Circuit, which will be considered next in Part V.[327]

Justice Rehnquist then distinguished *Benson* and *Flook*, where the preemption of the algorithm itself had been the paramount problem, while the inventors here "seek only to foreclose from others the use of that equation in conjunction with all of the other steps in their claimed process."[328] Then, in apparent agreement with Judge Rich's reading of prior Supreme Court cases,[329] he stated: "Our earlier opinions lend support to our present conclusion that a claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula, computer program, or digital computer."[330] Here, that portion of the Citadel consistently relied upon by the Patent Office—that *Benson* and *Flook* precluded the patentability of all computer-related inventions—was brought down.[331]

Justice Rehnquist then took another page from Judge Rich's book to lay to rest another hydra-headed heresy practiced by the Patent Office:

> In determining the eligibility of a respondents' claimed process for patent protection under § 101, their claims must be considered as a whole. It is inappropriate to dissect the claims into old and new elements and then to ignore the

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325. *Diehr*, 450 U.S. at 184 (quoting from *Benson*, 409 U.S. at 70).

326. *Id*.

327. Refer to notes 388–403 *supra* and accompanying text (discussing whether a physical transformation is necessary to satisfy § 101).

328. *Id*. at 187.

329. In his prior opinions, Judge Rich seemingly challenges the Supreme Court to direct otherwise:

> Until the Court directs us otherwise, we continue to disagree with the notion that a claim may be rejected as nonstatutory merely because it Involves a computer program or is computer-related. As far as we are concerned, claims may be rejected under § 101 because they attempt to embrace only a mathematical formula, mathematical algorithm, or method of calculation, but not merely because they define inventions having something to do with a computer.

In re Diehr, 602 F.2d 982, 986–87 (C.C.P.A. 1979).

330. *Diehr*, 450 U.S. at 187.

331. *Id*. at 185–88.

> presence of the old elements in the analysis. . . . The "novelty" of any element or steps in a process, or even of the process itself, is of no relevance in determining whether the subject matter or claim falls within the § 101 categories of possibly patentable subject matter.[332]

This clearly adopts en masse Judge Rich's *Anatomy of the Patent Statute* from *Bergy II*; indeed, Justice Rehnquist quotes Judge Rich's language: "The question therefore of whether a particular invention is novel is 'wholly apart from whether the invention falls into a category of statutory subject matter.'"[333]

In short, the majority in *Diehr* rejected two important bastions of the strong version of the Citadel: (1) that all computer-related inventions are unpatentable, and (2) even if (1) cannot be sustained, that claims may be dissected and rejected as nonstatutory if the novel step or element is nonstatutory.[334] The question remaining, however, was whether the remnants of the Citadel would bar processes that did not involve a physical transformation or, stated another way, whether the transformation could be merely symbolic, provided the end-use was more than an "insignificant" one. As Justice Rehnquist made clear, one of the underlying reasons for the result in *Flook* was to preclude a skilled claim drafter from avoiding a § 101 rejection merely by tacking on a nonessential and obvious end-use.[335] However, as the dissent in *Diehr* points out, drafting skill still becomes highly relevant because there seems to be little question that the *Flook* claims could be drafted along the lines of the *Diehr* claims and be sustained according to the majority's decision.[336]

Justice Stevens filed a strong, and somewhat bitter, dissenting opinion in *Diehr*. He began his opinion by accusing the majority of misreading the present patent application and then compounding this error by "ignoring the critical distinction between the character of the subject matter that the inventor claims to be novel—the § 101 issue—and the question whether that subject matter is in fact novel—the § 102 issue."[337] He thus rejected Judge Rich's *Anatomy of the Patent Statute*, as adopted by the majority. His interpretation appears to inject a subjective

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332. *Id.* at 188–89.

333. *Id.* at 190 (quoting *Bergy II*, 596 F.2d 952, 961 (C.C.P.A. 1979)).

334. *Id.* at 191–93.

335. *Id.* at 191–92.

336. *See id.* at 210 n.32 (Stevens, J., dissenting) (quoting claims for the *Flook* invention redrafted in *Diehr* format from a law review article); David A. Blumenthal & Bruce D. Ritter, *Statutory or Non-Statutory?: An Analysis of the Patentability of Computer Related Inventions*, 62 J. PAT. OFF. SOC'Y 454, 506 (1980).

337. *Diehr*, 450 U.S. at 194 (Stevens, J., dissenting).

element into claim interpretation. As a general principle, Justice Stevens's proposition would lead to rather curious results. Are claims to clearly statutory subject matter—a mouse trap—to be rejected on the basis of § 101 if, in fact, the machine is not novel, even though the inventor claims it to be so? Nonetheless, it is not apparent whether the insistence upon this construction of § 101 resulted in the defection of Justices White and Powell, who had previously joined in Stevens's *Flook* opinion.

Justice Stevens then proceeded to an extended and quite illuminating historical analysis of the demise of the "function of machine" and "mental step" doctrines and the redefinition of process, all of which had led to the greatly expanded scope of § 101.[338] After this review and the reaction of the CCPA to *Benson* and *Flook*, Justice Stevens concluded: "In my judgment, this reading of *Flook*—although entirely consistent with the lower court's expansive approach to § 101 during the last 12 years—trivializes the holding of *Flook*, the principle that underlies *Benson*, and the settled line of authority reviewed in those opinions."[339] Indeed, such trivialization of the holding in *Flook* and the principle underlying *Benson* may be *Diehr*'s most important legacy. Thus, the "settled line of authority" continues in vitality to the extent that laws of nature, natural phenomena, and abstract ideas remain nonstatutory subject matter.

In conclusion, Justice Stevens turned to policy. He repeated the truism more honored in form than in substance: "The broad question whether computer programs should be given patent protection involves policy considerations that this Court is not authorized to address."[340] However, he addressed policy as solely involving "judicial considerations," and advocated that the Court provide:

> (1) an unequivocal holding that no program-related invention is patentable process under § 101 unless it makes a contribution to the art that is not dependant entirely on the utilization of a computer, and (2) an unequivocal explanation that term "algorithm" as used in this case, as in *Benson* and *Flook*, is synonymous with the term "computer program."[341]

Reasonable minds may differ whether these postulates or those of the majority would better implement the instrumental philosophy of the Constitution's Patent Clause. However, had

338. *See id.* at 195–201 (Stevens, J., dissenting).

339. *Id.* at 205 (Stevens, J., dissenting).

340. *Id.* at 216–17 (Stevens, J., dissenting).

341. *Id.* at 219 (Stevens, J., dissenting).

Justice Stevens been able to hold either of the two defectors from his *Flook* majority, the Citadel would have been considerably expanded beyond the original walls of *Benson* and *Flook*.

V. THE ASSAULT CONTINUES

The ongoing battle between the Patent Office and the CCPA over the protection of computer-related inventions had stretched over a decade. The battle ended seemingly with the Supreme Court's decision in *Diehr*, except for a few pockets of resistance. The Supreme Court's decision in *Diehr* was not the only factor that led to the cessation of hostilities. Other factors would likely include: the entry into the Reagan era, with an administration more receptive to intellectual property rights; the creation of the Court of Appeals for the Federal Circuit in late 1982;[342] and the Supreme Court's adoption of an essentially hands-off policy with respect to the CAFC. In addition, over this period of time the Patent Office was developing increased competency and resources for examining computer-related patent applications.[343]

The problem remained of separating the claiming of a mathematical algorithm per se from the claiming of an application of that algorithm. *Diehr* may have limited, but certainly did not overrule, *Benson* and *Flook*. As previously discussed, based upon *Benson*, the CCPA had fashioned the *Freeman* test—first inquiring whether a mathematical algorithm was being claimed, and second, if so, whether the claim preempted the algorithm.[344] This test proved easier to state than to apply.[345] To accommodate the holding in *Flook* that a total

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342. *See* Maier & Mattson, *supra* note 9, at 321.

> [A] new era had begun with the election of Ronald Reagan as President of the United States. The Reagan Administration ended the era of antitrust ascendency and recognized that innovation itself was one of the most import American "products." Thus, a strong patent system was an important component of Reagan's policy. To strengthen the patent system and provide national uniformity in patent law, the Reagan Administration quickly began the work of establishing the Court of Appeals for the Federal Circuit.

Id. (footnotes omitted).

343. As summarized by Professor Samuelson: "This change seems to be in the Patent Office's policy and practice regarding program-related inventions. After *Diehr*, the Patent Office ceased to resist issuing patents for computer program-related inventions. It now only rarely rejects applications pertaining to those inventions on subject matter grounds." Samuelson, Benson *Revisited*, *supra* note 9, at 1093–94; *see also* Maier & Mattson, *supra* note 9, at 323 (contending that the delays in the filing of computer-related applications brought about by *Benson* and *Flook* permitted the Patent Office to acquire adequate resources to examine such applications).

344. Refer to notes 223–24 *supra* and accompanying text.

345. *See In re* Maucorps, 609 F.2d 481, 485–86 (C.C.P.A. 1979) (holding that a computer system for "optimizing the organization of sales representative in a business"

preemption was not required, the CCPA in *In re Walter*,[346] as discussed above,[347] modified the second part of the test in an attempt to separate the algorithm from its application.[348] This modification would require "that the mathematical algorithm [be] implemented in a specific matter to define structural relationships between the physical elements of the claim (in apparatus claims) or to refine or limit claim steps (in process claims)."[349] The *Freeman-Walter* test also proved to be fickle.[350]

In the summer of 1982, just before the creation of the CAFC, the CCPA, in *In re Abele*,[351] was faced with the issue of whether it was strictly required that the mathematical algorithm "define structural relations between the physical elements" or "refine or limit" process steps.[352] The court, in an opinion by Judge Nies, unanimously held "no," stating: "Rather, *Walter* should be read as requiring no more than the algorithm be 'applied in any manner to physical elements or process steps,' provided that its application is circumscribed by more than a field of use limitation or non-essential post-solution activity."[353] The court rather cryptically added: "The goal [of the two-part test] is to answer the question 'What did applicants' invent?'"[354] Equally cryptically, the court quoted from *In re Sarkar*,[355] decided in 1978: "[E]ach

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was not patentable subject matter as the claims would "wholly preempt the recited algorithms"); *In re* Sarkar, 588 F.2d 1330, 1330, 1332 (C.C.P.A. 1978) (holding that a method of "mathematically modeling an open channel—a natural stream or artificial waterway"—is not patentable subject matter because the steps involved collecting data (citing *In re* Christensen, 478 F.2d 1392, 1394 (C.C.P.A. 1973)); *cf. In re* Toma, 575 F.2d 872, 874, 877 (C.C.P.A. 1978) (holding that "a method of operating a digital computer to translate from a source natural language, e.g., Russian, to a target natural language, e.g., English," was patentable subject matter as not involving a "procedure for solving a mathematical problem").

346. 618 F.2d 758 (C.C.P.A. 1980).

347. Refer to note 174 *infra* and accompanying text (declaring that the statutory subject matter issue was governed by Judge Rich's two-part test from *In re Freeman*).

348. *Walter*, 618 F.2d at 767.

349. *Id*.

350. In *In re Taner*, the Patent Office relied upon *In re Walter* to reject claims directed to a method of seismic exploration. 681 F.2d 787 (C.C.P.A. 1982). The court found that the claims satisfied § 101, stating:

> The board's reliance here on *In re Walter* is misplaced. Though *Walter* involved processing of seismic data, the claims there were drawn to "an improved method of correlating" and to "an improved method of cross-correlating," i.e., not to "methods of or apparatus for seismic processing . . . (but rather) to improved mathematical methods of interpreting the results of seismic prospecting."

Id. (citations omitted) (alteration in original).

351. 684 F.2d 902 (C.C.P.A. 1982).

352. *Id.* at 906–07.

353. *Id.* at 907.

354. *Id*.

355. 588 F.2d 1330 (C.C.P.A. 1978).

invention must be evaluated as claimed; yet semantogenic considerations preclude a determination based solely on words appearing in the claims. In the final analysis under § 101, the claimed invention, as a whole, must be evaluated for what it is."[356] It is not apparent, at least to me, whether the court means that there is some synergistic "semantogenic" magic in the claims as a whole compared to the individual words that make up the whole.[357]

With this supposed clarification provided by the *Freeman-Walter-Abele* test, some consistency might be expected in its application by the Patent Office and by the court against the challenges of creative patent attorneys seeking to advance the assault against restrictions on the protectability of various types of computer-related inventions. This proved to be an unfulfilled expectation over the next decade following the *Abele* decision.[358]

Also, just before the creation of the CAFC, the CCPA decided in *In re Meyer*[359] that a computer-implemented neurological examination procedure claimed in apparatus and method format did not fall within § 101 because the claims were to "a mathematical algorithm representing a mental process that has not been applied to physical elements or process steps."[360] Similarly, after a lapse of seven years, the CAFC in 1989 held in *In re Grams*[361] that "[a] method of diagnosing an abnormal condition in an individual" was non-statutory.[362] Judge Archer asked the question raised in *Abele*, quoted the "semantogenic considerations" claims "as a whole" language and answered the question "no," reasoning by analogy to find the claims here closer to *Meyer* than to *Abele*.[363]

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356. *Abele*, 684 F.2d at 907 (quoting from *Sarkar*, 588 F.2d at 1333) (emphasis added). The opinion in *Sarkar* was written by Chief Judge Markey, who seems to have coined the term "semantogenic." Refer to note 357 *infra*.

357. I was unable to find the word "semantogenic" in any dictionary I had access to in hard copy or on the Internet. I turned to our library staff for help. I was advised by Assistant Librarian Kyle Passmore that she also could not find a definition, but she suggested this might be the combination of "semantic" plus the suffix "genic." If this was what Chief Judge Markey in *Sarkar* had in mind, then the definition of "semantogenic" might be something like: "semantic . . . Of or relating to meaning, especially meaning in language," THE AMERICAN HERITAGE DICTIONARY OF THE ENGLISH LANGUAGE 1581 (4th ed. 2000), plus the suffix "genic . . . Producing; generating . . . ." *Id.* at 733. Thus, "meaning producing" or "generated from the meaning" may be as close as we can get.

358. *See* Chisum, *supra* note 9, at 1003 ("The two-step analysis is simply not helpful, and nowhere is this lack of helpfulness better illustrated than in the facts and holdings of *Abele* itself.").

359. 688 F.2d 789 (C.C.P.A. 1982).

360. *Id.* at 796.

361. 888 F.2d 835 (Fed. Cir. 1989).

362. *Id.* at 836 (claim 1).

363. *Id.* at 840–41.

Four days after the CAFC announced its ruling in *Grams*, a different CAFC panel decided *In re Iwahashi*,[364] with Judge Rich writing the opinion. The Patent Office had rejected a claim for "[a]n auto correlation unit for providing auto correlation coefficients for use as feature parameters in pattern recognition."[365] as directed to nonstatutory subject matter, arguing that this claim "encompasses any and every means for performing the functions recited therein."[366] Judge Rich, rather summarily, disposed of the § 101 rejection referring to the *Freeman-Walter* Test and then, citing *Abele*, concluded:

> The claim as a whole certainly defines apparatus in the form of a combination of interrelated means and we cannot discern any logical reason why it should not be deemed statutory subject matter as either a machine or a manufacture as specified in § 101. The fact that the apparatus operates according to an algorithm does not make it nonstatutory.[367]

In apparent contradiction to the approach of Judge Archer in *Grams*, Judge Rich maintained that it is what the claims say: "The above-listed line of CCPA cases held some claims statutory and other claims nonstatutory, depending entirely on what they said. We have to do the same here."[368]

The Patent Office's argument that "the claim 'encompasses any and every means for performing the functions recited therein'" was also rejected by Judge Rich.[369] He reasoned that, even though all of the elements of the claims are in means-plus-function format (except for one element reciting "a read-only memory"), such elements are controlled by § 112, paragraph 6, which limits them to "the corresponding structure, material, or acts described in the specification and equivalents thereof."[370] In the only footnote in the case, Judge Rich took pains to clarify a

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364. 888 F.2d 1370 (Fed. Cir. 1989); *see* Richard H. Stern, *Tales from the Algorithm War:* Benson *to* Iwahashi, *It's Deja Vu All Over Again*, 18 AM. INTELL. PROP. L. ASS'N Q.J. 371, 381–86 (1991) (discussing implications of *Iwahashi*).

365. *Id.* at 1373 (claim 1).

366. *Id.* at 1375.

367. *Id.*

368. *Id.* at 1374.

369. *Id.* at 1375.

370. *Id.* 35 U.S.C. § 112 para. 6 reads:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

35 U.S.C. § 112 (2000).

sentence from *In re Sweet*,[371] decided by the CCPA in 1968, which reads: "[A] recitation of 'means' for performing a function is interpreted broadly to cover all means capable of performing the stated function and *is not limited to the particular structure which the application may disclose*."[372] He stated that what should have been said is that such means plus function covers those "means disclosed and *all equivalents* thereof."[373] He then concluded: "Section 112 ¶ 6 cannot be ignored when a claim is before the [Patent Office] any more than when it is before the courts in an issued patent."[374]

The difficulty of applying *Freeman-Walter-Abele* in any consistent manner is further illustrated by *Arrhythmia Research Technology, Inc. v. Corazonix Corp.*,[375] decided in 1992. The claimed invention was a method and apparatus "for analyzing electrocardiograph signals to determine the presence or absence of a predetermined level of high frequency energy in the late QRS signal."[376] The district court granted summary judgment on the basis that these claims did not qualify as statutory subject matter.[377] The CAFC reversed and, contrary to *Meyer* and *Grams*, found that this diagnostic technique satisfied § 101.[378] The court applied the *Freeman-Walter-Abele* test and concluded with respect to the method claims: "These claimed steps of 'converting', 'applying', 'determining', and 'comparing' are physical process steps that transform one physical, electrical signal into another. The view that 'there is nothing necessarily physical about "signals"' is incorrect."[379] The apparatus claims were found to be statutory as defining "'a combination of interrelated means' for performing specified functions."[380] Judge Rader, concurring in result, was bolder. He would cut the "Gordian knot" imposed by the two-part test.[381] Indeed, he declared that the Supreme Court had already "cut the knot by strictly limiting *Benson*."[382] He reasoned that the focus should be

371. 393 F.2d 837 (C.C.P.A. 1968).

372. *Iwahashi*, 888 F.2d at 1375 n.1 (quoting *Sweet*, 393 F.2d at 841–42, and adding emphasis).

373. *Id*.

374. *Id*.

375. 958 F.2d 1053 (Fed. Cir. 1992).

376. *Id*. at 1055 (claims 1 and 7).

377. *Id*. at 1054 & n.1.

378. *Id*. at 1053, 1059.

379. *Id*. at 1059 (citing *In re* Taner, 681 F.2d 787, 790 (C.C.P.A. 1982)).

380. *Id*. at 1060 (citing *Iwahashi*, 888 F.2d at 1375).

381. *Arrhythmia*, 958 F.2d at 1061.

382. *Id*.

on the statute, not the "two-step post-*Benson* test."[383] Moreover, he asserted that both parts of the test suffered from lack of predictability of outcome as reflected in the conflicting decisions attempting to apply the test.[384] He concluded that *Diehr* strictly limited *Benson* and, as a consequence, "the Supreme Court signaled a change in the focus for patentability from the algorithm rule to the statutory standards of the Patent Act."[385] Judge Rader was unable to convince Judges Newman[386] and Lourie[387] to join him in cutting the "knot," but two years later the full court was provided with the opportunity to review the § 101 issue in *In re Alappat*.[388]

The § 101 issue did not arise on its sole merit in *Alappat*. The issue was pendant to a jurisdictional issue, raised *sua sponte* by the court, concerning whether the court had jurisdiction to decide an appeal where the Commissioner had ordered a rehearing of an appeal before a different panel of the Board of Patent Appeals and Interferences.[389] Nonetheless, for the first time the full court addressed its attention to the § 101 issue, which was the basis for the Patent Office's rejection of the applicant's claims directed to: "A rasterizer for converting vector list data . . . into anti-aliased pixel illumination intensity data to be displayed on a display means."[390] All of the elements of this claim were in means-plus-function format.[391]

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383. *Id.*

384. *Id.* at 1063.

385. *Id.* at 1065.

386. However, two years later in *In re Schrader*, 22 F.3d 290, 297 (Fed. Cir. 1994), Judge Newman, in dissent, proposed the following test:

> [A] statutory "process" is limited only in that it must be technologically useful. . . .
>
> All mathematical algorithms transform data, and thus serve as a process to convert initial conditions or inputs into solutions or outputs through transformation of information. . . . The test is simply whether the mathematical formula . . . is all that is claimed, or whether the procedures involving the specified mathematics are part of a useful process. When the latter requirement is met the subject matter is statutory.

Id.

387. However, two years later in *In re Waterdam*, 33 F.3d 1354 (Fed. Cir. 1994), Judge Lourie joined in an opinion by Judge Plager, where, because of the difficulty of determining whether a mathematical algorithm was being claimed, an "abstract idea" test was relied upon: "The body of claim 1 recites the steps of 'locating' a medial axis, and 'creating' a bubble hierarchy. These steps describe nothing more than the manipulation of basic mathematical constructs, the paradigmatic 'abstract idea.'" *Id.* at 1360 (citing Rubber-Tip Pencil Co. v. Howard, 87 U.S. (20 Wall.) 498, 507 (1874)).

388. 33 F.3d 1526 (Fed. Cir. 1994) (en banc).

389. *Id.* at 1530.

390. *Id.* at 1538–39 (claim 15).

391. *Id.* at 1539.

While the Patent Office admitted that the claim was in machine format, it argued that the claim still fell within the "mathematical algorithm" exception to statutory subject matter.[392] Writing for the majority, Judge Rich, citing *Diehr*, dismissed the idea that there was a fourth category of court-made exceptions to § 101 in addition to "laws of nature, natural phenomena, and abstract ideas."[393] He concluded: "A close analysis of *Diehr*, *Flook*, and *Benson* reveals that the Supreme Court never intended to create an overly broad, fourth category."[394] Thus, mathematical algorithms, equations, or formulae must be fitted into the traditional categories even though the Supreme Court had never made it clear which one, viewing "mathematical algorithms" as "natural laws" in *Diehr*, but as "ideas" in *Benson*.[395] Judge Rich reasoned that, however categorized, "the claimed subject matter *as a whole*" must be analyzed to determine if it is "a disembodied mathematical concept."[396] Such was not the case here:

> [T]he claimed invention as a whole is directed to a combination of interrelated elements which combined to form a machine for converting discrete waveform data samples into anti-aliased pixel illumination intensity data to be displayed on a display means. This is not a disembodied mathematical concept which may be characterized as an "abstract idea," but rather a specific machine to produce a *useful, concrete, and tangible result*.[397]

The "*useful, concrete, and tangible result*" would thus be the transformation from one set of data to another, which Judge Rich admitted "may be viewed as a series of mathematical calculations."[398] However, he concluded that this alone does not justify holding that the claim as a whole is directed to nonstatutory subject matter.[399] He asserted that the claimed subject matter here does not run afoul of *Benson* because it does not "'wholly preempt' the use of any apparatus employing the combination of mathematical calculations recited."[400] In a footnote, Judge Rich made clear that: "It was not the ROM alone

392. *Id*. at 1542.
393. *Id*.
394. *Id*. at 1543.
395. *See id*. at 1543 n.20.
396. *Id*. at 1544.
397. *Id*. (emphasis added).
398. *Id*.
399. *Id*.
400. *Id*.

that carried the day" in *Iwahashi*.[401] He also pointed out, in evident deference to *Flook*, that what is claimed here is a "rasterizer for creating a smooth waveform . . . , [which] is not a mere field-of-use label having no significance."[402]

Finally, Judge Rich addressed the argument made by the Patent Office (and admitted by the applicant) that the rejected claim would read on an appropriately programmed, general-purpose digital computer. To resolve this, he cited the long-standing rule of the CCPA, as now adopted by the CAFC, that a "new" machine is created when it was programmed to perform a specific function.[403]

In dissent, Chief Judge Archer, who was joined by Judge Nies, went back to the "what was invented here" question of *In re Grams*.[404] In doing so, the Chief Judge rejected the majority's interpretation that a new machine had been "invented or discovered," and argued that what really had been invented or discovered was a mathematical equation, which was solved by a pre-existing machine.[405] This reasoning would appear to take a page from Judge Stevens's view of § 101, as elaborated in *Flook*, and to reject Judge Rich's *Anatomy of the Patent Statute* from *Bergy II*, which was adopted by the majority of the Supreme Court in *Diehr*. Chief Judge Archer would affirm the court's rejection under § 101, "because Alappat has not shown that he invented or discovered a machine within § 101."[406]

Alappat is, in my view, a triumph for Judge Rich. He was the only remaining judge from the CCPA that decided *In re Musgrave*, *In re Benson*, *In re Flook*, *Bergy II*, and *In re Diehr*. The CAFC, though bound in theory to the precedents of the CCPA, still maintained considerable discretion due to the ambiguity of the relevant Supreme Court decisions and those of the CCPA. In this regard, Judge Rich was presented with a rare didactic opportunity to articulate and convince the full CAFC of the merits of his views (legal and policy-based). He was, admirably, if not entirely, successful in this persuasive role.[407] Of

401. *Id*. at 1543 n.24.

402. *Id*. at 1545.

403. In this particular instance, the new machine was developed to perform the specific function of the transforming data into a viewable form.

404. *Id*. at 1545, 1557 (Archer, C.J., dissenting).

405. *Id*. at 1564–68 (Archer, C.J., dissenting).

406. *Id*. at 1551 (Archer, C.J., dissenting).

407. Some commentators were not persuaded. *See* Thomas, *supra* note 9, at 1154 ("Reconciling *Alappat* with *Benson* appears difficult."); *see also* John A. Burtis, Comment, *Towards a Rational Jurisprudence of Computer-Related Patentability in Light of* In re Alappat, 79 MINN. L. REV. 1129, 1152 (1995) ("The Federal Circuit *accidentally* reached the correct result in this case . . . ." (emphasis added)).

the eleven judges, six agreed on the merits of § 101,[408] with only two judges dissenting on that issue.[409] Rather curiously, Judges Clevenger and Schall, having lost on the jurisdictional issue, refused to express their view of § 101.[410] In any event, Judge Clevenger later adhered to Judge Rich's view in *AT&T Corp. v. Excel Communications, Inc.*[411] (discussed below),[412] and joined Judge Plager's opinion along with Judge Rader.[413]

Judge Rich's last significant contribution to the law of computer-related inventions is in *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*,[414] where he was able to creatively apply and expand *Alappat* in order to abandon the *Freeman-Walter-Abele* test as having little applicability after *Diehr* and *Alappat*. As an added bonus, the decision confronted head-on and laid to rest another ill-conceived, court-created exception to patentable subject matter under § 101—the so-called "business method" exception.[415]

State Street was an infringement action, where the district court granted summary judgment to the accused infringer because the claims fell within two statutory subject matter exceptions: (1) the mathematical algorithm exception, and (2) the

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408. Judges Newman, Lourie, Michel, Plager, and Rader joined Judge Rich on the merits. *Alappat*, 33 F.3d at 1551. Judges Newman, Plager, and Rader filed separate concurring opinions. *Id*. at 1568 (Newman, J., concurring), 1577 (Plager, J., concurring), 1581 (Rader, J., concurring). Judge Newman concluded her concurrence: "It is thus appropriate constructively to apply statute, precedent, and policy to the variety of inventions that the information age has generated, and to remove the cloud on whether these inventions may participate in the benefits and obligations of the patent system." *Id.* at 1571 (Newman, J., concurring). In his concurrence, Judge Plager stated: "Accordingly, I join the majority's disposition of the merits, and in particular Judge Rich's skillful chasing out of some of the less useful judicial accretions regarding patentability under § 101." *Id.* at 1577 (Plager, J., concurring). Judge Rader added his clarification: "While I fully agree with Judge Rich that Alappat's claimed invention falls squarely within the scope of 35 U.S.C. § 101 (1988), I write to clarify that this conclusion does not hinge on whether Alappat's invention is classified as machine or process under [§] 101." *Id.* at 1581 (Rader, J., concurring). Judge Mayer dissented only on the jurisdictional issue and said nothing about § 101, and Judge Michel joined in this dissent. *Id*. at 1571–77 (Mayer, J., dissenting). The official report of the case indicates that Judge Michel joined with the majority on the § 101 issue, while Judge Mayer took no position. *Id*. at 1530.

409. *Id*. at 1530, 1583–85 (Schall, J., dissenting).

410. Judge Schall explained their denial to address the merits of the claim by stating: "Because I think this court lacks jurisdiction to pass on the merits of this appeal, I express no views on the merits." *Id*. at 1585 (Schall, J., dissenting).

411. 172 F.2d 1352 (Fed. Cir. 1999).

412. Refer to text accompanying notes 329–32 *supra*.

413. *AT&T*, 172 F.2d at 1353.

414. 149 F.3d 1368 (Fed. Cir. 1998).

415. *Id.* at 1375.

business method exception.[416] The patentee appealed to the CAFC, which reversed the district court and remanded for trial.[417]

The patent at issue was entitled, "Data Processing System for Hub and Spoke Financial Services Configuration."[418] The application originally contained six claims in machine format and six claims in method format.[419] During prosecution of the application, all six of the method claims were canceled, and the six machine claims were allowed.[420] Claim 1, the sole independent claim, recites in the preamble: "A data processing system for managing a financial services configuration of a portfolio established as a partnership."[421] Thus, all six elements follow the "means-plus-function" format. The district court construed the claims to be method claims, where the means clauses represent mere steps in a process.[422] Judge Rich rejected this construction based upon *Alappat* because "'machine' claims having 'means' clauses may only be reasonably viewed as process claims if there is no supporting structure in the written description that corresponds to the claimed 'means' elements."[423] He then proceeded to indicate the structure within the patent specification that supports each of the individual means clauses.[424]

Here, the claims were clearly directed to a machine; however, Judge Rich restated his broad construction of statutory subject matter under § 101: "We note that, for the purposes of a § 101 analysis, it is of little relevance whether claim 1 is directed to a 'machine' or a 'process,' as long as it falls within at least one of the four enumerated categories of patentable subject matter, 'machine' and 'process' being such categories."[425] As in *Alappat*, he equated mathematical algorithms with abstract ideas and concluded: "Unpatentable mathematical algorithms are identifiable by showing they are merely abstract ideas constituting disembodied concepts or truths that are not 'useful.' From a practical standpoint, this means that to be patentable an

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416. *Id*. at 1372.
417. *Id*. at 1377.
418. *Id*. at 1370.
419. *Id*. at 1371.
420. *Id*.
421. *Id*.
422. *Id*. at 1371–75.
423. *Id*. at 1371 (citing *In re Alappat*, 33 F.2d 1526, 1540–41 (Fed. Cir. 1994)).
424. *Id*. at 1371–72.
425. *Id*. at 1372. As nicely put by Professor Thomas: "After *State Street*, it is hardly an exaggeration to say that if you can name it, you can claim it." *See* Thomas, *supra* note 9, at 1160.

algorithm must be applied in a 'useful' way."[426] As stated by Judge Rich, the application in a "useful" way is demonstrated in this case:

> Today, we hold that the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces "a useful, concrete and tangible result"—a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades.[427]

Judge Rich then turned his attack on the *Freeman-Walter-Abele* test and found that the district court erred in applying this test.[428] This attack may seem a bit harsh, being that the *en banc Alappat* court had applied this test, albeit, it would seem, superficially. Nonetheless, Judge Rich found that in addition to being a "source of much confusion[,][429] . . . [a]fter *Diehr* and *Chakrabarty*, the *Freeman-Walter-Abele* test has little, if any, applicability to determining the presence of statutory subject matter."[430] After cutting the Gordian knot, Judge Rich then utilized the legal precedent set forth in *Diehr* and *Alappat* to dispose of any remnants of the argument that material transformation is required by § 101, stating: "[A]fter *Diehr* and *Alappat*, the mere fact that a claimed invention involves imputing numbers, calculating numbers, outputting numbers, and storing numbers in and of itself, would not render it nonstatutory subject matter, unless, of course, its operation does not produce a 'useful, concrete[,] and tangible result.'"[431]

So much for the test that began in *Freeman*, which was made in response to *Benson*, modified in *Walter* to accommodate *Flook*, and then modified again in *Abele* to define application more liberally. Now the focus was shifted to the question of what was the "practical utility" of the new machine or invention. For example, was the solution used to "produce a 'useful, concrete[,] and tangible result?'"[432]

The elegance of the "result" test is in replacing a negative test with a positive one. The *Freeman-Walter-Abele* test was

426. *Id.* at 1373.
427. *Id.*
428. *Id.*
429. *Id.* at 1374 n.5.
430. *Id.* at 1374.
431. *Id.* (citing *In re Alappat*, 33 F.3d 1526, 1544 (Fed. Cir. 1994)).
432. *Id.*

designed to determine whether otherwise statutory subject matter claimed as machine or process fell within the mathematical algorithm exception to § 101. If the test as applied was satisfied, the exception to statutory subject matter was established, and the claims rejected on the basis of § 101. Judge Rich's analysis, however, is direct. Rather than focusing on the exception, Judge Rich directed attention to the claim as a whole to determine whether a "useful, concrete, and tangible result" is produced by the claimed subject matter. If so, the claim directly satisfies § 101, whether claimed in machine or method format.

Returning to the Citadel theme, Judge Rich's line of reasoning is reminiscent of Justice Cardozo's in *MacPherson v. Buick Motor Co.*,[433] which destroyed a major pillar of the privity doctrine. Prior to *MacPherson*, the rule of privity precluded consumers from proceeding directly against manufacturers of negligently produced products, unless one of two court-created exceptions applied.[434] These exceptions required that the product be either a food product or capable of characterization as "inherently" or "imminently dangerous."[435] Justice Cardozo reasoned that the categorization of the exception was not the fundamentally important issue, rather, the pertinent question concerned whether the product itself was a "thing of danger" and whether it was foreseeable that an ordinary consumer would be injured if this product was negligently constructed.[436] Thus, privity was undermined by placing the direct focus on the product itself, not on whether the product fell within a recognized exception to privity. Similarly, Judge Rich directed attention to the claim itself (irrespective of format), rather than to the exception, to determine whether a "useful, concrete, and tangible" result was obtained.[437]

The Citadel may not have completely fallen,[438] but *Alappat* and *State Street* have significantly restricted its domain. In

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433. 111 N.E. 1040 (N.Y. 1916). Refer to notes 11–21 *supra* and accompanying text.

434. *See* Prosser, *Assault*, *supra* note 10, at 1101.

435. *Id*. at 1103–14.

436. As set forth by Judge Cardozo: "If the nature of a thing is such that it is reasonably certain to place life and limb in peril when negligently made, it is then a thing of danger." *MacPherson*, 111 N.E. at 1053. Prosser dramatically portrays Judge Cardozo's statement as: "[W]ielding a mighty axe, [he] burst over the ramparts, and buried the general [privity] rule under the exception." Prosser, *Assault*, *supra* note 10, at 1100.

437. *State Street*, 149 F.3d at 1373–74.

438. Compare this to the conclusion of Professor Kreiss: "In short, the *State Street* decision contains a conclusion, but does not contain adequate reasoning. The Federal Circuit makes statements which do not withstand cursory thought and either interprets or ignores Supreme Court decisions in order to justify the result it wants to reach." Kreiss, *supra* note 9, at 53. On the other hand, if the conclusion, reasoning,

particular, *State Street* adds the important insight that the claim as a whole and the result produced, rather than its individual elements and its particular format, are determinative of patentable subject matter. The case method, of course, will have to work out the details of "useful, concrete, and tangible results";[439] however, the focus is now fixed on "results," rather than the "exception" criteria.

The most controversial part of *State Street* was the court's taking of the opportunity to lay the "business method" exception to rest. The easy route would have been to say that there was no "method" being claimed here[440] because the claims were in machine format. But an opportunity missed is an opportunity lost. The doctrine was already on shaky ground, and the time was ripe for its demise.[441] Judge Rich referred to the "judicially-created, so called 'business method' exception" as "ill- conceived,"[442] consistent with his belief that most judicially created exceptions to statutory subject matter are "ill-conceived."[443]

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interpretation, and ignoring binding precedent were that bad, one would think that the Supreme Court would have granted certiorari. Professor Durham observes: "Whether the Federal Circuit reached the right result is debatable, but the analysis in *State Street* is seriously deficient because the court failed to address, in any explicit or coherent fashion, the central problem of defining the 'technological arts.'" Alan L. Durham, *"Useful Arts" in the Information Age*, 1999 B.Y.U. L. REV. 1419, 1420–21 (discussing the reasoning and analysis used in *State Street*). However, this is hardly a novel deficiency. The equation without a definition of "useful arts" with "technological arts" can be traced back to *Musgrave*, which was decided in 1970. Furthermore, the best the Supreme Court has ever told us is that laws of nature, natural phenomena, and abstract ideas are not within the definitions of useful or technological.

439. Professor Kreiss objects that the "useful way" approach is inconsistent with *Flook*. *See* Kreiss, *supra* note 9, at 53. Whatever vitality *Flook* may still have after *Diehr*, an expanded reading of its holding hardly commends itself.

440. Because a method was not being claimed, Professor Thomas opines: "[T]his portion of the *State Street* opinion may amount to nothing more than dicta." *See* Thomas, *supra* note 9, at 1161. Moreover, the Patent Office had already abandoned any claim to a business method exception. *See* Examination Guideline, 61 Fed. Reg. 7478, 7479 (1996). It seems unlikely that a district court would ignore as dicta a clearly articulated "position" of its supervisory court.

441. As stated by Judge Newman, dissenting in *In re Schrader*, 22 F.3d 290, 298 (Fed. Cir. 1994) (Newman, J., dissenting), and quoted by Judge Rich in *State Street*, 149 F.3d at 1375 n.10:

> [The business method exception] is . . . an unwarranted encumbrance to the definition of statutory subject matter in [§] 101, my guidance is that it be discarded as error-prone, redundant, and obsolete. It merits retirement from the glossary of [§] 101. . . . All of the "doing business" cases could have been decided using the clearer concepts of Title 35. Patentability does not turn on whether the claimed method does "business" instead of something else, but on whether the method, viewed as a whole, meets the requirements of patentability as set forth in sections 102, 103, and 112 of the Patent Act.

Schrader, 22 F.3d at 298 (Newman, J., dissenting).

442. *State Street*, 149 F.3d at 1375.

443. The "printed matter" exception may be added to the class of "ill-conceived"

Judge Rich utilized the straightforward logic that had served him well in the past: Unless there was binding precedent adopting this exception, there was no rational basis for treating business methods differently from any other methods that produced a useful, concrete, and tangible result.[444] He then analyzed the cases that were said to be based on the business method exception and concluded that none of these cases had actually adopted the exception, but instead had been decided on other statutory grounds.[445] In particular, this was true with respect to the most frequently cited case said to uphold the exception, *Hotel Security Checking Co. v. Lorraine Co.*,[446] where the patent was in fact held invalid for lack of novelty and invention, rather than because it was directed to a business method per se.[447] Finally, Judge Rich indicated that the Patent Office itself had now seen the wisdom of not treating business method inventions any differently from any other process inventions and had eliminated the exception itself.[448]

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exceptions. *See In re* Beauregard, 53 F.3d 1583, 1584 (Fed. Cir. 1995) (dismissing an appeal on the ground that "[t]he Commissioner now states 'that computer programs embodied in a tangible medium, such as floppy diskettes, are patentable subject matter under 35 U.S.C. § 101 and must be examined under 35 U.S.C. §§ 102 and 103'"). This followed after the decision in *In re Lowry*, which was opined by Judge Rader and joined by Judge Skelton. 32 F.3d 1579, 1584 (Fed. Cir. 1994) (holding that, "[m]ore than mere abstraction, the data structures are specific electrical or magnetic structural elements in a memory"). Thus, the "new machine" logic (or fiction) of *Bernhart* applies to storage devices. *See In re* Prater, 415 F.2d 1395, 1400 (C.C.P.A. 1969). Refer to text accompanying notes 152–53 *supra*. *See also* Maier & Mattson, *supra* note 9, 327–31 (discussing the "printed matter" issue).

444. Professor Thomas would distinguish business methods from other methods, such as the transformational ones seen in *Diehr*. He offers the following argument: "One need only recall the techniques of the Hanseatic League or the theory of mercantilism to realize that such methods are far older that the patent system itself. Yet only recently has it been suggested that this sort of practical knowledge may be appropriated by way of the patent system." Thomas, *supra* note 9, at 1162. Yet every category of patentable subject matter (machines, manufacture, compositions of matter, as well as processes) is far older than the patent system. It was not too long ago that many thought that living matter was not patentable subject matter. Professor Thomas, however, makes a rather compelling case for restricting the "useful Arts" within the limited Constitutional authorization of the Patent Clause. *See id*. at 1163–85.

445. *See State Street*, 149 F.3d at 1375–76.

446. 160 F. 467 (2d Cir. 1908).

447. *Id*. at 472.

448. *See State Street*, 149 F.3d at 1377 (citing Examination Guideline, *supra* note 440, at 7479–80). Professor Durham seems to place the blame on Judge Rich for the patentability of business methods:

> It is curious that the author of the opinion "laying to rest" the business methods exception was Judge Rich, who years before commented on the unpatentability of the diaper service. He might have explained what caused him to change his mind, or, if he had not changed his mind, what distinguishes the diaper service from any other business plan.

See Durham, *supra* note 438, at 1495–96. For whatever relevance, and aside from

One final question that is not answered expressly in *State Street* is: Would the claims have passed § 101 muster if they had been drafted in method format, rather than machine format? Implicitly, the answer would seem to be "yes," considering Judge Rich's reference that the categorization is not the important aspect; rather, it is the result. This question was directly at issue and resolved in *AT&T Corp. v. Excel Communications, Inc.*,[449] which was decided by the CAFC in 1999 and involved method claims: "Whether stated implicitly or explicitly, we consider the scope of § 101 to be the same regardless of the form—machine or process—in which a particular claim is drafted."[450] The court then concluded: "Because the claimed process applies the Boolean principle to produce a useful, concrete, tangible result without pre-empting other uses of the mathematical principle, on its face the claimed process comfortably falls within the scope of § 101."[451] Judge Rich did not sit on this panel; however, it would not be surprising if he would have whole-heartedly concurred with this result.

"conventional wisdom" of the day made forty years ago in a law review article based upon speeches given to patent law associations may have today, Judge Rich's legal conclusion as stated in *State Street* was: "The business method exception has never been invoked by this court, or the CCPA, to deem an invention unpatentable." *State Street*, 149 F.3d at 1375; *cf.* Giles S. Rich, *Principles of Patentability*, 28 GEO. WASH. L. REV. 393 (1960). Even if he did change his mind, it is not apparent how this detracts from the merits of any judicial decision. Patent law has significantly evolved over the past forty years to encompass subject matter previously thought not protectable by patents. *See* Rich, *supra*, at 398–402. Judge Rich, in his long career on the bench, was at the forefront of that evolution and has more than adequately explained and justified his disdain for judicially-created exceptions to patentable subject matter. The Supreme Court denied certiorari in *State Street*. State St. Bank & Trust Co. v. Signature Fin. Group, Inc., 525 U.S. 1093 (1999). Of course, if Congress is dissatisfied with the scope of protection presently being granted to business methods, including diaper services and janitorial services (for example, U.S. Patent No. 5,851,117 (issued Dec. 22, 1998)), it can amend the Patent Act. *See* 35 U.S.C. § 273 (2000) (Defense to infringement based on earlier inventor). The limitations on the applicability of this defense are many, including: it only applies to "methods of doing or conducting business", *id.* § 273(b)(3)(A); the prior inventor must have actually reduced the invention to practice at least one year prior to the filing date of the patent and have commercially exploited the method prior to the filing date, *id.* § 273(a)(1); the prior inventor may not license the invention, *id.* § 273(b)(3)(C); and may only assign the invention with the enterprise or line of business, *id.* § 273(b)(7).

> [I]t seems clear that *State Street Bank* is neither an anomaly in law nor a decision by an aberrant panel of the Federal Circuit without strong precedential significance. On the contrary, *State Street Bank* seems to be fully consistent with the long term philosophy of the Federal Circuit and its predecessor court, the CCPA.

Maier & Mattson, *supra* note 9, at 336. Of course, consistency with the "long term philosophy" of the Supreme Court also may be valued.

449. 172 F.3d 1352 (Fed. Cir. 1999).

450. *Id.* at 1358 (citing *In re* Alappat, 33 F.3d 1526, 1581 (Fed. Cir. 1994), and *State Street*, 149 F.3d 1368, 1372 (Fed. Cir. 1998)).

451. *Id.*

VI. CONCLUSION

Judge Rich died on June 9, 1999, at the age of ninety-four. He was witness to the revolutionary technological developments during the entire twentieth century. At his birth, the telephone, automobile, and radio were still in elementary forms. The airplane, as well as television and antibiotics, had yet to be invented. Nuclear fusion, rocket ships, and satellites were yet to come. The invention of the transistor eventually opened the possibility of digital computers. Microorganisms began to be engineered in laboratories.

The patent system played a significant role in its fostering of creative genius with respect to these and many other technological developments. Judge Rich devoted his entire professional life to implementing the instrumentalist philosophy of the Constitution's Patent Clause. His vision of what subject matter created by human ingenuity could and should be protected by patents was expansive. He had little patience with those who would pigeon-hole creativity into narrow historical slots and with those who urged caution and exceptions to the patentability of new technological developments, especially when done out of self-interest rather than public interest.

In this retrospective analysis of his judicial approach to the patentability of computer-related inventions, Judge Rich's open-door philosophy to human creativity becomes abundantly clear. Like Syphisus, patent law must roll the rock up the hill to deal with each new technology, only to have to begin again as soon as newer technology is created. Judge Rich did yeoman service in attacking bastions in patent law erected by courts that impeded the introduction of new technology into the panoply of the "useful Arts."

Judge Rich's assault against the Citadel of *Benson* and *Flook* is a study in perseverance and judicial creativity. The assault finally struck home with *Chakrabarty* and *Diehr*, shaking the very foundations of the Citadel. In two strokes of genius, he found the key to opening the door of the Citadel by persuading the Supreme Court to accept a broad view of statutory subject matter: The first was his *Anatomy of the Patent Statute*, which set the Court straight on the interrelationship of § 101 with § 102 and § 103.[452] The second was dredging the legislative history of § 101 to find the now famous "anything under the sun made by man" metaphor, which seemingly convinced the Court that it could construe the section broadly, having been given the "signal"

452. *See Bergy I*, 563 F.2d 1031, 1034–40 (C.C.P.A. 1977).

by Congress in its deliberations.[453] Without these weapons in the hands of a seasoned warrior, patent protection for computer-related inventions would have been unable to breach the fortifications of an expanded Citadel, as envisioned by the minority in *Diehr*.

Finally, I do not wish to give the impression that the only contributions made by Judge Rich were in the area of computer-related inventions. His contributions to patent and trademark law, and intellectual property law in general, are immense. However, I have chosen to limit myself to the computer-related area primarily because it provides an opportunity to illustrate, in a longitudinal study, the impact that one judge may have on the evolution of patent law, given a rapidly evolving area of technology. To be sure, Judge Giles Sutherland Rich's legacy is secure and his efforts have resulted in the promotion of the "useful Arts"—or, as he would translate this in the late twentieth century, the "technological arts"—to the benefit of us all.

453. *See In re* Chakrabarty, 447 U.S. 303, 308–09 (1980).