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CHEMICAL OBVIOUSNESS AND 35 U.S.C. § 103

Recent trends in chemical research threaten to make obsolete the statutory scheme under which patentability of new chemical compounds is determined. This Note examines the current interpretation of the nonobviousness requirement of the 1952 Patent Act, 35 U.S.C. § 103, as well as the underlying rationales for the interpretation. This Note also examines the application of legal standards of nonobviousness in cases involving chemical compounds structurally similar to prior art compounds. Recent trends in chemical synthesis are examined where chemical properties are correlated with chemical structure. The Note concludes that the court must reexamine its traditional analysis for resolving questions in light of these recent scientific trends.

INTRODUCTION

SOCIETY IS becoming increasingly dependent on chemical compounds which are used, for example, as pharmaceuticals, fuels, and detergents. Only a few new chemical compounds are marketed each year, however, because chemical companies, seeking to recoup substantial investments in the research and development of these compounds, desire limited monopolies for their discoveries through patent protection. This Note will discuss both the statutory requirements of patentability which govern these chemical inventions and the Court of Customs and Patent Appeals' interpretation of the current statutory scheme.

Chemical compounds are defined as compositions of matter under 35 U.S.C. § 101¹ and are patentable only if they meet the statutory requirements of utility,² novelty,³ and nonobviousness.⁴ Assume, for example, that a chemist synthesizes a compound that is structurally similar⁵ to compounds disclosed in the

1. 35 U.S.C. § 101 (1976).

2. *Id.*

3. *Id.* § 102.

4. *Id.* § 103.

5. For the purpose of this Note, the phrase "structurally similar" should be construed broadly to include such compounds as homologues and isomers (geometric and stereo) of the prior art compounds.

A series of compounds in which each member differs from the next member by a constant amount is called a *homologous series*, and the members of the series are called *homologs*. The family of alkanes (methane, CH₄; ethane, CH₃CH₃; propane, CH₃CH₂CH₃; etc) forms such a homologous series, the constant difference between successive members being CH₂.

R. MORRISON & R. BOYD, ORGANIC CHEMISTRY 80 (3d ed. 1975).

Isomers are different chemical compounds that have the same molecular formula. Ste-

prior art.⁶ If this chemist then satisfies the statutory requirements of novelty and utility, the central issue in determining patentability becomes one of obviousness. In addressing this issue, this Note will focus on the standard of obviousness applicable to patent claims for chemical compounds in which structurally related chemical compounds are disclosed in the prior art.⁷ This Note also will discuss the obviousness problem from a legal⁸ and chemical⁹ perspective. The mechanical background¹⁰ and historical tests of chemical obviousness,¹¹ as well as the policies¹² and underlying rationale¹³ of the nonobviousness requirement also will be reviewed. This Note then will conclude that recent developments¹⁴ in the chemical field may make the current interpretation of the nonobviousness requirement obsolete.¹⁵

I. THE STANDARD OF OBVIOUSNESS

A. *The Legal Problem*

If a chemical compound meets the statutory requirements of patentability, the United States Patent Office will grant a composition of matter patent. This patent seeks to prevent unauthorized persons from synthesizing the compound for use or sale and potentially subjects such infringers to liability to the patentee.¹⁶ Furthermore, a composition of matter patent protects the patentee from all infringers on *all* uses, even if it is discovered later that the compound has additional uses which were not known initially.¹⁷ A composition of matter claim, therefore, seems to offer the patentee unjustified "windfall" protection, such that it would be better

reoisomers differ *only* in the way their atoms are oriented in three dimensional space. *Id.* at 115.

Geometric isomers differ because of their configuration around a multiple bond. *Cis-2-butene* and *trans-2-butene*, for example, are geometric isomers. *Id.* at 148-49.

6. For a discussion of what constitutes prior art, see generally 1 & 2 D. CHISUM, PATENTS: A TREATISE ON THE LAW OF PATENTABILITY, VALIDITY AND INFRINGEMENT §§ 3.04-.08, 5.03[3] (1978).

7. See notes 77-167 *infra* and accompanying text.

8. See notes 16-22 *infra* and accompanying text.

9. See notes 23-26 *infra* and accompanying text.

10. See notes 27-47 *infra* and accompanying text.

11. See notes 77-167 *infra* and accompanying text.

12. See notes 48-60 *infra* and accompanying text.

13. See notes 61-76 *infra* and accompanying text.

14. See notes 168-73 *infra* and accompanying text.

15. See notes 169-78 *infra* and accompanying text.

16. 35 U.S.C. § 271 (1976).

17. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 269 (1977).

to limit the grant to the "use" patent.¹⁸ The use patent only prevents others from using the compound for the claimed use and thus individual users, of which there may be many, constitute the class of infringers. The pursuit of individual users, however, is a cumbersome and inadequate remedy.¹⁹ From the patentee's standpoint, therefore, the broad composition of matter patent is more desirable than the "use" patent.²⁰

Under the current interpretation of section 103 in the chemical area, if the chemical compound's structure resembles those chemical compounds disclosed in the prior art, the claimed compound may be deemed *prima facie* obvious and therefore unpatentable unless the patent claimant rebuts the *prima facie* showing.²¹ The claimant may so rebut by proving that the claimed compound's properties were unexpected in light of prior art disclosures.²² If, however, the properties of the claimed compound could be predicted quantitatively in light of the prior art, the chemical compound would be unpatentable under the current interpretation of section 103.

B. *The Chemical Problem*

A synthetic chemist generally is concerned with the synthesis of new and useful chemical compounds. The chemist's problem usually involves synthesizing one or more of a series of compounds, each designed for a specific use. The following simplified fact pattern will highlight this problem. The chemist is assigned to synthesize chemical compounds which possess a desirable characteristic A and no undesirable characteristics. Suppose the chemist knows of a compound X that possesses the desirable characteristic A and undesirable characteristics. The chemist's task is to modify compound X to maintain or enhance the desirable characteristic A while minimizing or eliminating the undesirable characteristics. To avoid a total loss of the desirable characteristics, the chemist will synthesize compounds that are structurally similar to compound X. The chemist knows that minor changes in physical characteristics will most likely accompany the minor changes in chemical structure. These ideas constitute the tech-

18. *See id.* *See also* Sease, *Chemical Properties: Are They a Sensible Legal Yardstick of Patentability?*, 26 *DRAKE L. REV.* 39 (1976-1977).

19. *Id.* at 44.

20. *Id.* at 45.

21. *See* notes 119-67 *infra* and accompanying text.

22. *See In re Stemniski*, 444 F.2d 581 (C.C.P.A. 1973).

nique of molecular modification which is embedded in the chemist's approach to the solution of this problem.²³

The chemist who utilizes the molecular modification approach to solve chemical problems generally knows the two dimensional representation of the chemical compound which is the object of the synthesis. In some cases, the chemist also may know a reasonable synthesis for the creation of the novel chemical compound. It is generally not known with absolute certainty, however, whether that synthesis will create the desired compound or whether the compound, once created, will possess the desired physical properties. The chemist may *expect* that a compound will possess a certain property or class of properties, but he or she cannot predict accurately or quantitatively the extent to which the compound will possess these properties. The chemist, therefore, is generally not surprised if testing reveals that the compound either does or does not possess the desired properties. Thus, from our hypothetical chemist's standpoint, *nothing is certain before the chemical compound is tested; nothing is obvious.*

23. This strategy has been defended as one of the most useful approaches to new drug design:

One of the most serious current problems in preclinical research aimed at the identification of new compounds of biological significance is the indictment heard from regulatory agencies and from some segments of the scientific community that the medicinal chemist's efforts are usually trivial molecular manipulations rather than basic investigations. This concern has been discussed in many settings and except for the intensity and persistence of the attacks on medicinal chemists in the pharmaceutical industry, it would seem fatuous to discuss the biological significance of minute variations in molecular structure. The molecular defect in sickle cell disease, is subtle enough that the mechanism of this politically sensitive disorder should have persuaded those who doubted the importance of minor variations in molecular structure. The presence of a single methyl group which makes the molecule of codeine different from that of morphine should offer to politically-sensitive critics a persuasion of the importance of small structural differences. In the preclinical phase where there is a steady feedback between the chemist and the biologist as the former proceeds with molecular manipulation, the difficulty, of course, is the ill-defined relationship between structure and function. This difficulty is exaggerated by the specific interspecies and individual intraspecies differences in animal test systems. There is no way for the chemist to know when he undertakes the synthesis of a new molecule, whether he will be accused of a trivial effort or praised for a biological breakthrough. Indeed the chemist tends to be pleased if his minor modification has not entirely destroyed the molecule's biological activity. Since, however, there is no more effective test system available than the animal model, we continue to deal with the cumulative uncertainties of molecular manipulation and variation in species response. It is, however, this very high degree of uncertainty which creates the problem. It seems to me, therefore, that the explanation of the attack by spokesmen of regulatory agencies upon molecular manipulation must be sought outside of the realm of science.

Hubbard, *Preclinical Problems of New Drug Development*, in REGULATING NEW DRUGS 35, 41 (R. Landau ed. 1973).

Suppose, however, that our chemist has discovered a new chemical compound that solves this chemical problem. The new compound possesses the desired characteristic A, exhibits no undesirable characteristics, and is structurally similar to the original compound. The question, therefore, is whether the compound is patentable. Because of current court interpretations of 35 U.S.C. § 103, the solution to this chemical problem may not give rise to a patentable invention.²⁴ Furthermore, in situations similar to that previously discussed, chemists no longer randomly synthesize compounds that are structurally similar to compound X to obtain a new compound with the desired characteristics.²⁵ Thus, as a result of recent advances in chemical approaches to the solution of complex compound design problems, there may be a need for a fundamental change in the statutory scheme for the patentability of chemical compounds.²⁶

II. BACKGROUND—MECHANICAL PATENTS

Although chemical and mechanical inventions must meet the same statutory requirements for patentability, the courts use different approaches to the problems surrounding these inventions.²⁷ Such disparate approaches are necessitated by the contrasting nature²⁸ and source of creation of the two types of inventions.²⁹ De-

24. See notes 91-167 *infra* and accompanying text.

25. See notes 168-73 *infra* and accompanying text.

26. See notes 174-78 *infra* and accompanying text.

27. See Note, *Standards of Obviousness and the Patentability of Chemical Compounds*, 87 HARV. L. REV. 607 (1974), arguing for a fundamental revision in the statutory framework. *Id.* at 623 n.69.

28. See Note, *Patentability of Chemical Compounds—In re Stemniski*, 50 TEX. L. REV. 566, 576 (1972).

Courts have been unable to assess consistently the obviousness of chemical compounds against a standard of patentability devised for mechanical inventions. The methods and logic that underlie the process of chemical invention often are wholly different from those underlying nonchemical inventions. The individual parts of a machine retain their separate identity in the composite whole, but a chemical compound is the synthesis of chemical elements whose individual identities are lost entirely in the final result. Although nonchemical elements can be varied, modified, or altered in an infinite number of ways, chemical compounds can be constructed and modified only according to the laws of nature.

Id. The structure-property analysis employed in chemical cases for resolving the obviousness issue would be wholly inappropriate in mechanical cases.

29. One author has observed:

The law of chemical patents is a child (or orphan) of mechanical patent law. But there are reasons for a distinction between chemical and mechanical patents. Chemistry is significantly different from applied mechanics. Mechanicians generally do not create contraptions to see what they will do; chemists do. Machines are developed to fulfill a specific function, and it is unlikely they will perform another that is not obvious; the same is not true for chemicals.

spite these differences, however, it is unrealistic to analyze the legal issues surrounding the chemical patent without reference to the Supreme Court decisions in the mechanical field because the Supreme Court has not yet prescribed nonobviousness criteria for chemical patents.

The general nonobviousness requirement of patentability is rooted in the 1850 Supreme Court case of *Hotchkiss v. Greenwood*.³⁰ In *Hotchkiss*, the Court struck down a patent on a door knob constructed of porcelain or clay because similar devices constructed of wood or metal were common. The Court reasoned that:

[U]nless more ingenuity and skill in applying the old method of fastening the shank and the knob were required in the application of it to the clay or porcelain knob than were possessed by an ordinary mechanic acquainted with the business, there was an absence of that degree of skill and ingenuity which constitute essential elements of every invention. In other words, the improvement is the work of the skillful mechanic, not that of the inventor.³¹

Thus, *Hotchkiss* stands for two propositions: First, that more than utility and novelty is required for patentability; and second, that mere substitution of materials is obvious and does not constitute "invention."³² The *Hotchkiss* rule was codified by the 1952 Patent

Eggert, *Uses, New Uses and Chemical Patents—A Proposal*, 51 J. PAT. OFF. SOC'Y 768, 783 (1969).

A second commentator writes:

A mechanical invention is usually made with a specific utility in mind and the apparatus or process produced is tailored to fit a certain need. . . . In contrast, a chemical compound may be synthesized as a result of research of academic interest only, or it may be made without any specific use in mind and be submitted to another laboratory for screening to see if it has any utility. On the other hand, a compound may have its origin from a study of closely related compounds having beneficial properties and the object in synthesizing the new compound may be in improving these properties. A compound may have its genesis in the belief that it will possess properties not possessed by the prior art and thus provide an unexpected result or satisfy a long-felt need.

Western, *Is 35 U.S.C. 103 Applicable to Chemical Compounds?*, 8 IDEA 443, 444 (1964). See also Hoxie, *A Patent Attorney's View*, 47 J. PAT. OFF. SOC'Y 630, 636 (1965).

30. 52 U.S. (11 How.) 248 (1851).

31. *Id.* at 267. The dissent in *Hotchkiss* argued that the "true test [of patentability] was, if the invention was new and better, and cheaper than what preceded it." *Id.* at 268. The dissent's argument was partly economic: if the invention is new and useful, it is entitled to patent protection because it increases "the power, convenience and wealth of the community." *Id.* at 269.

32. Rich, *Escaping the Tyranny of Words—Is Evolution in Legal Thinking Impossible?*, 60 J. PAT. OFF. SOC'Y 271, 288 (1978). Judge Rich argues that the *Hotchkiss* decision hinged on the word "inventors" in art. I, § 8, cl. 8 of the Constitution. "Inventors" is a limiting word in the Constitution, and the mere substitution of materials is the work of a *skillful mechanic*, not an *inventor*. Thus, the device was not patentable. *Id.* at 286.

Act in the first sentence of section 103:

A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.³³

Section 103 was included in the 1952 Patent Act to promote uniformity, definiteness, and stability³⁴ in the judicial resolution of questions of patentability.

Following the enactment of the 1952 Patent Act and after debate over whether Congress intended to relax the *Hotchkiss* patentability requirements,³⁵ the Supreme Court decided *Graham v. John Deere*³⁶—a mechanical patent case involving a device that absorbed the shock of plow shanks when used in rocky soil. The Court, after a detailed discussion of the policy and precedents underlying section 103,³⁷ concluded that section 103 was not intended to change the existing patentability requirements and announced a three-step analysis of the obviousness issue:

Under Section 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.³⁸

The Court then stated that “secondary considerations”³⁹ such as “commercial success, long felt but unsolved needs, failure of

33. 35 U.S.C. § 103 (1976).

34. S. REP. NO. 1979, 82d Cong., 2d Sess. 6 (1952). The statute was not intended to be the final word on the criteria, but was intended to “serve as a basis for the addition at a later time of some criteria which may be worked out.” *Id.* at 18. See also Rich, *supra* note 32, at 290.

35. See Note, *The Standard of Patentability—Judicial Interpretation of Section 103 and the Patent Act*, 63 COLUM. L. REV. 306 (1963); Note, *Patent Law—Test of Invention*, 1956 WIS. L. REV. 513.

36. 383 U.S. 1 (1965).

37. *Id.* at 3–17. For other historical discussions of § 103, see Rich, *supra* note 32, at 281–93; Note, *supra* note 27, at 607 n.2. See also Colaiani, *35 U.S.C. § 103: A Quest for Objectivity*, 39 FED. B.J. 23 (1980).

38. 383 U.S. at 17.

39. There has been considerable dispute over the word “secondary.” Some authorities argue that the factors are secondary *in time only* and always should be considered, while other authorities argue that secondary refers to factors secondary *in importance* and need not be considered in every case. Schneider, *Non-Obviousness, the Supreme Court, and the Prospects for Stability*, 60 J. PAT. OFF. SOC’Y 304, 312–13 (1978).

others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy."⁴⁰ The Court also attempted to settle the issue of whether obviousness was a factual or legal issue⁴¹ by declaring that it was essentially an issue of law which lent itself to factual inquiries.⁴²

Despite *Graham* and section 103, courts continue to have difficulty with the nonobviousness analysis.⁴³ Most authorities agree, however, that in mechanical combination patents an invention must show synergism⁴⁴—the effect of the whole is greater than the sum of the effects of the parts—to establish nonobviousness.⁴⁵ In contrast, a synergistic effect need not be proven to establish the nonobviousness of a chemical compound,⁴⁶ as the proof would be trivial.⁴⁷ In this context, therefore, synergism as a requirement of patentability requires no further discussion.

Thus, mechanical patent cases such as *Graham* provide useful background for discussions concerning the patentability require-

40. 383 U.S. at 17-18.

41. *Id.* at 17.

42. The issue of whether obviousness is an issue of fact or law remains unsettled. See Goldstein, *Conflicting Rules of Patent Law Within the Federal Judiciary System*, 12 INTELLECTUAL PROP. L. REV. 135 (1980); Note, *Non-Obviousness in Patent Law: A Question of Law or Fact*, 18 WM. & MARY L. REV. 612 (1977).

43. See notes 65-76 *infra* and accompanying text.

44. For recent discussions of this topic, compare Goldstein, *supra* note 42, at 139-41 with Rich, *supra* note 32, at 295 and Crossan, *Patent Law: Synergism Rejected*, 56 CHI-KENT L. REV. 339 (1980). See also Synergism Virus: Cause and Cure, a talk by Chief Judge Markey before the Los Angeles Patent Law Association (Sept. 16, 1980), reprinted in 496 BNA PAT. T.M. & COPYRIGHT J. D-1 (1980). Judge Markey of the U.S. Court of Customs and Patent Appeals argues strongly against synergism, asserting that mechanical inventions cannot exhibit synergism because such an exhibition would contradict the laws of physics. *Id.*

45. Synergism was conceived in *A&P Tea Co. v. Supermarket Corp.*, 340 U.S. 147 (1950), and emerged in *Anderson's Black Rock v. Pavement Co.*, 396 U.S. 57, 61 (1961). Crossan, *supra* note 44, at 241-42.

46. The electro-chemical invention in *United States v. Adams*, 383 U.S. 39 (1966), decided the same day as *Graham*, shows synergism. Each individual element of the *Adams* invention (a battery) could be found in the prior art. The *Adams* invention, however, was synergistic in its unexpected operating advantages over the prior art. *Id.* at 51. The *Adams* battery was held nonobvious over the prior art because of the prevalence of secondary *Graham* considerations, including initial disbelief of experts, unexpected beneficial operating characteristics, indications in the prior art away from the invention, immediate recognition in the field, and only one reference to cite against the invention. *Id.* at 51-52.

47. The effective properties of a simple molecule like ethylene glycol, for example, are not the mere sum of the properties of two carbon atoms, six hydrogen atoms, and two oxygen atoms. Ethylene glycol can act as an efficient heat exchange fluid in automobile radiators where the individual components, taken collectively, cannot.

ments for chemical compounds. As a result of factual distinctions between chemical and mechanical patents, however, the legal doctrines in the two areas are not interchangeable.

III. POLICY AND SECTION 103

Article I of the Constitution contains the authority for Congress "[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries"48 The *Graham* court viewed the phrase, "promote the Progress," as a limitation on the power given to Congress to legislate in the patent field:

Congress may not authorize the issuance of patents whose effects are to remove existent knowledge from the public domain, or to restrict free access of materials already available. Innovation, advancement and things which add to the sum of useful knowledge are inherent requisites in a patent system which by constitutional command must "promote the Progress of . . . useful Arts."⁴⁹

The *Graham* discussion defined progress as the sum of useful knowledge in the useful arts and viewed the historical mechanism by which progress is promoted as economic, stating: "This patent monopoly was not designed to secure to the inventor his natural right in his discoveries. Rather, it was a reward, an inducement, to bring forth new knowledge."⁵⁰

Thus, the limited monopoly afforded by a patent provides an incentive to invent, disclose the invention, and invest in the research, development, production, and marketing of the invention.⁵¹ Intertwined with these incentives is the other major

48. U.S. CONST. art. I, § 8, cl. 8 "[T]he Founding Fathers were not writing a *standard* of patentability into the Constitution; they left that job to Congress under certain restraints." Rich, *supra* note 32, at 284 (emphasis supplied).

49. 383 U.S. at 6. Cf. Rich, *Principles of Patentability*, 28 GEO. WASH. L. REV. 393 (1960).

The patent system does not promote progress merely by rewarding those who succeed commercially. It promotes it by stimulating inventive activity, by bringing out a disclosure of the results of that activity, and by encouraging investment in the production and marketing of inventions as well as in research and development. It is not to be expected that everything which this stimulus succeeds in producing will be of equally good quality.

Id. at 400-01.

50. 383 U.S. at 9. For discussions of this topic, see Rich, *supra* note 32, at 281-87 and articles cited therein. Progress also may be measured in economic terms; see Harris & Fay, *Certain Incontestable Patents are Warranted*, 60 J. PAT. OFF. SOC'Y 27, 30 (1978).

51. For discussions of the incentive features of the patent system, see Crews, *The Three Patent Incentives—A Reappraisal*, 43 J. PAT. OFF. SOC'Y 554 (1961); Rich, *supra* note 49.

function of the patent system: to protect the patentee's intellectual property rights by excluding others from making, using, or selling the invention for the statutory period of seventeen years.⁵² Both the incentive and protective features of the patent system favor the grant of a patent to promote progress in the useful arts.

Alternatively, when the patent grant is viewed as a limited monopoly whereby the inventor may exact a toll from the public for use of the invention, the goal of protecting the economic interests of the public favors the denial of patent protection for inventions.⁵³ This view of the patent grant echoes the philosophy of Thomas Jefferson, the author of the original Patent Act of 1793, who reflected the public's aversion to monopolies when he stated: "Society may give an exclusive right to the profits arising from them, as an encouragement to men to pursue ideas which may produce utility, but this may or may not be done, according to the will and convenience of the society, without claim or complaint

The incentive features of the patent system are most frequently analyzed in economic terms: the incentive to invent is a long term pecuniary incentive that fosters competition in the marketplace. After the grant of a patent, the patentee is prodded by the fear of loss of his or her position in the marketplace while the competition is driven by the hope of improving its position in the marketplace. Geoffrey, *Do the Atomic Energy Act and National Aeronautics and Space Act Promote Adequate Space Advancements?*, 43 J. PAT. OFF. SOC'Y 624, 632-33 (1961).

One commentator notes:

Although some observers maintain that inventors are motivated by a certain intellectual fanaticism and are oblivious to worldly gain, in fact, no inventor would spend his time and energy and no company or backer would incur the necessary costs to engage in such a risky venture without a special incentive.

Dratler, *Incentives for People: The Forgotten Purpose of the Patent System*, 16 HARV. J. LEGIS. 129, 137-38 (1979).

52. 35 U.S.C. § 154 (1976). The intertwining of these two features of the patent system is illustrated by the following statements: "Inventors, denied protection, will not have the incentive and thus progress shall falter." Geoffrey, *supra* note 51, at 632. Alternatively, the incentive to invent is the right to exclude others from making, using, or selling one's invention for the statutory period. Crews, *supra* note 51, at 554.

53. See Schneider, *supra* note 39, at 323-27. Professor Schneider presents a strong argument for the reappraisal of the economic underpinnings in courts' decisions:

The Supreme Court—and everyone—carries a bundle of economic predilections, and all of them can't be made explicit and placed in logical array in the development of an opinion. Economic considerations are part of the real world economic background, which we take for granted, in which patents operate pursuant to the constitutional purpose. But economics is a complex subject and, as in patent law, easy assumptions may do violence to the whole truth. Are the Court's usually unspoken economic premises correct or appropriate to the occasion in any given decision? If patents do indeed represent the heavy hand of tribute or tolls exacted from users of a public way, the reasons for the court's exacting and often patent-defeating requirements for patent validity can be understood. And if that is the message the lower courts are hearing, the kind of stability reflected by the premise that the only good patent is a dead patent is not far off.

Id. at 325-26.

from anybody."⁵⁴ Furthermore, when a second investor seeks to patent a device similar to one already patented, the need to protect the first invention weighs against granting a patent to the second inventor. The patent grant, therefore, is viewed best as a limited monopoly affording incentives such as limited protection for prospective patentees.

When the focus of the inquiry is narrowed to chemical patents with a potential pharmaceutical application, additional policy considerations become relevant.⁵⁵ The denial of patent protection for a newly synthesized chemical compound, for example, may deprive the public of the use of potentially improved drugs.⁵⁶ This problem arises both because the examination of a chemical's pharmacological properties is usually incomplete when the patent application is filed and because the patent office generally does not know whether the chemical is a suitable pharmaceutical for human use.⁵⁷ Thus, protection for the pharmaceutical companies' chemical discoveries is essential initially to ensure that substantial investments are continued in the research, development, and testing of new compounds.⁵⁸

These considerations favor patentability in the chemical and pharmaceutical fields. In fact, a problem of over-patenting may

54. VI WRITINGS OF THOMAS JEFFERSON 181 (H. Washington ed. 1854), quoted in *Graham v. John Deere Co.*, 383 U.S. 1, 7 (1966). "Although recognizing the patent system's desirable stimulus to invention, we have also viewed the patent as a monopoly which, although sanctioned by law, has the economic consequences attending other monopolies." *Blonder-Tongue Laboratories, Inc. v. University of Illinois Foundation*, 402 U.S. 313, 343 (1970).

55. Effective policies of a patent system also would nurture inventive minds through industry research funds, Sparks, *Initiation, Care and Feeding of New Ideas*, 47 J. PAT. OFF. SOC'Y 613, 618 (1965), and would protect the research atmosphere in the industry. DeStevens, *A Chemist's View*, 47 J. PAT. OFF. SOC'Y 653, 657 (1965).

56. See *Eli Lilly & Co. v. Premo Pharmaceutical Laboratories, Inc.*, 630 F.2d 120 (3d Cir. 1980):

Unless this type of an investment of human and capital resources is rewarded by some form of patent protection, companies such as Eli Lilly might well choose not to undertake such large expenditures and instead devote themselves to other endeavors. To the extent this change occurs, resources would be diverted from activity that is socially beneficial—the development of new drugs.

Id. at 137.

57. Marcus, *The Patent Office and Pharmaceutical Invention*, 47 J. PAT. OFF. SOC'Y 669, 673 (1965).

58. Denton, *A Researcher's View*, 47 J. PAT. OFF. SOC'Y 658, 661 (1965). The protection is the assurance the pharmaceutical company seeks for its continually increasing investment in the compounds it develops. There is limited opportunity for the corporation to recoup its investment without a patent. *Id.* The patent problem is only one of the barriers to overcome in recouping investments made in the marketing of new chemical compounds in the drug field. See also REGULATING NEW DRUGS, *supra* note 23.

exist in these fields which is not inherent in the mechanical field.⁵⁹ Where the second applicant has made a chemical compound structurally similar to a previously patented compound and the chemical compounds possess essentially the same properties, granting a patent to the second applicant would undercut the previous patentee's original incentive to patent and deprive the first patentee of expected protection. The subject matter of the second application might meet with commercial success through an attractive advertising campaign or a less expensive production and distribution scheme, which are not necessarily characteristics of the subject matter itself. From a policy perspective, therefore, it would be improper to grant a patent for a chemical compound that is structurally similar to a compound previously patented when the two compounds have substantially similar properties.

Some decisions in the area of chemical patentability reflect the above-mentioned policy considerations. Other decisions can be rationalized if credence is given to such considerations. The policy discussions of the courts, however, are often too brief to be useful.⁶⁰ When strong policy bases do exist for a decision in this area, the policy is either not discussed or inadequately treated. Thus, the reliance by courts on policy justifications which they fail to discuss may explain why cases involving rejections predicated on obviousness seem to be irreconcilable.

IV. RATIONALE OF SECTION 103 OBVIOUSNESS REJECTIONS

The Supreme Court in *Graham* explained the underlying theory behind section 103: Congress only may enact legislation that authorizes patents for inventions which promote progress in the useful arts.⁶¹ Furthermore, only new and useful inventions which

59. The situation herein discussed is different from Judge Rich's argument that there is no risk of overpatenting because the marketplace can differentiate between the subject matters of the patents. Thus, the patent granted on a "commercial dud" is a nullity because an unwanted item is the subject of the monopoly. Rich, *supra* note 49, at 400-02. The problem with Judge Rich's argument is its assumption that there is a free flow of information to consumers who can discern the respective qualities of various related inventions. In the case of chemicals and pharmaceuticals, however, these assumptions may be invalid. Consumers may not be able to discriminate between two structurally similar pharmaceuticals that possess substantially similar pharmacological properties.

60. *But see* *Eli Lilly & Co. v. Premo Pharmaceutical Laboratories, Inc.*, 630 F.2d 120 (3d Cir. 1980). The policy considerations in the *Eli Lilly* case concerned a preliminary injunction. These considerations apply with equal weight, however, to the nonobviousness issue.

61. 383 U.S. at 5.

advance understanding and knowledge promote such progress.⁶² Hence, discoveries which do not expand this body of knowledge fail to promote progress in the useful arts and are deemed "obvious" and therefore unpatentable.⁶³

A. *Motivation Rationale*

The motivation rationale is the strongest legal rationale for the rejection of a claim based on obviousness. If the prior art contains enough information to suggest to the person of ordinary skill in the art that a certain modification of a known compound would possess advantageous properties, the modified compound which conforms to the suggestion would be obvious.⁶⁴ If there is no suggestion in the prior art that the modified compound would possess beneficial properties, the compound should not be deemed obvious.

Hypothetically, the prior art may disclose a compound useful as an anaesthetic and also indicate that substituent Y prolongs the activity of anaesthetics. A chemist then may modify compound X so that it contains substituent Y (X-Y) with the expectation that the anaesthetic will possess prolonged activity. X-Y may possess prolonged activity as an anaesthetic but, ultimately, it is unpatentable because that characteristic is obvious. Most cases, however, do not possess suggestions in the prior art that are as strong as those suggested by the hypothetical, and some courts seem to adopt less appropriate rationales.

B. *Quantum of Novelty Rationale*

The quantum of novelty theory, an example of a less appropriate rationale, suggests that the idea represented in the invention, although new, does not possess the requisite quantum of novelty to permit a limited monopoly. Justice Bradley discussed this rationale in *Atlantic Works v. Brady*:⁶⁵

The design of the patent laws is to reward those who make some substantial discovery or invention, which adds to our knowledge and makes a step in advance in the useful arts. Such inventors are worthy of all favor. It was never the object

62. *Id.* at 9.

63. *Id.*

64. *In re Stemniski*, 444 F.2d 581, 586 (C.C.P.A. 1971). See also *Wyman, Chemical Compounds and 35 U.S.C. 103*, 50 J. PAT. OFF. SOC'Y 586, 587-89 (1968); Note, *supra* note 27, at 625; Note, *supra* note 28, at 572 n.30.

65. 107 U.S. 192 (1882).

of those laws to grant a monopoly for *every trifling device, every shadow of a shade of an idea*, which would naturally and spontaneously occur to any skilled mechanic or operator in the ordinary progress of manufactures. Such an indiscriminate creation of exclusive privileges tends rather to obstruct than to stimulate invention.⁶⁶

Justice Bradley's "shadow of a shade of an idea," however, is a standard which focuses on novelty rather than obviousness. Equally inappropriate is the argument that the quantum of novelty in an invention may be so great that the invention's nonobviousness is indisputable.⁶⁷ These often unarticulated analyses evidence a confusion between the applicability of sections 102 and 103 of the Patent Act. This confusion is reinforced by the language of both *Graham* and section 103 which emphasize "differences between the subject matter sought to be patented and the prior art."⁶⁸

Section 103 analyses also suffer from hindsight analysis⁶⁹ in which the court reads the teachings of the invention at issue into the prior art. Such deficient analysis invariably results in an obviousness rejection.⁷⁰ This problem can be resolved if the courts remember to examine the differences "when it [the invention] was made,"⁷¹ as patent attorneys do in completing the application.⁷²

Another problem encountered in section 103 analyses is deciding from whose viewpoint obviousness should be measured. The plain meaning of section 103 suggests that such obviousness should be measured from the perspective of the person of ordinary skill in the art.⁷³ From this perspective, it would be most logical to examine not only a few select prior art references, but *all* related publications of which the person of ordinary skill in the art was aware when the invention was made. This view of the prior art would enhance the court's appreciation of the level of skill in

66. *Id.* at 200 (emphasis added).

67. Laurence, *Patentability of Homologs, Isomers and Other Analogs*, in PATENTS FOR CHEMICAL INVENTIONS 73, 78 (American Chemical Society Advances In Chemistry Series No. 46, 1964).

68. 35 U.S.C. § 103 (1976), *interpreted in* 383 U.S. at 17-19.

69. 383 U.S. at 36.

70. *Id.* See 347 BNA PAT. T.M. & COPYRIGHT J. A-12 (1977) (summary of Tom Arnold's speech before the BNA's conference on "Non-obviousness: The Standard of Patentability," (Sept. 7-9, 1977)). Arnold argues that this hindsight analysis also arises from the "differences" language of both *Graham* and § 103 which focuses on the differences which were not apparent when the invention was made. *Id.*

71. Markey, *supra* note 44, at D-1.

72. See text accompanying notes 174-78 *infra*.

73. 35 U.S.C. § 103 (1976).

the art and might lessen the tendency of courts to deem inventions obvious.⁷⁴ The courts, however, do not adopt this viewpoint in their examination of the prior art.⁷⁵ After reviewing only a limited number of prior art references, courts seemingly substitute their own judgments for those of the person of ordinary skill in the art and, as a result, have difficulty both in finding the claimed invention *not* obvious and in articulating reasons for their decisions.

Since the enactment of the 1952 Act, therefore, problems have plagued the courts' attempts to define workable standards and to articulate the rationales underlying section 103 of the 1952 Act. The history of the section has taught the legal community that no single approach is satisfactory. In fact, the courts are split; some courts support a rule that preserves the policies of the patent system and other courts support a rule that would satisfy prospective patentees. This tension has resulted in statutory requirements which yield to the policies behind the patent system.⁷⁶ A partial solution to this problem may be found if courts would limit obviousness rejections to cases where it can be shown that the inventor clearly was motivated by prior art references and the claimed invention was obvious in light of all the prior art references *at the time the invention was made*.

V. SECTION 103 AND CHEMICAL PATENTS

A. *The Hass-Henze Doctrine*

Prior to the enactment of 35 U.S.C. § 103, the Court of Customs and Patent Appeals decided the two cases which form the basis of the *Hass-Henze* doctrine.⁷⁷ The first case, *In re Hass*,⁷⁸ involved an applicant seeking a patent for certain nitrated alkenes when the prior art contained a homologue⁷⁹ and an isomer⁸⁰ of

74. *In re Murch*, 464 F.2d 1051, 1055 (C.C.P.A. 1972) (citing *In re Palmer*, 451 F.2d 1100, 1102-03 (C.C.P.A. 1971)).

75. See, e.g., *In re Papesch*, 315 F.2d 381 (C.C.P.A. 1963). "The problem of 'obviousness' . . . is not really a problem in chemistry It is a problem of *patent law*." *Id.* at 386 (emphasis supplied). This statement reinforces the argument made by some commentators that the person "of ordinary skill in the art" is as mythical as the "reasonable person" in tort law. See Colaianni, *supra* note 37, at 28; Western, *supra* note 29, at 446.

76. See notes 163-78 *infra* and accompanying text.

77. *In re Henze*, 181 F.2d 196 (C.C.P.A. 1950); *In re Hass & Susie*, 141 F.2d 122 (C.C.P.A. 1944).

78. 141 F.2d 122 (C.C.P.A. 1944).

79. See note 6 *supra*. See also Note, *supra* note 28, at 568 n.12.

80. See note 6 *supra*.

one of the claimed compounds. In rejecting Hass' claims, the court stated:

It is well understood by chemists that the members of a homologous series of chemical compounds possess the same principal characteristics; that generally the chemical and physical properties of the individual members vary gradually from member to member; and that knowledge of the properties and chemical behavior of one of the members suggests to the chemist the properties and chemical behavior of the other members of the series.⁸¹

Hass thus stands for the proposition that when considering the obviousness of chemical compounds, where the isomers or homologues of such compounds are found in the prior art, the compound claims will be invalid *unless* the applicant can prove some unexpected or unobvious beneficial properties not possessed by the prior art compounds. The rationale in *Hass* indicates the court's view that the chemist had invented nothing by synthesizing a structurally similar compound to the compound disclosed in the prior art. The court rejected Hass' claims because the applicant failed to prove any significant difference between the properties of the claimed compound and those properties possessed by the prior art compound. This conclusion is consistent with the *Hotchkiss* edict that invention requires more than mere novelty.⁸²

The second case supporting the *Hass-Henze* doctrine, *In re Henze*,⁸³ elevated the *Hass* requirement to a *presumption* of unpatentability, rebuttable only by proof that the prior art compound did not, *in fact*, possess the properties of the structurally similar claimed compound—in this case, the next lower homologue of the prior art compound.⁸⁴ This expansion of the *Hass-Henze* doctrine engendered much criticism from the legal community. Critics claimed that the presumption of unpatentability placed a burden on the inventor to test comparatively the claimed compound with structurally similar prior art compounds. Such a burden was viewed as a disincentive to disclose the invention in contravention of the major policies of the patent system.⁸⁵

81. 141 F.2d at 125. The court rejected Hass' claims despite the appellant's argument that the prior art failed to disclose a workable synthesis for the claimed compound and that the prior art reference was published prior to proper identification of the claimed compound.

82. See notes 30–33 *supra* and accompanying text.

83. 181 F.2d 196 (C.C.P.A. 1950).

84. *Id.* at 201.

85. See Note, *supra* note 27, at 610 n.14; Note, *supra* note 28, at 570 and references cited therein.

B. *The Demise of the Hass-Henze Doctrine—The Growth of Inseparability*

In reaction to the criticism of the *Hass-Henze* doctrine, the Court of Customs and Patent Appeals, in a series of opinions, gradually weakened the doctrine and replaced it with the inseparability doctrine. The first opinion to indicate a movement away from the *Hass-Henze* doctrine, *In re Mills*,⁸⁶ involved an applicant seeking to overturn a board rejection of claims on an anticaking agent where the prior art disclosed an anticaking agent that was neither an isomer nor a homologue of the claimed compound.⁸⁷ The *Mills* court held that *Hass-Henze* was inapplicable in this situation and that the *Henze* presumption was merely an inference of fact which placed the burden of persuasion on the applicant.⁸⁸ Most importantly, the court in *Mills* recognized that *differences as well as similarities* in properties are *obviously* expected when studying members of homologous series.⁸⁹ In reversing the board's rejection of the applicant's claims, the *Mills* court stated that homology is but one factor which should be considered in determining questions of obviousness under 35 U.S.C. § 103.⁹⁰

Prior to *In re Papesch*,⁹¹ the next major case in this area, the Court of Customs and Patent Appeals always used the *Hass-Henze* doctrine to deny patentability unless the applicant could prove the existence of unexpected properties which the structurally similar prior art compound did not possess.⁹² In the *Papesch* decision, however, the court used an affirmative restatement of the *Hass-Henze* doctrine to *grant* a patent for a triethyl compound possessing an advantageous antiinflammatory characteristic which the prior art trimethyl compound did not possess. The court stated, "[P]roof of the existence of unobvious or unexpected beneficial properties in a new compound, which would otherwise appear to be obvious (along with its properties), is indicative of the

86. 281 F.2d 218 (C.C.P.A. 1960), noted in 29 GEO. WASH. L. REV. 957 (1961).

87. The prior art compounds contained at least seven and as many as eleven additional methylene groups ($-\text{CH}_2-$) over the claimed compound. See also note 6 *supra*.

88. The *Mills* court distinguished *Henze* on the peculiar fact that the *Henze* applicant reasonably could have been expected to have the results of the comparative testing of the prior art and claimed compounds on hand.

89. 281 F.2d at 224.

90. *Id.*

91. 315 F.2d 381 (C.C.P.A. 1963).

92. See generally *In re Papesch*, 315 F.2d 381, 387-92 (C.C.P.A. 1963), and cases discussed therein.

presence of 'invention' and hence of patentability."⁹³

The *Papesch* decision, therefore, reiterated the position of the *Mills* court that *proven dissimilarities* in homologue compounds are more important than *assumed similarities*. Moreover, the *Papesch* court reasoned that since the prior art did not disclose a beneficial property for the trimethyl compound, it was not obvious for a chemist to synthesize the triethyl compound to obtain its beneficial property. This analysis is consistent with the motivation rationale.⁹⁴ In addition, the *Papesch* decision examined both the *structures and the properties* of the claimed and prior art compounds to resolve questions of obviousness and stated that a "compound and all of its properties are inseparable."⁹⁵ Thus, *Papesch* is the foundation of the inseparability doctrine. *Papesch* indicates, however, that the claimed compound is not patentable where the prior art discloses a structurally similar compound which possesses the same properties as the claimed compound to a lesser degree.⁹⁶ "A mere difference in degree is not the marked superiority which ordinarily will remove the unpatentability of adjacent homologues of old substances."⁹⁷

This "lesser degree" problem arose only three months after *Papesch* in *In re Riden*.⁹⁸ The court in *Riden*, following the reasoning of *Papesch*, denied the grant of a patent where the applicant failed to prove that the claimed compound possessed a *new property not possessed* by the prior art compound.⁹⁹ The *Hass-Henze* requirements, therefore, survived where the prior art disclosed a beneficial property similar to that possessed by the structurally related claimed compound. The applicant in *Riden* further argued that the synthetic route¹⁰⁰ to the claimed compound was undisclosed in the prior art and thus made the compound nonobvious.¹⁰¹ The court recognized that although the synthetic route is a relevant factor to consider in resolving questions of obviousness,

93. 315 F.2d at 386.

94. See note 64 *supra* and accompanying text.

95. 315 F.2d at 391. Support for this conclusion is found in § 103: "Subject matter as a whole" includes the claimed compound's structure and properties. See also *Commissioner of Patents v. Deutsche Gold-und-Silber-Scheideanstalt Vormals Roessler*, 397 F.2d 656, 664 (D.C. Cir. 1968).

96. 315 F.2d at 392 (citing *In re Loring Coes*, 173 F.2d 1012 (C.C.P.A. 1949)).

97. *Id.* (emphasis supplied).

98. 318 F.2d 761 (C.C.P.A. 1963).

99. *Id.* at 764.

100. A synthetic route is a series of individual synthetic steps utilized in the production of a chemical compound.

101. 318 F.2d at 764.

it is entitled to minimal weight.¹⁰²

One year after *Riden*, the Court of Customs and Patent Appeals decided *In re Elpern*,¹⁰³ a split decision that illustrates the disagreement within the court in the mid-1960's over questions of chemical obviousness. In *Elpern*, the examiner viewed the prior art compound as homologous to the claimed compound when, in fact, the compounds contained different alkyl substituents at two adjacent carbon atoms. The court compared the structural differences of the compounds and concluded that these compounds were nonadjacent members of a homologous series that fell within the *Mills* exception to *Hass-Henze*.¹⁰⁴ This conclusion allowed the court to confer patentability without considering the differences in properties between the claimed compounds and the prior art compounds.¹⁰⁵ Thus, the court's analysis, which examined structural similarities rather than property similarities, weakened the *Hass-Henze* doctrine without augmenting the inseparability doctrine. In a concurring opinion, however, Judge Smith argued that *Papesch* required the court to consider the structural similarities *as well as* the pharmacological properties in the claimed and prior art compounds to resolve questions of obviousness.¹⁰⁶ Judge Smith found that the prior art disclosed no pharmacological properties on which to base an obviousness rejection and concluded that the claimed compounds were patentable.¹⁰⁷

The dissenters in *Elpern*, Judges Almond and Worley, argued that the structural similarity of the prior art and claimed compounds required a *direct comparison* of the compounds' physical properties to resolve the obviousness issue¹⁰⁸—a position more consistent with the *Hass-Henze* doctrine. Thus, the *Elpern* decision illustrates the variety of approaches to questions of chemical obviousness taken by the Court of Customs and Patent Appeals in the mid-1960's.

In 1971, the Court of Customs and Patent Appeals resolved some of the conflicts in this area with its decision in *In re Stenniski*.¹⁰⁹ In *Stenniski*, two prior art references could be com-

102. *Id.*

103. 326 F.2d 762 (C.C.P.A. 1964). Judge Martin, writing for the court, was joined by Judge Rich.

104. *Id.* at 767.

105. *Id.*

106. *Id.* at 767-68.

107. *Id.*

108. *Id.* at 768-69.

109. 444 F.2d 581 (C.C.P.A. 1971).

bined to teach the synthesis of the claimed component but neither reference disclosed any utility for the prior art compounds. The appellant, arguing for a reversal of the board's rejection of his patent request, asserted that "[D]iscovery of the utility itself is evidence of the unobviousness [sic] of the novel compounds."¹¹⁰ The court accepted the appellant's argument and reversed the rejection of his claims:

[W]hat on this record—other than abstract, theoretical or academic considerations—would lead one of ordinary skill to change the structure of the reference compounds to obtain the claimed compounds? Certainly no practical considerations which promote the progress of useful arts or are of use to society are manifest. How can there be obviousness of structure, or particularly of the subject matter as a whole, when no apparent purpose or result is to be achieved, no reason or motivation to be satisfied, upon modifying the reference compounds' structure?¹¹¹

The court, by explicitly overruling *Henze* and *Riden*, struck down the comparative testing requirement where the properties of the structurally similar prior art compounds are not disclosed in the prior art.¹¹² The decision in *Stemniski*, which grants a patent on the composition of matter where the true discovery lies in unexpected beneficial properties, has met with mixed reaction in the legal community.¹¹³ The decision has been criticized on the grounds that the full composition of matter patent is a "windfall" protection where the patentee's true invention exists in the compound's properties.¹¹⁴ Critics assert that the use patent is more appropriate than the composition of matter patent in such circumstances.¹¹⁵ In light of this criticism, *Stemniski* and other decisions¹¹⁶ indicate that the policies of the patent system are served

110. *Id.* at 584.

111. *Id.* at 586.

112. *Id.* at 587.

113. Compare Kitch, *The Patent System and the New Drug Application: An Evaluation of the Incentives for Private Investment in New Drug Research and Marketing*, in REGULATING NEW DRUGS, *supra* note 23, at 81, 88-100 with Note, *supra* note 27, at 614-20.

114. Kitch, *supra* note 113.

115. *Id.* at 88; Note *supra* note 27, at 608 n.5.

116. The most significant District Court case after *Papesch* but prior to *Stemniski* was *Commissioner of Patents v. Deutsche Gold-und-Silber Scheideanstalt Vormals Roessler*, 397 F.2d 656 (D.C. Cir. 1968). Chief Justice (then Judge) Burger realized that the enormous number of known organic compounds gives rise to a situation where the synthesis of a new chemical compound with a unique grouping of atoms is a rare occurrence. *Id.* at 663. Thus, in a situation where an obviousness rejection is predicated only on structural similarity, few new compounds would be patentable, and the incentive aspects of the patent system would be lost. *Id.*

best by granting a patent on the composition of matter rather than on the use. Thus, the inseparability doctrine, although not without limitations,¹¹⁷ continues to expand.¹¹⁸

The Third Circuit recently adopted the *Papesch* approach in *Eli Lilly & Co. v. Premo Pharmaceutical Laboratories, Inc.*, 630 F.2d 120 (3d Cir. 1980), apparently overruling a prior district court opinion, *Monsanto Co. v. Rohm & Haas Co.*, 312 F. Supp. 778 (E.D. Pa. 1970) (dicta), *aff'd on other grounds*, 456 F.2d 592 (3d Cir.), *cert. denied*, 407 U.S. 934 (1972). See also Note, *supra* note 27, at 614-16.

In contrast, the Second Circuit has failed twice to accept the *Papesch* doctrine by disposing of cases on alternative grounds. See *General Tire & Rubber Co. v. Jefferson Chemical Co.*, 497 F.2d 1238 (2d Cir.), *cert. denied*, 419 U.S. 968 (1974); *Carter-Wallace, Inc. v. Davis-Edwards Pharmacal Corp.*, 341 F. Supp. 1303 (E.D.N.Y. 1972), *aff'd on other grounds sub nom. Carter-Wallace, Inc. v. Otte*, 474 F.2d 529 (2d Cir. 1972), *cert. denied*, 412 U.S. 929 (1973).

117. See, e.g., *In re Grose*, 592 F.2d 1161 (C.C.P.A. 1979): The *Grose* court reviewed the board's rejection of claims for a patent on a zeolite, a chemical mixture essentially identical in composition to a prior art zeolite, and specifically restricted the application of the *Papesch* decision to its facts:

No reason exists for applying the law relating to structural obviousness of those compounds which are homologs or isomers of each other to this case. . . . A zeolite, like those of the instant case, is not a compound which is a homolog or isomer of another, but is a mixture of various compounds

Id. at 1167-68.

The court affirmed the board's rejection on the grounds that the appellant's X-ray data failed to prove that the claimed zeolite was structurally different from the prior art zeolite. Had the *Grose* court employed the inseparability doctrine, a two-pronged inquiry would have resulted. First, the court would ask whether the similarities in chemical composition of the claimed and prior art zeolites would indicate a similarity in the properties of the zeolites. This question would probably be answered in the affirmative. Second, the court would ask whether proof of the differences in the properties of the zeolites would rebut a showing of obviousness based on chemical composition similarity. The answer to this question would demand an inquiry into whether the X-ray properties of a zeolite are useful properties—an inquiry which the court was not willing to undertake.

The avoidance in *Grose* of the inseparability doctrine contradicts the analysis of *Papesch* engaged in by the court in *In re Huellmantel*, 324 F.2d 998 (C.C.P.A. 1963). In that chemical mixture case, the court examined the similarity of the claimed and prior art chemical compositions and their pharmaceutical properties. *Id.* at 1001.

118. The inseparability doctrine recently has been incorporated in the area of optical isomers where the prior art discloses the chemical racemate. Optical isomers are compounds which differ only in their effect upon polarized light and their reactivities in an asymmetric environment. A racemate is a fifty-fifty mixture of laevo-rotatory and dextro-rotatory optical isomers. These two components of a racemic mixture may be separated and purified. The issue in these cases is whether the pure optical isomer is patentable when the prior art discloses the racemate.

The leading case on optical isomers is *In re Williams*, 171 F.2d 319 (C.C.P.A. 1948). In *Williams*, the applicant sought a patent for the laevo rotamer of a lactone where the racemic lactone was disclosed in the prior art. The court reversed the board's rejection of the applicant's claim on the ground that there was no proof that one skilled in the art would know that the prior art disclosed a racemic mixture. The court indicated that had the prior art reference clearly disclosed that the lactone obtained was a racemic mixture, the knowledge possessed by those skilled in the art (that racemic mixtures may be separated into the dextro and laevo optical isomers) would make the laevo isomer obvious and unpatentable.

C. *Prima Facie Obviousness*

A *prima facie*¹¹⁹ showing of obviousness is made when the prior art reveals chemical compounds so similar in structure to the claimed compound that a person of ordinary skill in the art would expect the properties of the prior art and the claimed compound to be similar.¹²⁰ The more similar the structures of the prior art and claimed compounds, the stronger the inference that a *prima facie* case of obviousness has been made.¹²¹ This *prima facie* case, once

In re Adamson, 275 F.2d 952 (C.C.P.A. 1960), followed *Williams* and denied the patentability of a claimed optical isomer under similar facts. The *Adamson* court, however, recognized two important facts: First, that a person of ordinary skill in the art should have known that the compound disclosed in the prior art was racemic; and, second, that the physiological activities of the different optical isomers are expected to be different. These facts led the court in *Adamson* to conclude that it would be obvious for one skilled in the art to separate a racemic mixture into its dextro and laevo isomers and test the individual isomers for their physiological activity.

The *Adamson* decision is properly viewed as superseding the *Williams*' obviousness analysis. *Ex parte Openshaw*, 143 U.S.P.Q. (BNA) 40 (Pat. Off. Bd. App. 1964). Later cases which favorably cite *Williams* focus on the novelty requirement. See, e.g., *In re May*, 574 F.2d 1082 (C.C.P.A. 1978). *Williams* is one case in a long line of cases beginning with the now famous Aspirin Case, *Farbernfabriken of Elberfeld Co. v. Kuehmsted*, 171 F. 887 (N.D. Ill. 1909), *aff'd*, 179 F. 701 (7th Cir. 1910). Most recent cases, such as *May*, have abandoned the *Adamson* analysis and adopted the inseparability analysis. In *May*, the court reversed the board's rejection because the applicant proved that the claimed optical isomers of prior art compounds were *nonaddictive*, a property not disclosed in the prior art. Research established *substantial unpredictability* in the physiological activities of these and other closely related compounds. Read in light of *Williams* and *Adamson*, *May* establishes some uniformity in the area of chemical patents. *May* rejects the factual distinctions of the *Papesch* decision and broadens the inseparability doctrine to include the area of optical isomers. This broad reading of *Papesch* may have future impact on other areas of chemical patents not covered by the inseparability doctrine. See also *In re Kratz*, 592 F.2d 1169 (C.C.P.A. 1979).

119. The words "inference of obviousness" in the *Elpern* decision were replaced by "prima facie obviousness" in *In re Hoch*, 428 F.2d 1341 (C.C.P.A. 1970). There is, however, a line of cases stating that the term used is not necessarily controlling. "Whether it is called an inference of obviousness . . . [or] a prima facie showing of obviousness . . . is, we believe, immaterial." *Commissioner of Patents v. Deutsche Gold-und-Silber Scheideanstalt Vormals Roessler*, 397 F.2d 656, 664 (C.C.P.A. 1967).

120. *In re Hoch*, 428 F.2d 1341, 1344 (C.C.P.A. 1970).

121. The expectation of similarity in the properties of prior art and claimed compounds, however, does not extend to cases where the prior art compound is a product of a series of chemical reactions and the claimed compound is an intermediate in the reaction sequence.

In re Gyurik, 596 F.2d 1012 (C.C.P.A. 1979), involved a claim for a thio compound where the prior art disclosed a sulfinyl compound allowing the claimed compound to be used as an intermediate in the synthesis of the prior art compound. Although the prior art compound possessed a general beneficial property (anthelminticity), the claimed compound proved to possess greater anthelmintic activity and lower toxicity. The court held there was no presumption of unpatentability (obviousness) in a case where the intermediate in a reaction sequence is the claimed compound and the end product is the prior art compound. The rationale for this rule is twofold: First, there is no presumed similarity of

made, is rebuttable only by proof that its underlying presumptions are invalid.¹²² Such a showing can be achieved if the applicant can prove that there are *actual and significant* differences between the properties of the claimed and prior art compounds¹²³ or that the differences which exist were unexpected in light of the prior art.¹²⁴ Furthermore, the prima facie case of obviousness will be deemed rebutted if it can be established that the chemist was unmotivated by the prior art¹²⁵ or that the claimed compound's structure was not obvious from the prior art.¹²⁶ Finally, a successful rebuttal can be predicated on a showing that a substantial degree of unpredictability exists in the prior art.¹²⁷

The answer to the recurring question—whether the prior art disclosures of chemical structures and properties constitute sufficient motivation for the synthesis of the claimed compound¹²⁸—provides the most appropriate rationale for these decisions.¹²⁹ This subjective question concerning the chemist's motivation is answerable only upon the examination of two objective factors: the similarity of the prior art and claimed structures,¹³⁰ and the relationship between the properties of the prior art compound and the properties of the claimed compound.¹³¹

By a direct comparison of the structures of the prior art and claimed compounds, an argument against a prima facie showing of obviousness can be made based on the dissimilarity of those

properties between intermediates and their corresponding end products; and second, there is no motivation for the chemist to test intermediates for the activity possessed by their end products. Based on these reasons, the court reversed the board's obviousness rejection. *See also In re Payne*, 606 F.2d 303 (C.C.P.A. 1979); *In re Magerlein*, 602 F.2d 366 (C.C.P.A. 1979).

122. *In re Hoch*, 428 F.2d 1341, 1344 (C.C.P.A. 1970).

123. *In re Shetty*, 566 F.2d 81 (C.C.P.A. 1977); *In re Hoch*, 428 F.2d 1341 (C.C.P.A. 1970).

124. *Application of Juillard*, 476 F.2d 1380 (C.C.P.A. 1973).

125. Thus, the prior art is silent as to the properties of the structurally similar prior art compounds. *In re Albrecht*, 514 F.2d 1385 (C.C.P.A. 1975); *In re Stemmiski*, 444 F.2d 581 (C.C.P.A. 1971).

126. *In re Grunwell*, 609 F.2d 486 (C.C.P.A. 1979). *See Wegner, Prima Facie Obviousness of Chemical Compounds*, 6 AM. PAT. L.A.Q.J. 271 (1978).

127. *See Eli Lilly & Co. v. Prema Pharmaceutical Laboratories, Inc.*, 630 F.2d 120 (3d Cir. 1980). *See also R. CHOATE, CASES AND MATERIALS ON PATENT LAW* 371 (1973); *Note, supra* note 27.

128. *In re Lintner*, 458 F.2d 1013, 1016 (C.C.P.A. 1972).

129. *See notes 63–65 supra* and accompanying text.

130. *See Wegner, supra* note 126.

131. These two objective factors highlight the ascertainable differences between the prior art and the claims at issue and, as such, are primary considerations in the *Graham* sense. 383 U.S. at 17.

structures.¹³² It might be just as instructive, however, to compare synthetic methods when arguing against the establishment of a prima facie case. Proof that the chemist employed a synthetic route different from that disclosed in the prior art—provided that the synthesis disclosed in the prior art is applicable to the claimed compound—may show that the chemist was not motivated by the prior art. If the synthesis disclosed in the prior art is inapplicable to the claimed compound or is, in fact, the one employed, motivation by the prior art might be established. Merely showing, however, that the synthesis disclosed in the prior art is the same as that employed by the chemist to synthesize the claimed compound does not conclusively establish the obviousness of the claimed compound. The simplicity of common synthetic methods and the availability and expense of starting materials also may dictate the selection of a given synthetic route.

On at least two occasions, the Court of Customs and Patent Appeals has considered whether variation in the synthetic methods for the claimed compound and the prior art compound is evidence of nonobviousness. In *In re Riden*,¹³³ the court held that evidence of the variation of synthetic routes should be considered on the issue of nonobviousness of the claimed compound but should be accorded *little weight*.¹³⁴ In the later case of *In re Hoeksema*,¹³⁵ the court held that the complexity or nonobviousness of a synthesis as evidence of the nonobviousness of the compound should be given *no weight*.¹³⁶ This court then stated, however, that such evidence is relevant to the question of whether a *method* is patentable.¹³⁷ In light of the above discussion, evidence of a synthetic route different from that disclosed in the prior art should be considered as evidence rebutting the prima facie showing of obviousness, as it may prove that the chemist was unmotivated by the prior art references.¹³⁸

132. See Wegner, *supra* note 126.

133. 318 F.2d 761 (C.C.P.A. 1963). See notes 98–102 *supra* and accompanying text.

134. *Id.* at 764. The appellants in *Riden* did not fully develop their arguments. "The record does not show whether there are other methods, besides appellants', for making the compounds." *Id.*

135. 379 F.2d 1007 (C.C.P.A. 1967).

136. *Id.* at 1011.

137. *Id.*

138. This view was expressed in *In re Grose*, 592 F.2d 1161 (C.C.P.A. 1979): "Failure of the prior art to disclose or render obvious a method for making any composition of matter, whether a compound or mixture of compounds . . . precludes a conclusion that the composition would have been obvious." *Id.* at 1168. *In re Hoeksema*, 399 F.2d 269, 274 (C.C.P.A. 1968).

The second factor in determining the motivational issue demands a comparison of the properties possessed by the prior art compound(s) with the properties of the claimed compounds. The central question is determining the nature of the relationship between the properties disclosed in the prior art or possessed by the prior art compounds and those of the claimed compound. The courts are divided on the proper method of resolving this question. The cases fall into three categories which will be analyzed individually.

1. Case 1

The claimed compound possesses a property not disclosed in the prior art for the structurally similar prior art compounds. This broad category encompasses three different fact patterns.

a. The claimed compound possesses a property not disclosed in the prior art but which is actually possessed by the structurally similar prior art compound.

The most noted case supporting patentability in this situation is *In re Stemmiski*. This case held that a prima facie showing of obviousness is rebuttable by proof that the claimed compound possesses a significant utility not indicated by the prior art.¹³⁹ The rationale for this rule is that the prior art provides no motivation for the chemist to synthesize the claimed compound because it discloses *no utility* for the claimed compound.

Despite *Stemmiski's* strong rationale, other cases in the Court of Customs and Patent Appeals have been decided differently.¹⁴⁰ In each of these cases, the prior art was silent concerning the property actually possessed by the prior art compound. In *In re Wilder*,¹⁴¹ the applicant discovered that the chemical compound (a rubber additive which retarded deterioration) lacked the skin toxicity characteristic of the prior art compounds. The Court of Customs and Patent Appeals affirmed the board's rejection in *Wilder*.¹⁴² *Wilder* can be rationalized on two grounds. First, one of the prior art compounds was shown to be a lesser irritant than the claimed compound. Thus, the appellant could not show any actual difference between the claimed and prior art compounds.

139. See notes 109-18 *supra* and accompanying text.

140. See *In re Shette*, 566 F.2d 81 (C.C.P.A. 1977); *In re Wilder*, 563 F.2d 457 (C.C.P.A. 1977); *In re Hoch*, 428 F.2d 1341 (C.C.P.A. 1970); *In re Mod*, 408 F.2d 1055 (C.C.P.A. 1969); *In re DeMontmollin*, 344 F.2d 976 (C.C.P.A. 1965).

141. 563 F.2d 457 (C.C.P.A. 1977).

142. *Id.* at 461.

Second, the lack of skin toxicity is an insignificant property for a compound which is used primarily as a rubber additive.¹⁴³ The *Wilder* line of cases, therefore, stands for the proposition that to rebut the prima facie showing of obviousness, the claimed compound must have a *significant, additional* property which the prior art compound lacks.¹⁴⁴

b. The claimed compound possesses a property diametrically opposed to those properties indicated by prior art disclosures of structurally similar compounds.

Cases falling into this category generally hold that the compound is patentable.¹⁴⁵ One such case, *In re Lambooy*,¹⁴⁶ involved a claimed compound possessing antivitamin properties where the prior art contained a homologue of the claimed compound (riboflavin) possessing vitamin properties. The court held the claimed compound patentable as there was no evidence "which would lead one skilled in this art to expect that the differences in the molecular structure between riboflavin and the appellant's compound would cause this difference in properties."¹⁴⁷ Thus, *Lambooy* also is consistent with the motivation rationale.¹⁴⁸

c. The claimed compound possesses a property not disclosed in the prior art, and there is no comparison between the respective properties of the prior art and claimed compounds.

143. The Court of Customs and Patent Appeals also affirmed the board's rejection in a similar fact situation where the claimed compound had the singular additional ability, over similar prior art compounds, to dye cellulose. See *In re DeMontmollin*, 344 F.2d 976 (C.C.P.A. 1965). The court avoided a *Papesch* analysis stating, "We do not agree . . . that a single variance in the properties of new chemical compounds will necessarily tip the balance in favor of patentability where otherwise closely related chemical compounds are involved." *Id.* at 978. Judge Smith's dissent in *DeMontmollin* sharply criticized the majority for its avoidance of the *Papesch* analysis and its hindsight reconstruction of the prior art. *Id.* at 979. *Wilder* and *DeMontmollin* also may be viewed as examples of the court's employing the quantum of novelty rationale. See notes 65-72 *supra* and accompanying text.

144. Additional support for this statement can be found in *In re Mod*, 408 F.2d 1055 (C.C.P.A. 1969):

Inasmuch as the claimed compounds and those of Bousquet do possess a close structural relationship and it is not denied that they have a *specific, significant* property in common, viz. insecticidal activity, we do not regard the additional antimicrobial activity discovered by appellants for the claimed compounds sufficient ground to hold that the subject matter as a whole is unobvious.

Id. at 1057 (emphasis supplied).

145. See *In re Petering*, 301 F.2d 676 (C.C.P.A. 1962); *In re Lambooy*, 300 F.2d 950 (C.C.P.A. 1962).

146. 300 F.2d 950 (C.C.P.A. 1962).

147. *Id.* at 955.

148. See notes 63-65 *supra* and accompanying text.

In re Albrecht,¹⁴⁹ which is indicative of the cases that follow *Stemniski*, suggests that a structurally similar claimed compound is patentable regardless of whether the prior art compound actually possesses the property of the claimed compound. The case further stipulates, however, that such patentability only occurs if the prior art is silent as to that property. In this regard, the *Albrecht* court stated, "We are of the opinion that a novel chemical compound can be *nonobvious* to one having ordinary skill in the art notwithstanding that it may possess a known property in common with a known structurally similar compound."¹⁵⁰ *Albrecht*, therefore, is consistent with the *Stemniski* analysis and the motivation rationale.¹⁵¹

In contrast, there are several cases including *Wilder*, that support the opposite view. In *In re Shetty*,¹⁵² for example, the court affirmed the board's rejection of the composition claims for a class of compounds which curbed animal appetites where the prior art disclosed structurally similar compounds which combatted microbial infestation. The court stated:

Confronted with . . . evidence of obviousness, appellant has offered no evidence of unobviousness, as by showing an actual difference in properties between his compounds and the prior art compounds. Appellant merely shows that his compounds are appetite suppressants whereas the reference compounds are not so known. Further, appellant has not indicated whether his compounds are antiviral, as is [the] prior art compound. [In the] absence of comparative evidence . . . we hold that composition claim . . . obvious . . . and unpatentable . . .¹⁵³

Shetty also is consistent with the quantum of novelty rationale. The court stated that the minor molecular modification did not constitute an "appreciable difference" from the prior art compounds and that "a person skilled in chemical and/or pharmaceutical arts would not hesitate to [synthesize the claimed compound]."¹⁵⁴

2. Case 2

The claimed compound possesses the same beneficial property

149. 514 F.2d 1389 (C.C.P.A. 1975).

150. *Id.* at 1395-96 (emphasis supplied).

151. See notes 63-65 *supra* and accompanying text.

152. 566 F.2d 81 (C.C.P.A. 1977).

153. *Id.* at 86.

154. *Id.* The court thought that the similarities of the claimed and prior art compounds, as well as the disclosure of the synthesis of the claimed compound in the prior art, provided sufficient motivation for the chemist to synthesize the claimed compound. *Id.*

as that disclosed in the prior art for the structurally similar prior art compound, but to a different degree.

Although there is language to the contrary in some cases,¹⁵⁵ chemical compounds generally are patentable when the property they possess is present to an unexpected and greater degree than that present in the prior art compound. A case representative of this principle, *In re McLamore*,¹⁵⁶ involved an applicant seeking a patent on a chemical compound for the oral treatment of diabetes where the prior art contained a homologue useful for the same purpose. The court reversed the board's rejection of the compound claim and held that *substantially improved results* in the same field of use known in the prior art is evidence to rebut a showing of prima facie obviousness.¹⁵⁷

McLamore and similar cases¹⁵⁸ are inconsistent with both the motivation rationale and the holding of *Wilder*. In *McLamore*, the prior art discloses structurally similar compounds with beneficial properties. A person of ordinary skill in the art, however, knows that small structural modifications may create beneficial differences in the compound's known properties which, in turn, may motivate the synthesis of such compounds. Furthermore, the property which the claimed compound possesses fails to be "additional;" it is simply present to a greater degree. This line of reasoning, therefore, is inconsistent with the *Wilder* standard which provides that a prima facie showing of obviousness only will be rebutted by showing that the claimed compound possesses a significant and additional property not possessed by the prior art compound.¹⁵⁹ Thus, the court in *McLamore* demonstrates the quantum of novelty rationale.¹⁶⁰ *McLamore* may be justified further by previously discussed policies embraced by the patent system.¹⁶¹

3. Case 3

The prior art discloses both a compound and a proposed modification for that compound which is expected to be beneficial.

155. See, e.g., *In re Papesch*, 315 F.2d 381 (C.C.P.A. 1963); *In re Coes*, 173 F.2d 1012 (C.C.P.A. 1949).

156. 379 F.2d 985 (C.C.P.A. 1967).

157. *Id.* at 989-90.

158. E.g., *In re Ackermann*, 444 F.2d 1172 (C.C.P.A. 1971); *In re Lohr*, 317 F.2d 388 (C.C.P.A. 1963).

159. See notes 138-44 *supra* and accompanying text.

160. See notes 65-67 *supra* and accompanying text.

161. See notes 48-60 *supra* and accompanying text.

The claimed compound is synthesized in accordance with the prior art proposal.

The general rule in this situation is to deny patentability of the claimed compound when it possesses the beneficial properties to the extent predicted.¹⁶² The prior art would make the compound with the proposed modification and its beneficial properties obvious to a person of ordinary skill in the art. Furthermore, the expectation that the property would be beneficially modified might provide the motivation for the synthesis.

The Court of Customs and Patent Appeals, however, has granted patents on compound claims where the proposed modification produced a more beneficial result than was expected. In *In re Blondel*,¹⁶³ for example, the prior art disclosed structurally similar compounds to those claimed and suggested that the addition of longer alkyl chains would significantly enhance the beneficial property by prolonging the drug's activity.¹⁶⁴ The applicant in *Blondel* synthesized the compound conforming to the suggested modification and discovered that the compound possessed more prolonged activity than could have been predicted by the prior art. The court reversed the board's rejection of the applicant's composition claim on the basis of this finding.¹⁶⁵

Blondel is inconsistent with cases adopting the motivation rationale because the prior art references motivated the chemist to synthesize the longer chain compound with the expectation that prolonged activity would result. The mere fact that the *quantitative* prediction of prolonged activity based on the prior art was surpassed (by 150%) caused the court to find the compound non-obvious and patentable.¹⁶⁶ Thus, *Blondel* can be viewed either as a case in which the quantum of novelty rationale supported the court's opinion or as a case where the underlying policies of the patent system¹⁶⁷ subverted the statutory scheme.

VI. RECENT DEVELOPMENTS—PROPOSALS

Judicial reliance on either unexpected properties or unantici-

162. See notes 121–27 *supra* and accompanying text.

163. 499 F.2d 1311 (C.C.P.A. 1974).

164. *Id.* at 1312–14.

165. *Id.* at 1318.

166. *Id.* The court also recognized that a substantial degree of unpredictability in physical properties results from minor modifications of chemical structure. *Id.* at 1317.

167. See notes 152–65 *supra* and accompanying text. See also *In re Murch*, 464 F.2d 1051 (C.C.P.A. 1972) where significant improvement in an obvious combination led to a patent.

pated increases in known properties as indicia of nonobviousness of a chemical compound may be made obsolete by the current trends in chemistry. A party attempting to invalidate an opponent's patent in an infringement proceeding, for example, may find it easier to argue that a compound exhibits expected results or possesses predictable properties—factors which have been deemed virtually conclusive on the issue of obviousness.¹⁶⁸ Furthermore, quantitative structure-activity and linear free energy relationships are rapidly becoming useful tools in solving complex chemical problems.¹⁶⁹ Simply stated, the theory behind such relationships is that similar modifications of chemical structure will produce quantitatively similar changes in chemical properties.¹⁷⁰ Although various approaches to these problems exist, some chemists create mathematical correlations between physical activity and chemical structures. This approach predicts structures which optimize the advantageous characteristics while minimizing adverse characteristics under prescribed conditions.¹⁷¹

These linear free energy and structure-activity relationships are potentially revolutionary techniques because of their predictive value in new chemical design.¹⁷² Chemists are no longer randomly synthesizing molecules in the hope that a given molecule will possess certain characteristics. Using such relationships, chemists try to synthesize chemical compounds with predictable characteristics to eliminate the expense and delay of random searches for new and useful compounds. If such predictions concerning the physical characteristics of unsynthesized compounds succeed, however, it would be difficult to argue that the compound, once synthesized, exhibits unexpected results. If the current judicial standard—accepting proof of “expected” properties in novel compounds as conclusive evidence of obviousness—remains unchanged, therefore, then the patentability of compounds synthesized after such studies would be questionable. Thus, these recent advances in chemists' approaches to the solu-

168. See notes 120-67 *supra* and accompanying text.

169. For a general review, see CORRELATION ANALYSIS IN CHEMISTRY (N. Chapman & J. Shorter eds. 1978).

170. Wold & Sjöstrom, *Linear Free Energy Relationships as Tools for Investigating Chemical Similarity—Theory and Practice*, in *id.* at 1, 3.

171. AMERICAN CHEMICAL SOCIETY ADVANCES IN CHEMISTRY SERIES NO. 114, BIOLOGICAL CORRELATIONS—THE HANSCH APPROACH vi (1972); Joyner & Purcell, *Quantum Pharmacology and Quantitative Structure—Activity Relationships: A Brief Review*, in QUANTITATIVE STRUCTURE—ACTIVITY RELATIONSHIPS 13, 19 (M. Tichy ed. 1973).

172. 499 F.2d 1311 (C.C.P.A. 1974).

tion of complex compound design problems may necessitate a fundamental change in the statutory scheme for the patentability of chemical compounds.¹⁷³

Some of the uncertainties in this area would be eliminated if the courts would adopt a more rigorous analysis. The courts should first examine carefully the differences between the prior art and the claimed compounds in a manner analogous to the patent attorney's examination of the invention at the time it was made and prior to filing for a patent. If the differences between the structures and syntheses of the claimed and prior art compounds are so great that there is no probability the chemist was motivated by the prior art, the claimed compound should not be deemed obvious. If the *prima facie* case arises, conversely, because there are sufficient structural similarities between the prior art and the claimed compounds to suggest that the chemist was motivated by the prior art, the court should examine carefully whether there is any evidence to rebut the *prima facie* case. The court should determine whether the prior art is silent as to the properties of the prior art compound and whether the prior art leads the field in the opposite direction. Finally, if the underlying policies of the patent system support protection of the invention, the court should relax the statutory requirements of patentability and articulate its reasons for these less stringent requirements.

VII. CONCLUSION

Under the current interpretation of 35 U.S.C. § 103, courts examine the structural similarities and properties of the claimed and prior art compounds,¹⁷⁴ subject to few exceptions.¹⁷⁵ If these compounds possess similar structures and a person of ordinary skill in the art would expect that the properties also would be similar, the courts examine the unexpected or actual, significant differences in the properties of the claimed and prior art compounds.¹⁷⁶ The use of structure activity and linear free energy relationships, however, is rapidly advancing to the point where chemists can use their studies of the structures and properties of prior art compounds to predict with quantitative accuracy the properties of unsynthesized compounds.¹⁷⁷

173. See notes 91-167 *supra* and accompanying text.

174. See notes 86-167 *supra* and accompanying text.

175. See note 117 *supra*.

176. See notes 119-67 *supra* and accompanying text.

177. See notes 168-73 *supra* and accompanying text.

The policies of the patent system¹⁷⁸ dictate that full composition of matter patents should be granted for chemical compounds that are new, useful, and not obvious to a person of ordinary skill in the art. If the current trends in science and law continue, few new patents on chemical compounds will issue, existing patents will be easier to challenge as obvious, and the policies of the patent system will be defeated.

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178. See notes 48-60 *supra* and accompanying text.