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THE PATENT SYSTEM AND THE MODERN ECONOMY

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FOREWORD

This report was prepared by Mr. George E. Frost, a partner in the patent law firm of Frost & Verhoeven, Chicago, Ill., for the Subcommittee on Patents, Trademarks, and Copyrights as part of its study of the United States patent system, conducted pursuant to Senate Resolutions 92 and 167 of the 84th Congress. It is one of several now in preparation under the supervision of John C. Stedman, associate counsel for the subcommittee.

Because of his experience as a practicing patent attorney, professor of law, and frequent contributor to professional journals and law reviews, Mr. Frost has a broad background in the field of patent law. He has participated in some of the important patent litigation of recent years and in numerous symposiums and conferences held on the subject of patents and related matters. He has served as a member of the Attorney General's National Committee To Study the Antitrust Laws and has been active in various bar association committees. In addition to practicing patent law, he currently teaches at the John Marshall Law School, Chicago, Ill., and he has taught at the University of Chicago Law School. Among Mr. Frost's writings, published in various professional journals and law reviews, are Patent Infringement and the Public Interest (1944), Legal Incidents of Non-Use of Patented Inventions Reconsidered (1946), Misuse as a Per Se Violation (1955), and Patent Office Performance in Perspective (1956).

In publishing this report, it is important to state clearly its relation to the policies and views of the subcommittee. We point out here, as we have in other studies in this series, that the views expressed by the author are entirely his own. The subcommittee accepts, and welcomes, the report for consideration and study, but its publication in no way signifies or implies acceptance or approval by the subcommittee or its members of the facts, opinions, or recommendations contained in it. Such publication does, however, testify to the subcommittee's belief that the report represents a valuable contribution to the literature concerning the patent system and its operation, and that the public interest will be served by its publication, distribution, and consideration.

JOSEPH C. O'MAHONEY,
Chairman, Subcomittee on Patents, Trademarks, and Copyrights,
Committee on the Judiciary, United States Senate.

DECEMBER 26, 1956

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THE PATENT SYSTEM AND THE MODERN ECONOMY*

INTRODUCTION

The history of the American patent system spans the growth of the Nation. It is written in the constitutional provision unanimously adopted in 1787,[1] the first patent act of 1790,[2] and in the numerous patent statutes running down to the present 1952 Patent Code.[3] In its inception the system was characterized as an expression of the right of an individual to the fruits of his inventive intellectual accomplishment.[4] Today it operates in a dynamic research-centered economy at a time when application of the scientific method to the arts of both peace and war is a necessary ingredient of world leadership. And—while the individual inventor remains significant—the spotlight has shifted to the salaried scientist and engineer engaged in group research of the kind that accounts for the sustained whirlwind pace of current technical progress.

No evaluation of the patent system can ignore these changes. The ultimate consideration, however, is not the fact of the change but rather whether the system performs a useful function in the modern economy. The success of the system in an earlier day can have no significance beyond its bearing on the present. Conversely, abuses of the patent system when patent and antitrust doctrines were less well developed can only stand as historical facts deserving consideration to the extent they represent current conditions.

In like measure a meaningful analysis of the patent system demands a proper emphasis upon normal conditions. The patent system—like the free enterprise economy of which it is a part—takes significance from over-all effect. The unusual is always of interest and the temptation great to concentrate upon it. The normal is by comparison dull and uninteresting. Yet, until the day-to-day operation of the patent system is explored there can be no perspective from which to consider the unusual or to evaluate the opportunities for improvement.

It is an important coincidence that the research and development competition fostered by the patent system has become progressively

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*In the preparation of the present study the writer has had the benefit of comments and suggestions from a great number of persons skilled in the various technologies and having specific experience with various phases of the patent law in action. The number of such persons is too great for a listing of individual names. To each, the author expresses his sincere gratitude.

[1] "The Congress shall have the power * * * to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries" (Constitution, art. 1, sec. 8, clause 8).

[2] 1 Stat. 109.

[3] 66 Stat. 792.

[4] "The utility of this power (art. 1, sec. 8, clause 8) will scarcely be questioned. The copyright of authors has been solemnly adjudged, in Great Britain, to be a right of common law. The right to useful inventions seems with equal reason to belong to the inventors. The public good fully coincides in both cases with the claims of individuals. The States cannot separately make effectual provision for either of the cases, and most of them have anticipated the decision of this point, by laws passed at the instance of Congress" (The Federalist, No. 43 (Modern Library Edition, p. 279).)

more important in recent years. No longer can business management confine competitive effort to existing production, management, and sales techniques. Rather, effort must be directed towards competition in the research and development of improved processes and products. Years ago, change was something to be accepted when it came but never encouraged. Even laggard business organizations that awaited the results of the activities of their more progressive rivals could usually adopt changes belatedly without serious competitive consequences. Few business organizations can survive with this attitude today. Rather, competition in process and product development and innovation is as important to business survival and growth as is management, production, and sales effort.

Evidence of this competition appears on every hand. Newspapers and magazines abound with comment on new products and processes developed through competitive research and with announcements of the construction of new laboratory facilities. Stock analysts carefully study not only the traditional accounting and sales figures, but also the extent of research and development effort and accomplishment in relation to competitors. Annual reports likewise reflect the change. No longer do they boast of profits made on the tried and true products of the past. Instead they speak proudly of the new products and processes of the present and point to the proportion of sales volume in products developed through recent research. In countless fields of business, sales effort emphasizes not only price, quality, and like considerations, but additionally concentrates on the new features derived from research.

This competition between rival organizations in research, development, and marketing of new products and processes is every bit as important to real economic progress as the classical competition in production and sales. It is crucial to the dynamic economy and is thus essential both to an increased standard of living and to maintenance of world leadership. It is due in large measure to the patent system and appropriately forms the subject of first consideration herein.

The patent system is frequently criticized as inconsistent with the competitive economy and the antitrust laws. Misconceptions respecting the economic power conferred by letters patent are responsible for much of this criticism. The fact is that the system is a stimulus to competitive effort, both in terms of the competitive activity of existing firms in product and process development and in terms of inducing the formation and activity of new business based on new products and new processes. The system is accordingly complementary to the antitrust laws in effectuating the overall public policy of competition on all fronts. Of course there are questions with respect to the application of the patent law and the antitrust law to various specific competitive practices. These questions and the relation of the patent system to the competitive economy form the second major subject discussed herein.

Finally, a patent system must be workable to be effective. Patent subject matter must be defined; practical procedures must be available for the issuance of patents; and the law must provide for effective enforcement of the rights granted. Judicial decisions and administrative practice have, over the years, given rise to the evolution of numerous patent doctrines and practices. They represent the prac-

tical steps taken by the judiciary and the Patent Office to make effective a body of law that the Congress can spell out only in outline. For the most part, these practices and doctrines have been effective and wise, and where change has been required it has been made. In a few respects, however, the system has "just growed" with the consequence that anachronisms exist and procedures devised to solve problems in the past have themselves given rise to current difficulties. Also the "invention" concept has been the source of controversy. And a problem of over-all complexity raises the question of possible simplification of all patent practice. Moreover, a problem exists of assuring to the Patent Office continued funds adequate for the vital task it must perform. Part 3 of this paper is devoted to a consideration of these aspects of the patent system.

Over-all, the patent system represents a vitally necessary institution to preserve and enhance the research competition that has characterized the postwar economy. It is wholly consistent with the competitive economy as a whole, and the problems arising with respect to its relation to that economy can be handled with presently developed legal rules. As to the mechanics of the patent system, however, a number of changes are in order.

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PART I—THE PATENT SYSTEM AS A STIMULUS TO COMPETITIVE EFFORT IN RESEARCH AND DEVELOPMENT

> The patent system encourages invention, not only in that it rewards the inventor with a patent, but it spurs the competitors to put forth their mightiest effort to produce a product as good, yet different from the patentee's. * * * It must be admitted that in an effort to avoid infringement of a patent, as much skill is often displayed as is shown in the conception or development of invention itself. There is, however, nothing objectionable in this. In fact, it is thus that the patent system is working at its best. For it is then that we have competition between a holder of a legal monopoly and his competitors. It illustrates how the legal monopoly evidenced by a patent excites the competitors to their best to meet or excel the product covered by the existing patent. Competition among industrial rivals and inventors is thus incited.[5]

Space limitations forbid consideration of all the economic, psychological, and social factors bearing on the operation of the patent system.[6] Consideration must accordingly be confined to the role of the system in a specific economic area—the stimulation of competition in research and development. The competition here considered is not of the classical kind between sellers of like goods whose attention is primarily directed to the production and sales efforts involved. Rather, we deal with competition in the conception, development,

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[5] Per Judge Evans in *James P. Marsh Corporation* v. *United States Gauge Co.*, 129 F. 2d 161, 165 (7th Cir. 1942).

"To illustrate, an inventor brings forth an apparatus which is better and made at less cost than anything heretofore made or used in this field. All competitors are threatened with loss and perhaps ruin if an equally good product is not made and sold at prices which meet the new patented product. At once, the inventive and creative talents of competitors are aroused. They are spurred to their best efforts to produce, not merely as good, but a better, product, by a new, noninfringing method or apparatus. Thus, instead of displaying monopolistic traits, the patent fosters competition among inventors and begets new and better products and lesser costs. As a result the public is the beneficiary." Per Judge Evans in *Chicago Steel Foundry Co.* v. *Burnside Steel Foundry Company*, 132 F. 2d 812, 816 (7th Cir. 1943).

[6] Over and above the competitive considerations here discussed, the patent system is credited with two desirable attributes. First, it honors the debt of society to the inventor. Second, it encourages disclosure of inventions rather than their use in secrecy.

Both of these are important. Thus Mr. Justice Reed notes in *Mazer* v. *Stein*, 347 U. S. 201, 219 (1954), that—

> "The economic philosophy behind the clause empowering Congress to grant patents and copyrights is the conviction that encouragement of individual effort by personal gain is the best way to advance public welfare through the talents of authors and inventors in 'Science and useful Arts'. Sacrificial days devoted to such creative activities deserve rewards commensurate with the services rendered."

Thorger G. Jungersen—the unsuccessful plaintiff in *Jungersen* v. *Ostby & Barton Co.*, 335 U. S. 560 (1949), and a pioneer in the investment casting process—testified that "I came to this country because of the American patent laws." Hearings before the Subcommittee on Patents, Trademarks, and Copyrights, of the U. S. Senate Committee on the Judiciary, 84th Cong., 1st sess., October 10–12, 1955, pursuant to S. Res. 92 (hereafter cited as Hearings, October 10–12, 1955, pursuant to S. Res. 92), p. 210. Ironically the Jungersen patent was upheld in Great Britain. Id. at p. 216.

As discussed in the body of the text, secrecy works against the competition stimulated by the patent system. Apart from the competitive aspect secrecy is undesirable because there is a public value in having as much technical knowledge spread upon the public record as possible. And there are many marginal situations where the choice between secrecy and patenting is a real one turning on the extent of the legal rights which would be granted to the inventor by the patent.

For discussion of the points generally urged in support of the patent system see Oppenheim, Cases on Federal Antitrust Laws 464–481 (1948), and Stedman, Invention and Public Policy, 12 Law and Contemporary Problems 649, 652 (1947) and see Frank, J., concurring in *Picard* v. *United Aircraft Corp.*, 128 F. 2d 632, 643 (2d Cir. 1942).

application, and marketing of new products and processes. This competition accents the differences—and derives its social usefulness from these differences. It is influenced by the patent system in three major respects. First, the patent system provides a protected market with the opportunity for unusual profit necessary to justify the heavy investment in time, effort, and capital necessary to bring the improvement to the public. This same protected market provides an entering wedge by which a business enterprise entering a new field can overcome the obstacles that otherwise discourage entry into an industry already populated. Finally, the ever-present threat of new firms with exclusive rights to new technologies compels existing enterprises to explore avenues of improvement upon pain of sudden obsolescence. All of these effects aid in generating a dynamic progressive environment under which the businessman must compete not only in terms of production and sales technique but must also exert his talents in the direction of technological improvement.[7]

Competition in innovation is the aggregate result of many factors making up the "climate" for research and technological improvement generally. Most important of these is the psychological factor. Thus all industry tends to become improvement and research minded once the accomplishments of a few firms in this area become apparent. Indeed, nearly every technical "breakthrough" stimulates chain reaction effects far beyond the area of immediate accomplishment and of importance surpassing the initial change. Conversely, when application of antitrust, patent, or other law apparently penalizes product improvement itself—or what is apparently normal conduct in relation to such improvement—the "climate" is adversely affected and all business tends toward the dull routine of making the same old thing in the same old way.[8] The tax law similarly bears on the matter of technological innovation and in the past has exerted a depressing effect in some areas of research.[9] In like measure some aspects of the tax laws—especially the capital gains provisions—have a direct and

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[7] The importance of an economy with vigorous research and product competition has not been overlooked by the economists. Schumpeter states:

> "* * * it is not that kind of competition [from the maker of an identical product] which counts but the competition from the new commodity, the new technology, the new source of supply, the new type of organization (the largest scale unit of control for instance)—competition which * * * strikes not at the margins of profits and the outputs of the existing firms but at their foundations and their very lives. This kind of competition is as much more effective than the other as a bombardment is in comparison with forcing a door * * *" (Capitalism, Socialism, and Democracy 84 (3d ed. 1950).)

Schumpeter's view is discussed at length in Hale and Hale, Monopoly in Motion: Dynamic Economics in Antitrust Enforcement, 41 Virginia L. Rev. 431 (1955).

When asked what would happen if General Motors were faced with a revolutionary patent in the automobile industry, William S. Knudsen, then president of General Motors, testified * * * "If such a thing were possible, we certainly would all either make a deal for license under this revolutionary patent or you will see a lot of people working 7 nights a week until we have found something." Pt. 2, TNEC hearings, p. 339.

[8] The recent consent judgment entered against American Telephone & Telegraph Co. (Jan. 24, 1956, in Civil Action No. 17-49, *U. S.* v. *Western Electric Company et al.*) has been publicized as a "sweeping patent victory" for the "antitrusters." See Business Week, January 28, 1956, p. 160. The net effect of this and similar publicity on the decree has been to leave the impression that the focus of the case was on the patents and that some real fault existed on the part of the company in its research and patent policies. The fact is that the company has followed a policy of granting patent licenses, both to other companies in the telephone field and to other manufacturers. See, e. g., TNEC hearings, pt. 3, p. 961, and McHugh, Bell System Patents and Patent Licensing, Bell Telephone Magazine, January 1949.

[9] A particularly troublesome aspect of the tax law has been the past uncertainty as to the deductibility of research and development expense as a "reasonable business expense," against the contentions of the Commissioner of Internal Revenue that such costs should be capitalized. See Bush, Science the Endless Frontier, 16 (1945). This problem is in large measure overcome by sec. 174 of the 1954 Internal Revenue Code.

marked effect in stimulating investment in research and in enterprise based on new products.[10]

The patent system stimulates product competition in many forms. Competition may be that of the manufacturing newcomer challenging—with a patented product—the existing products of the established industry. It may be that of a royalty-supported research organization compelled to maintain its own pace of development ahead of the field or otherwise lose its royalty income. The competition may be that of established manufacturers seeking to maintain or improve their respective industry positions in relation to other established manufacturers, or seeking to save the expense of royalty payments to others, or to prevent foreclosure of some product line by reason of adversely held patents. And—with respect to the individual inventor seeking to sell a patented invention—the patent system provides an atmosphere of competition among his prospective manufacturing customers, each realizing that it may be foreclosed from a promising development if it closes the doors to such items. In all of these areas the patent system does more than serve as an incentive. It compels action in view of the activity or threatened activity of others. The stagnation that public policy abhors in the field of business activity generally is precluded in the field of research and development by the effects of the patent system.

Color television gives us a vivid example of current competition in development.[11] The two principal patent licensing organizations in the industry are RCA and Hazeltine. RCA is said to have invested $65 million to date in color TV research. Hazeltine has concentrated on color TV research during the last 5 years, with an annual expenditure for its research and license service activities of approximately $1 million. Neither company has yet received any significant return on this investment. And each faces the vigorous and effective competition of other organizations. Indeed, the first color television system licensed by the Federal Communications Commission was the CBS field sequential system.[12]

One area will illustrate the current activity. The cathode ray tube is the heart of a color TV receiver. It must not only reproduce the televised image as such, but in addition it must faithfully show the color content. At the present time at least four different types of color tubes are competing for supremacy. One—currently the leader—is the "shadow mask" type tube which has been the main point of emphasis by RCA. Significant improvements in the method of manufacture of this type tube have come from CBS–Hytron, one manufacturer of the tubes. General Electric is actively developing what

[10] There has been considerable difficulty in connection with the status of an exclusive royalty bearing license under a patent as a "sale" giving rise to capital gains income, and with respect to the question whether the patentee is disqualified from capital gains status because he is in the "trade or business" of inventing. See Gitlin and Woodward, Tax Aspects of Patents, Copyrights, and Trade-Marks, Practicing Law Institute, (1950) pp. 17–27. The difficulties in these respects are in great measure overcome by sec. 1235 of the 1954 Internal Revenue Code. See also Public Law 629, 84th Cong., 2d sess., approved, June 29, 1956.

[11] See, e. g., Fortune, November 1955, p. 136.

[12] The history of the field sequential system shows the risks in technical development and the need for the active pursuit of all approaches despite industry controversy. At the time the Federal Communications Commission licensed CBS the simplicity of this system and the quality of the picture available under favorable conditions were apparent. It did suffer from an inherent difficulty of not being "compatible" with black and white transmission, but it then was not certain that alternative systems could do better. More recent developments—induced at least in part by the CBS activity—have resulted in the greatly superior system now adopted as standard by the Federal Communications Commission.

is known as the "post accelerator" type tube, operating on a fundamentally different principle. And from sources outside the industry the Lawrence "chromatron" tube is being developed.[13] Fifty percent of the stock of Chromatic Laboratories, which is developing this tube, is owned by Paramount Pictures. Finally, an independent radio manufacturer, Philco, is developing the so-called "apple" tube.

Only time can resolve the rivalries between proponents of various color TV systems. Nor can there be any present resolution of the current industry controversy of whether color TV is premature.[14] The important consideration is that development is being vigorously pursued under competitive conditions on many fronts. As work proceeds—and especially after manufacturing and sales experience accumulates—many avenues of current development may prove impractical. Indeed, the field sequential system using rotating disks to provide color selection vigorously pursued by CBS less than a decade ago is now confined to a limited number of special applications.[15] And when the industry matures, the probability is that designers will have various alternatives from which to choose, each having its individual advantages and disadvantages. We can be certain that the public interest is served by active development of the various approaches in a competitive atmosphere.[16]

It is difficult to see how this activity could go on in the absence of a patent system.[17] With respect to Hazeltine, its only source of in-

[13] The Lawrence tube was conceived by Dr. Ernest O. Lawrence, a physicist famed for his work with the cyclotron. As is usually the case, however, the conception of the new product left much work to be done before a marketable product could be achieved. In this instance staggering manufacturing problems attend the application of the Lawrence concept and must be overcome before the tube finds its way into home color TV receivers. Additional problems reside in perfecting the receiver circuitry required to operate the tube.

[14] E. F. McDonald, Jr., president of Zenith Radio Corp., announced to stockholders recently that color TV is "premature" and that sets sold today "will be obsolete within a year." He reiterated an earlier charge that RCA is prematurely forcing color TV into the market. Wall Street Journal, April 25, 1956, p. 2.

[15] See footnote 12, supra.

[16] For an analogous competitive race in the development of equipment for converting the successive electrical impulses of an electronic computer to permanent visual form see Business Week, Aug. 25, 1956, p. 87. Hughes Aircraft Co., RCA, General Dynamics Corp., Standard Register Co., and General Electric Co. are listed as having mechanisms for this purpose in being or under development.

[17] Prof. W. Rupert Maclaurin of MIT has made a comprehensive study of the radio industry, resulting in the publication of Maclaurin, Invention and Innovation in the Radio Industry (Macmillan, 1949). His over-all conclusion "is that the patent system, in spite of its weaknesses, did operate to encourage research and invention during the period under review" (p. 260).

In a related paper, Patents and Technical Progress—A Study of Television, 58 J. Pol. Econ. 142 (1950), Professor Maclaurin considers specifically the development of monochrome television and concludes, at p. 152:

"Television seems to be a clear case in which the provision of a strong incentive has acted as a stimulus and protection to research. We have seen how many years it took to develop the product to a stage where it was commercially feasible. During this entire period there was almost no advantage to being the 'first in' on the product. Before regular broadcasting could be initiated, the Federal Communications Commission had to fix engineering standards for transmission which determined the type of receivers that could be sold. And television receivers can be imitated very readily. In fact, the second largest producer of television sets today—Admiral—did no pioneering research in television at all. Yet the company is rivaling RCA because of merchandising and promotional skill. The major financial incentive to RCA was the possibility, which it, in fact, realized, of building a patent position on which it could collect royalties from the entire industry.

"Without such incentives, it seems unlikely that Westinghouse and RCA would have spent over $9 million on television development before they received any returns. A possible analogy is the case of the automobile industry and headlight glare. Any system devised to eliminate glare will have to be installed on all automobiles simultaneously, and presumably no individual company will profit by the development. In consequence no automobile manufacturer has undertaken any significant research on this problem. And, although I really think RCA would have done some work on television without the patent incentive, I believe that progress would have been much slower."

For a similar study of the lamp industry see Bright, the Electric Lamp Industry (Macmillan, 1949) and Bright and Maclaurin, Economic Factors Influencing the Development and Introduction of the Fluorescent Lamp, 51 Jl. Pol. Econ. 429 (1943). And see Kottke, Electrical Technology and the Public Interest (1944) and Maclaurin, Technological Progress in Some American Industries, 44 Am. Econ. Rev. 178 (1954).

come is patent royalty and service fees to licensees.[18] RCA—though it does manufacture—could hardly undertake the staggering investment it has made in color TV in the absence of a patent system.[19] Surely the publicity and transitory production advantages associated with such research could not justify investment of this magnitude even by the industry leader. And certainly Paramount Pictures would not be likely to enter the field at all if it did not see an opportunity to recover the research and development investment. And with respect to Philco there is a multiple motive of obtaining both manufacturing and royalty income coupled with a desire to avoid paying patent royalties to others.

The color TV development is significant in another respect. The over-all problem is so big that individual research and development activity can touch only upon some narrow segment of the industry. Effective general research demands scientific skills in communications, electronics, optics, and even psychology, coupled with an appreciation of the manufacturing aspects of the industry.[20] Group research is a necessity and clearly in the public interest. Unless the patent system is effective as to group research as well as to individual activity the economic motivation for investment in this area will certainly diminish and the pace of development will be slowed.

Recent activity in connection with coal-mining machines illustrates current competition in machinery development. Squeezed between increased labor costs and the competition of oil and gas, the coal industry has fallen behind the general economic growth. Today the future is bright—largely due to research relating to the mining and utilization of coal.[21] Progress has been especially impressive in the development of machines which attack and remove solid coal in underground mining—the so-called continuous coal-mining machines. Less than a decade ago the first such machines were manufactured for sale and general use. The early competition was primarily between the Joy continuous miner and the Colmol machine. The former operates on the principle of the chain saw to rip into the coal seam whereas the latter uses a large number of rotary cutters for this purpose.[22] Today a variety of machines based on competing principles and manufactured by many companies are available. In addition to the chain-saw and rotary-cutter principles, some machines vibrate blunt hammers against the coal to break it loose, some use vibrating

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[18] Hazeltine is but one of a number of organizations looking to patent royalties for virtually all of their financial support. Universal Oil Products Co. operates in the field of oil refining in much the same way that Hazeltine operates in the radio industry. A number of universities and colleges have foundations supported by patent royalties. The ammoniated tooth powder development, for example, is the result of work by Dr. Kesel of the University of Illinois. The patent is assigned to the University of Illinois Research Foundation. See *University of Illinois Research Foundation* v. *Block Drug Co.*, 133 F. Supp. 580 (E. D. Ill. 1955). Research Corp. of New York is another example of the use of patent royalties to support research. This organization has agreements with some 60 colleges and universities and some 17 other nonprofit organizations for which it handles patentable discoveries and inventions. Income is used to support research activities (hearings, October 10–12, 1955, pursuant to S. Res. 92, pp. 149–50).

[19] The history of RCA is a prime example of how economic considerations influence patent license policy. The company initially licensed only the manufacture of tuned radio frequency receivers, technically inferior to the superheterodyne receiver which was reserved for its own manufacture. The licensees nevertheless outsold RCA. This experience—together with a recognition that the license royalties were a source of considerable income—led to the policy of licensing the industry. (See Maclaurin, Invention and Innovation in the Radio Industry, (1949) pp. 134–152).

[20] The range of the research behind color TV is brought out by the exhibits attached to the petition of Radio Corporation of America, et al., for approval of color standards for the RCA color television system, filed with the Federal Communications Commission on June 25, 1953. Virtually 700 printed pages of technical papers are included in the petition. In the press release at the time, RCA stated that it would spend $25 million in color TV research by the end of 1953.

[21] See, e. g., Lessing, Coal, Scientific American, July 1955, p. 50.

[22] See, e. g., Continuous Coal Mining, Fortune, June 1950, p. 111; Wolfert, Revolution in Coal, Reader's Digest, December 1954, p. 19. Joy Manufacturing Co. invested $1 million in 20 speculative continuous-mining machines in 1947, which were sold at nominal profit for experimentation. The Colmol was developed by two individuals who put $750,000 into the venture.

wedges for this purpose, others apply combinations and modifications of these principles, or still other techniques.

The development of a continuous coal-mining machine entails not only initial conception and design, but the expensive construction and thorough testing of the machine under operating conditions. The industry practice is to patent each machine and to rely upon the protection thus obtained to justify these developmental costs. Each machine has its own advantages and disadvantages—in terms of first cost, operating cost, flexibility, reliability, ability to operate under specific mining conditions, ability to produce coal of a particular size, and the like. No one can identify any one machine as "best" or even state with confidence which will prove most generally useful in the future. Indeed, the applications are so diverse that the industry will doubtless find need for a variety of machines from which to select. We can say with assurance that this competitive machine development accounts in large measure for the fact that since 1950 coal output per man-day has almost doubled,[23] and for the current prospect that our most plentiful hydrocarbon source will recover markets lost and acquire new markets. Significantly, a recent authoritative report states that "almost all" of the recorded research expenditures in the field of coal mining have been made by manufacturers of mining equipment and points to this phase of the industry as representing "progress of a high order." [24]

Development of the continuous coal-mining machines also shows how competitive research and development generates its own chain reaction of opportunity and activity. Machines now available break loose the coal more rapidly than it can be transported to the surface. The result is a current competitive race to devise new machines for transporting the coal.[25] Here again the industry looks to patent rights for protection of its research and development investment.

The history of oil refining provides one of the earliest examples of competitive research and development and vividly brings out the importance of this activity to national defense. Initially, petroleum refining was little more than a simple distillation process, producing kerosene as the principal product and in the proportion naturally occurring in the crude oil. Gasoline—at first a nuisance byproduct—increased in importance as the automobile industry created a growing demand. Shortly before World War I, it became apparent that demand for gasoline would soon exceed the amount available from simple distillation of crude petroleum. At that time the trained chemists in the industry—probably not more than 20 in all—were concerned mainly with analytical work. Research was virtually unknown. Dr. William M. Burton of the Standard Oil Co. (Indiana) perceived the opportunity to increase gasoline yield through thermal cracking. The resultant efforts by Burton and his coworkers led to the development of the Burton cracking process, patented in 1913.[26] This success opened the door to a whole new era in petroleum refining—for it showed that through research the refiner could devise ways to vary the proportions of gasoline, kerosene, and other products obtained from the crude oil. The lesson was not overlooked by

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[23] See Bureau of Mines, Outlook and Research Possibilities for Bituminous Coal, Department of Interior Information Circular, No. 7754, May 1956, p. 15.

[24] Id. at p. 14.

[25] See, e. g., Business Week, July 31, 1954, p. 126. The "Ropex" coal carrier recently announced by Goodman Manufacturing Company illustrates one result of the new competitive race. See Chicago Tribune, December 11, 1956, Business Section, p. 7. This ingenious device—based on the conveyor belt principle—is the subject matter of Patent No. 2,773,257, dated December 4, 1956.

[26] Giddens, Standard Oil Co. (Indiana) (1955), pp. 140–171.

competitors, with the result that a great many improved thermal cracking developments followed in rapid succession. These included the so-called Dubbs, Tube & Tank, Holmes-Manley, and Cross processes.[27] Most of these processes were in competition with each other and were the subject matter of patent applications and patents.

The cracking process development led to the organization and maintenance of research laboratories by each of the major petroleum refiners and to the organization of independent research and engineering companies serving the small refiners.[28] As research continued—under the stimulus of competition demanding improved quality, lowered costs, and increased yields—a great variety of new processes were developed. The catalytic cracking process, developed just prior to World War II, was a major milestone in petroleum technology. As to the importance of this and other developments on the eve of World War II, a review of the activity of the Petroleum Administration for War states:

> And so, when the war threw down its challenge, oil technologists had developed catalytic cracking, without which it would not have been possible to produce enough "base stock" for aviation gasoline; they had developed alkylation, without which we could not have made enough of the high-octane blending agents necessary for aviation fuel; and they had developed catalytic polymerization and hydrogenation, which proved to be useful tools in more ways than one. Of especial importance, they had developed knowledge and techniques for manufacturing the 100 octane gasoline which played so important a part in victory; and for making raw materials for synthetic rubber.[29]

The significance to the war effort of oil technology and its accomplishments through competitive research can hardly be overstated. Throughout the war the United States and its allies had 100 octane gasoline—in contrast to the Axis powers that were largely confined to gasoline of approximately 87 octane rating. In terms of aircraft engine weight required to produce a fixed power output, 100 octane gasoline makes possible a 20-percent reduction as compared with 87 octane—in terms of work produced per pound of fuel, 100 octane gasoline produces 15 percent more work than 87 octane gasoline.[30] A four engine World War II bomber with a total engine horsepower of 6,000 could carry 5 more 1,000-pound bombs on a 1,000-mile mission when fueled with 100 octane gasoline as compared with 87 octane gasoline.[31] Or—in terms of fixed bomb load—the same bomber could travel to and from a target an additional 300 miles from its base when fueled with 100 octane gasoline rather than 87 octane gasoline.[32] Moreover, the same research interest and emphasis that

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[27] See *U. S.* v. *Standard Oil Co. (Indiana)*, 33 F. 2d 617, 619–623 (N. D. Ill., 1929), reversed at 283 U. S. 163 (1931); *Universal Oil Products Co.* v. *Globe Oil & Refining Co.*, 322 U. S. 471, 475–478 (1944); Giddens, op. cit., footnote 26, supra, at pp. 256–280.

[28] Universal Oil Products Co. is one such company. Universal was formed to exploit the Dubbs cracking process, the principal capital being the investment of $2 million by J. Ogden Armour in 1926. When perfected, the Dubbs process permitted—for the first time—continuous runs extending as long as 30 days as compared with the maximum 2-day run of the competitive processes. Universal early adopted a policy of licensing refiners on an equal basis, a policy that is now common in the industry. For the story of the vicissitudes of the company in its early days see The Salvaging of the Armour Fortune, Fortune, April 1931, p. 49. And see The Oil and Gas Journal, May 27, 1937, p. U–8 et seq.

[29] Frey and Ide, A History of the Petroleum Administration for War (1946), p. 192.

[30] Hearings before the Committee on Patents, U. S. Senate, 77th Cong., 2d sess., on S. 2303 and S. 2491, p. 5088.

[31] Id. at p. 5089.

[32] Id.

fathered 100 octane gasoline also made possible effective methods for the production of butadiene from oil—a critically important raw material for the wartime synthetic rubber program.[33]

Today the petroleum refining industry continues its emphasis on competitive research. A number of competing catalytic cracking processes, including the U. O. P. Fluid, Model IV, Orthoflow, Thermofor, Houdriflow, and Houdresid processes, have been developed. Similar development of competing reforming, Alkylation, and other processes has taken place. A recent analysis of the industry reports that 6 different catalytic cracking processes, 12 patented catalytic reforming processes, and 5 patented alkylation processes are available to the industry under patent licenses.[34]

Competitive research progress in the petroleum industry has also brought forth a new industry—manufacture of petrochemicals. The wartime synthetic rubber program first emphasized the importance of petroleum as a raw material for the chemical industry and not just as a source of oils and fuels. Today, petrochemicals are conspicuous as raw materials for plastics, synthetic rubber, synthetic fibers, and detergents.[35] A recent report states that present plant investment is 4 billions of dollars and is expected to go above $8 billions by 1960—all made possible by competitive research of the kind that first took place in the days of the thermal cracking process development. And in the entire field of petrochemicals the oil refiners are facing the research and other competition of the established chemical manufacturers.

Another example of competition in research is found in the field of antibiotics. Penicillin and effective methods for its production are in the public domain.[36] The success of this drug led to the development of streptomycin in 1944 by Dr. Waksman at Rutgers University in conjunction with Merck & Co.[37] The Merck chemists have since developed dihydrostreptomycin, a form of the drug less likely to lead to the auditory nerve reaction often associated with prolonged streptomycin dosage. Another fairly early result of antibiotic research was the development by scientists at Parke, Davis &

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[33] See Frey and Ide, footnote 29, supra, p. 222 et seq.

[34] See Race for High Octanes Changes Oil Refining, Business Week, July 7, 1956, p. 75, and Oil and Gas Journal, March 19, 1956, pp. 138–159.

[35] The Oil and Gas Journal, September 3, 1956, p. 64.

[36] Penicillin is a classic example of what may happen to an important scientific break-through in the absence of sufficient incentives for its exploitation. Dr. Alexander Fleming of St. Mary's Hospital at the University of London had discovered penicillin, ascertained its general properties, and published his results by 1928. He tried to interest others in pursuing the matter without success. For a decade the discovery lay dormant. Fortunately for humanity Dr. Fleming continued to cultivate the mold during this period so that it was available when the necessities of war stimulated research on its use and the development of effective production techniques that ultimately led to the commercially useful drug.

The experience of Fleming should be contrasted with that of a contemporary, Dr. Wallace Carothers. Carothers had, by 1927, developed a theory that certain polymers would—after initial mechanical stretching—become tough elastic materials. DuPont employed Carothers to pursue this matter in 1927. In 1930, Dr. Julian Hill—working at duPont with Carothers—experimentally demonstrated the Carothers' theory. From these theoretical beginnings the work continued to the production of nylon thread in 1938. By 1950 duPont had invested $45 million in nylon research and $196,800,000 in plants and facilities for nylon production (*U. S.* v. *Imperial Chemical Industries*, 105 F. Supp. 215, 222 (S. D. N. Y. 1952). And see Heckert, Synthetic Fibers, 30 J. Chem. Education 166 (1953).

Query: To what extent does the experience of Fleming, as distinguished from that of Carothers, reflect the fact that until 1949 the British patent law did not provide for the patentability of chemical substances, such as penicillin? (See White, Patents for Inventions, 2d ed. (1955) pp. 54–55 and 63; Patents Act 1949, 12, 13 and 14 Geo. 6, ch. 87, secs. 101 (1) and 4 (7); Final Report of Departmental Committee, Patents and Designs Acts, Cmd. 7206 (London, 1947); Riesenfeld, The New United States Patent Act in the Light of Comparative Law, 34 J. P. O. S. 406, 417–8 (1954)).

[37] The development of streptomycin has been described as follows:

" 'We examined some 10,000 cultures,' relates Dr. Waksman, 'obtained antibiotic substances from about 1,000 of them, found some 100 specimens that gave promise of being medically useful, and finally narrowed the chase to 10 that seemed worth following closely.' The first to be studied was the antibiotic known as streptothricin. When discovered in 1942 it seemed highly promising but later tests with animals showed that it was too toxic for medical use. Streptothricin was not without value, however, for it led to the discovery of streptomycin" (Gray, The Antibiotics, 181 Scientific American 26, 30 (August 1949)).

Co. of the product sold under the trademark "Chloromycetin." This product was developed as the result of biosynthetic processes utilizing a microorganism isolated by Dr. Burkholder of Yale University. In this instance, however, further investigation and research led to the determination of the chemical structure of the antibiotic and to commercially feasible chemical processes for making the antibiotic. The chemical processes have now replaced the biosynthetic method of producing "Chloromycetin." [38]

The race for new antibiotics is highly competitive. In the words of one commentator:

> * * * Changes come thick and fast. Demand for each new wonder drug as it hits the market is tremendous. Fierce competition springs up overnight. Research moves ahead at breakneck speed. The drug is improved and modified; production time is cut; costs are slashed; the price of the drug drops like a plummet. Then, before the smoke has cleared, somebody comes out with another antibiotic—and the cycle starts all over again.
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> * * * shouldering a big part of the burden—if not most of it—are research scientists.
>
> Not only are they under pressure to beat existing competition on existing drugs; they're under pressure to beat the field to new drugs. * * * [39]

The annual reports of the leading companies in the field confirm this characterization. All emphasize research and the direction of continued research activity. Royalty earnings and research budgets run in the millions of dollars—and represent a pace that would hardly be maintained in the absence of patent protection.[40]

A similar research competition has developed in the broader field of synthetic chemicals generally. The first commercially applied synthesis of a natural chemical compound—Perkin's synthesis of

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[38] With respect to the patent system Parke, Davis has stated:

"* * * Patents on medicinal products, and on processes for their manufacture, give the pharmaceutical manufacturer, during limited periods, the opportunity to attempt to recover the heavy costs of the research which is responsible for the products and processes. Only after the costs of research, and then still other costs, have been recovered is there an opportunity to make a profit. Much of this profit, incidentally, is promptly reinvested in further research.

"Thus patent protection provides encouragement for the continuing investment of large sums, risked with no certainty of return, which lead to the development and constant improvement of healthgiving and life-saving medicinal preparations." Which One Will Open Next? Parke, Davis & Company, (1956).

[39] Business Week, September 26, 1953, p. 186.

[40] Thus the 1955 Merck & Co. annual report gives net sales of $158 million and research expenditures of $8,500,000, or 5.4 percent of sales. The report notes that 60 percent of the business of the company was in products introduced through research in the past 10 years. It states that the company introduced two new antibiotics during the year—"cathomycin" and "oxamycin." It also notes that in each instance the same antibiotics were independently announced by other companies. The 1954 Parke, Davis & Co. annual report gives 1954 net sales at $110 million, research and product development expense at $4,500,000, and "royalties and other income" at $2,200,000. The 1955 American Cyanamid Co. annual report gives a 1955 sales figure of $450 million, research and process development expense at $21 million, and income from royalties, licenses, and service charges of $6,600,000. The company reports that 15 percent of the time of its employed scientists is allotted to exploratory work and basic research chosen by the scientist and that one result of the work thus pursued was the ascertainment of the chemical structure of ACTH. The antibiotic field is but a part of the overall business of American Cyanamid and represents only a portion of the figures given above.

The tranquilizing drugs form a new center of attention and of competitive pharmaceutical research. Smith, Kline and French, Wyeth Laboratories, Chas. Pfizer & Co., Ciba Pharmaceutical Products, Inc., Carter's Products, Warner-Lambert Pharmaceutical Co., and other companies in the industry have developed and are marketing drugs of this kind. See Wall Street Journal, May 7, 1956, p. 1, and Newsweek, May 21, 1956, p. 68.

Ciba Pharmaceutical Products, Inc.—one of the leaders in the field of tranquilizing drugs—is the United States subsidiary of a Swiss parent company. The United States company reports that about 9 percent of its sales dollar volume is spent on research, and that 20 percent of its employees at its plant are engaged in research. The company further states that "A company like Ciba is stimulated by the patent system to spend millions in research—building modern research laboratories and staffing them with the finest creative talent available—all to develop new drugs, new dyes, new plastics, and other chemical products for the benefit of mankind * * *." See, How a New Drug Is Developed, Ciba Pharmaceutical Products, Inc., (1956).

aniline from coal—took place exactly 100 years ago. Today chemical companies, small and large, now compete in the development and manufacture of synthetic compounds used for rubber, plastics, fabrics, pharmaceuticals, cosmetics, and endless other purposes. Again the pressure is on the research laboratories—to create tomorrow's product before today's is rendered obsolescent by a competing development. A recent report states:

> "We try to invent all we can," says Shell Chemical's president, Richard McCurdy, "but we can never be sure that someone else won't render the invention obsolete. It's a calculated risk."
>
> *Research.*—To fight this continual threat of obsolescence, the synthetic chemical industry spends around 4 percent of its annual sales on research, more than twice the average for all industry. It is constantly involved in long-range research projects where the ultimate objectives—profits—are only a distant possibility. Union Carbide spent 17 years and $20 million before it perfected (in 1952) the coal-hydrogenation process which has substantially boosted coal's potential as a source of synthetics.[41]

The development of saran by the Dow Chemical Co. will serve as a specific illustration of the emergence of a synthetic chemical product. Vinylidene chloride is an old chemical, and as such is in the public domain. In the early 1930's Dow chemists saw potentialities in the chemical and began research work on it. Today, Dow manufactures vinylidene chloride polymers under the trade name "saran," for use as a film, a fiber, or as a plastic molding compound. In the film form saran competes with cellophane, vinylite, pliofilm, and various forms of paper wrapping materials; in the fiber form it can be used for screening, furniture, or as a yarn in carpets and draperies; and in the molded form saran can be used for pipes and similar articles. With respect to the patent system and its place in this development, Dow states:

> Patent encouragement has justified capital investment and continued vigorous research. And among the fruits of its research, Dow obtains an average of 120 patents each year.[42]

An example of smaller scale activity in the field of synthetics is found in Thiokol Chemical Corp. The corporation was formed in 1929 to manufacture the synthetic rubber developed by Dr. Joseph C. Patrick, in Kansas City. The patent rights to the product made it possible for Thiokol "despite its small size, to build on this new development and expand to its present stage."[43] Initial production of the product in 1933 established Thiokol as the first manufacturer of synthetic rubber in the United States. Competing with natural rubber prior to the war, and with other synthetics today, the company has continued its research and development activity. Typically, the product has not only turned out to have its originally contemplated synthetic-rubber application, but has become very important for another apparently unrelated use as a rocket propellant.

Undoubtedly, in the absence of a patent system, industries such as the antibiotics and synthetic-chemicals industries would carry on

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[41] Newsweek, June 4, 1956, p. 80.
[42] Saran, Patented Products of Patented Processes, Dow Chemical Co., 1956.
[43] From Rubber to Rockets, Thiokol Chemical Corp., 1956.

some research on a secret basis. It would indeed be unfortunate if the industries were forced to this expedient, not only because the pace of activity would surely be slowed but—equally important—cross-fertilization between competing research efforts would be impeded. Publication of research results—in the form of patent documents or otherwise—serves as a major stimulant to research activity. Each new development plants the seeds of thought in the minds of others, thereby sparking new ideas and new lines of inquiry.[44] It is for this reason that essentially all research workers avidly read the patent and other publications of their contemporaries. An example of this stimulation is found in the use of Diamox for the treatment of glaucoma. In 1950, this drug, a sulfa derivative, was synthesized by Dr. R. O. Roblin, Jr., of American Cyanamid. He was seeking a drug for the treatment of congestive heart failure. Diamox turned out to be highly effective for this purpose as it served to eliminate the excess fluids that overburdened the heart. Dr. Bernard Becker, of Johns

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44 "* * * When a patent issues, industry is informed of the new development embodied in the patent and often recognizes a commercial trend wherein patentable improvements are possible. Whole new industries have been developed based on patented processes in oil refining. Research is fostered in that its findings can be protected, and publication of results can be more complete and widespread, thus cutting down duplication of work and furnishing a basis for further study and experimentation. Anyone can pu chase a copy of a patent for 10 cents. The patent specification gives complete and detailed information as to the nature of the invention. Without patent protection, research would be driven underground and secret processes would develop. Chaos would reign in business and industry, and piracy of processes and methods would become common practice. Systems of espionage would develop for getting information on new processes and products, so that they could be used by competitors without consideration of inventors' rights. Manufacturing concerns could easily be put out of business by such thefts. Under such conditions it is questionable whether small businesses could survive. Those employed in industries would be enjoined from normal discussion of their work either inside or outside of their company, and cooperative research efforts would be frustrated. This would result in slowing up invention, if not in eliminating the United States from world leadership in industry, which it has held for many years under the patent system. One invention always promotes others, and inventors react catalytically on one another." Dr. Gustav Egloff, Invention and the Oil Industry, 26 J. P. O. S., 834–835 (1944). And see Kottke, Electrical Technology and the Public Interest 125 (1944).

The subject of secrecy as an alternative to the patent system raises a question as to what other alternatives are available. W. Rupert Maclaurin in Patents and Technical Progress—A Study of Television, 58 J. Pol. Econ., 142, 151 (1950), considers alternatives to the patent system and reaches the following conclusion:

"Let me now suggest some generalizations on patents and technical progress that are of significance to economic development.

"The principal dilemma raised by the present patent system is this: Patents provide an important protection to research budgets in large corporations and make it possible for small companies to come into being. On the one hand, society appears to need this public grant of monopoly to achieve certain technological objectives; on the other, the grant is subject to serious abuses, especially in the hands of large corporations.

"The only completely satisfactory way of handling the monopoly aspect of the problem is to abolish the patent grant. And there is a considerable group of informed individuals in this country, including a number of industrialists, who favor this. I should like, therefore, to consider briefly some of the alternatives that might be available for fostering new developments like television without relying on the stimulus of patents.

"Industrywide cooperative research is one possible solution. This has been attempted in the textile industry—so far, without marked success. It has the advantage of maintaining greater equality of opportunity between the various companies in an industry than usually develops under the patent system. However, my impression of the experience, both in this country and in England, is that the director of a cooperative research activity tends to become too far removed from the key decision makers in the industry. And in the annual competitive struggle for increased budget allocations between the internal departments of a firm and the 'outside' cooperative research department the insiders usually win. It thus proves exceedingly difficult to get first-rate talent to work on a project financed in this way.

"The alternative of relying on public bodies to carry the major load of important new technical developments also has some appeal. I do not personally feel that Government research agencies in this country, as now organized, would perform this task so efficiently as industry would. But a product like television could be effectively developed in university laboratories in the same way that radar was perfected during the war. In fact, today a considerable number of universities are engaged in very expensive and time-consuming engineering-development work of comparable nature, under contracts with the armed services. But I feel that in peacetime this represents an undesirable distortion of the purposes of a university and that in the long run such activities will be handled more efficiently by private industry.

"It is therefore my personal conviction that we are justified in relying on patent incentives to call forth the type of technological progress described in this article, provided that the abuses in the system can be significantly reduced. I think they can."

A bounty or award system is another possible alternative to the patent system. As a general matter, such system poses insuperable administrative difficulties in a representative government. See Kottke, Electrical Technology and the Public Interest (1944) p. 49. In some special fields, notably atomic energy, there are statutory provisions for the award of bounties to inventors. See, e. g., Atomic Energy Act of 1954, sec. 157 (66 Stat. 919, 947). It is of some interest that the bounty system has been used with apparent success in Russia. See New York Times, March 14, 1952, p. 3, and March 15, 1952, p. 3—reporting awards of "Stalin prizes in the field of inventions," totaling 20,325,000 rubles to 290 inventors. It has been argued that the patent system was discredited at the time of the Constitutional Convention and that Madison's proposal of "premiums and provisions" represented a general feeling in favor of bounties rather than the award of exclusive rights. See Hamilton and Till, Patents and Free Enterprise, TNEC Monograph No. 31, (1941) p. 24.

Hopkins University, read reports on this drug and noted the analogy between the action of the drug with respect to heart fluids and what was needed to relieve the buildup of fluid pressure in the eye causing glaucoma. He was stimulated to try the drug on glaucoma patients and found it highly effective for this purpose also. As a recent report states, "within 3 years' time a chemical designed to aid failing hearts is on the way to saving thousands from lifelong darkness." [45] It might have added that freedom to publish in the beginning made possible this rapid development.

The patent system performs an indispensable function in stimulating investment of capital in new manufacturing enterprise. The obstacles to entry into a new business are always great. Existing firms inherently have the advantages of going concern, adequate capital, a proven product, and established customer and supplier relations. The newcomer—even if it has a corps of unusually gifted personnel—has a heavy burden in attempting to overcome these manifold disadvantages. If, however, the new enterprise develops and manufactures a patented product these disadvantages are balanced in some measure by the exclusive market available. In consequence, investors can often be induced to participate financially in the development and manufacture of such products when they otherwise would not consider such investment.[46]

The experience of the late Clarence Birdseye provides an illustration. He gained an understanding of the principles and advantages of quick freezing of foods while working in Labrador.[47] Upon returning to the United States he organized a company to engage in the sale of quick-frozen fish. The venture failed. With his remaining assets he designed an automatic freezer which held promise of leading to a substantial business. On the strength of the patent protection anticipated on the new freezer and other inventions Birdseye was able to interest several wealthy men in the formation of a new company. Four years later the activity of the new company had reached the point where Birdseye and his associates were able to sell out to General Foods Corp. for $22 million.[48]

The history of P. R. Mallory & Co. illustrates the stimulating effect of the patent system on individual developmental activity spread over a period of years. Prior to the 1920's Mallory was engaged solely in the manufacture of metallurgical products. At that time it entered into a patent-license agreement with one Samuel Ruben, a

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[45] De Kruif, A New Weapon Against the Threat of Blindness, Reader's Digest, April 1956, p. 134.

[46] The record abounds with examples of investment induced by the patent system. See, e. g., hearings before the Committee on Patents, House of Representatives on H. R. 9259, H. R. 9815, and H. R. 1666, 75th Cong., 3d sess., March 21–25 and 28–31, 1938, and the extended hearings on the Oldfield bills in 1912 (H. R. 23417, 62d Cong., 2d sess.). And see TNEC hearings, pt. 3, especially at pp. 857–858.

[47] See Clarence Birdseye, If I Were 21, Reader's Digest, April 1951, pp. 64–66.

[48] The following summary of the effect of the patent system in inducing investment in the activities of individual inventors in the radio industry appears at p. 258 of Maclaurin, Invention and Innovation in the Radio Industry (Macmillan, 1949):

"After 1900, the possible rewards to be obtained from radio patents provided a direct stimulus to inventors and those who financed them. Fessenden, for example, obtained two backers, Walker and Given, who advanced large sums of money to finance his experiments. They did so with the definite hope that this would prove a profitable speculative investment. They expected Fessenden's patent position would enable him to develop a system of wireless communication which could be sold at a substantial profit to some competitor of the British Marconi Co. DeForest raised his funds by stock promotion, and his patents were played up in the sales appeal. Edwin Armstrong, as a struggling inventor, had no private means of sources of capital to tap, and for a number of years was able to finance himself only by what he received from his patents. And later, in television, a group of California bankers supported Farnsworth in the expectation that his patents would be basic to the new television industry and more than compensate for the initial investment. Without the patent system, it is difficult to see how many of these inventors could have obtained adequate financial support except by joining established companies; and in the critical years when these men were beginning their experiments, none of the existing firms was interested in their inventions. The patent system, therefore, provided an important stimulus."

skilled chemist working on his own. Ruben had just perfected the magnesium copper-sulfide dry rectifier and the dry electrolytic capacitor, both crucially important products in the radio industry today. They were then useful in battery eliminators for radio receivers, and Mallory invested in the manufacture and sale of the products for this purpose. Since then the use of these products has expanded to a great variety of other applications. For example, manufacture of dry electrolytic capacitors in the United States is probably at a rate exceeding 50 million annually. During the war years Ruben developed the mercury battery and thereby solved a problem of battery deterioration of great importance to the Armed Forces. Again Mallory manufactured the product, and continues to do so. The battery has since found a place in a variety of special applications, such as in hearing aids where its stable voltage characteristic is particularly desirable. Most recently, Ruben has developed a high voltage pile expected to have a very long shelf life and high voltage output per cubic inch, a product Mallory is again manufacturing. With respect to its activities with Ruben, Mallory states:

> The American patent system has provided incentive and protection for Samuel Ruben, one of the very small and perhaps vanishing group of great individual research men and inventors. With the protection of his patents, the Mallory Co. has been justified in spending millions of dollars in the commercial development of his inventions. The Mallory Co.'s electrochemical divisions, stemming directly from Ruben inventions, have greatly contributed to the growth of the company. Without the protection of the patents, however, some of these inventions might never have reached commercial success.[49]

Polaroid Corp. illustrates similar activity.[50] Photography dates back to 1840. The industry had made many improvements by 1948, but the cameras available to the public were still all of the kind requiring separate development and printing of the film. Polaroid Corp. entered the field that year with the so-called Land camera. The distinctive feature of this camera lay in its ability to provide a fully developed print promptly after exposure. The new camera has been highly successful, the Polaroid current net sales being of the order of $23 million per year. The company now has an annual research budget of over $1¼ million. Significantly, the company states that its "business is very largely dependent upon its patent structure." [51]

Nor need we speculate as to what the business community thinks of the patent system. Business organizations have consistently supported the patent system, and have emphasized the value of the system in spurring investment in small business.[52] And the record is replete with the testimony of businessmen, large and small, who have

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[49] Progress * * * in electrochemistry, P. R. Mallory & Co., 1956.

[50] Polaroid was incorporated in 1937 to market and develop the light-polarizing products developed by Dr. Edwin H. Land. Until the 1948 entry into the photography field the business of the company was confined to these products. Hearings, October 10–12, 1955, pursuant to S. Res. 92, pp. 265–267.

[51] For every success story there are, of course, many failures. One is found in the joint effort of Standard Oil Company of New Jersey and I. G. Farbenindustrie to exploit an electrical process for making acetaldehyde inexpensively. After an investment of $1,500,000 the process proved worthless. See hearings before the Committee on Patents, U. S. Senate, 77th Cong., 2d sess., on S. 2303 and S. 2491, p. 5199.

[52] See, e. g., testimony of William R. Ballard, representing the National Association of Manufacturers, hearings, Oct. 10–12, 1955, pursuant to S. Res. 92, p. 9.

testified before the Congress that the patent system is fundamentally sound.[53] Most striking of this testimony is that taken in 1938 with respect to the McFarlane compulsory-licensing bill. A total of 74 witnesses testified, of which 70 vigorously opposed the bill on the ground that it would diminish the value of the patent system and the incentives it creates. Only two witnesses supported the bill or an equivalent.[54] It is also significant that even though some large business concerns do not conduct research to obtain patents, the managers of these concerns are outspoken in their belief that the patent system is essential.[55]

Nothing short of wholly impossible large-scale social experimentation can determine the pace to which technical progress would drift in the absence of the patent system. There are unquestionably areas where research would continue[56]—and doubtless some business enterprise would continue to finance some research for noncompetitive reasons.[57] And in some areas secrecy would form a tolerable substitute for patent protection. It seems clear, however, that the pace would fall substantially below that of the present, and that in many areas copying and not creating would be the rule.[58] Long-term projects, particularly, would be put to one side in favor of minor short-term changes that could be written off before competition moved in. The activities of the royalty supported organizations such as Hazeltine, Universal Oil Products, Research Corp., and the various college and university foundations would doubtless be restricted and in some instances brought to an end. And in the case of manufacturing business enterprises management would doubtless consider many current

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[53] See, e. g., hearings cited at footnote 46, supra.

[54] For an analysis of these hearings see Ballard, There Is No Mystery About Patents (1946), appendix B, pp. 96–115.

[55] "* * * I don't think that if you were to abolish the patent system tomorrow, or if you were to greatly circumscribe it by its fundamentals in some way—I am not talking about procedural methods—that it would make one iota of difference to the Bell System with regard to the work it did itself for the development of communication, because we do not do work for the sake of taking out patents.

"Now, that isn't saying, however, that we and the public we serve would not suffer immeasurably by that, because what would happen? We would be deprived; we don't have to fear other people's using our stuff; we are a natural monopoly, we don't care, let them use it if they want to. But what we do want is to have the opportunity to get as many ideas as we can from the outside and pay for them, and anything which tended to dry up the flow of ideas from the outside, which we had the opportunity to buy or be licensed under, or what not, would tend to circumscribe and shrink down the kind of thing which we do." Testimony of Frank B. Jewett, president of the Bell Telephone Laboratories, at pt. 3, TNEC hearings, p. 974. See also the testimony of Charles F. Kettering with respect to General Motors Corp., at pt. 2, TNEC hearings, p. 344.

[56] The research and development budget of the Federal Government is an obvious example of research unrelated to the patent system. In fiscal 1956 this research is expected to exceed $2 billion. See National Science Foundation, the Federal Research and Development Budget (1955). Another example of research that would certainly continue is that of Bell Laboratories, which operates on a current budget of about $100 million per year and is concerned with supplying a market where the normal competitive forces are lacking. See Frank B. Jewett, footnote 55, supra. Another area where research and development would doubtless continue without a patent system is that existing where possible secrecy, heavy capital investment, and like factors assure that profits will be made before results are appropriated by competitors.

[57] The research now conducted by cooperative organizations such as trade associations and technical societies falls in this category. The total expenditures for such research in 1953 were about $20 million, a figure that should be contrasted with the sum of $3.7 billion spent by industry for other research in the same year. See National Science Foundation, Research by Cooperative Organizations (1956) and National Science Foundation, Science and Engineering in American Industry (1955). See also Maclaurin, Patents and Technical Progress, footnote 44, supra.

[58] Current practices in the textile and garment industry—where patent and copyright laws have in the past been ineffective—illustrate what can happen. In these fields it has been reported that—

"* * * The apt copyist may merely glance at the item displayed in stores or windows, pictured in advertisements, worn at fashion shows or glimpsed in a competitor's plant, and make close reproductions thereof. In the millinery industry it is said that the copyist often merely clips the advertisement from the paper and inscribes such notations as 'our price $3,' and mails it to his clients, whereas the original advertised model may have been priced at $12.50 or $18." Johnston and Fitch, Design Piracy—the Problem and Its Treatment Under NRA Codes (1936), p. 28.

Prior to the Supreme Court decision in *Mazer* v. *Stein*, 347 U. S. 201 (1954), much the same situation existed in the artistic lamp base industry. Rather than go to the expense of creating original designs, competitors simply purchased the successful original designs and used them to make molds from which copies were reproduced.

And see *Cheney Bros.* v. *Doris Silk Corp.*, 35 F. 2d 279 (2d Cir. 1929) and *Fashion Originators Guild of America, Inc.* v. *Federal Trade Commission*, 114 F. 2d 80 (2d Cir. 1940). Materials on style and design piracy are collected in Oppenheim, Cases on Unfair Trade Practices, (1950) pp. 498–512.

research and development expenditures unjustified in the absence of possible patent protection. Finally, we can be certain that investment capital would shy away from many new enterprises that presently obtain capital on the strength of existing or prospective patent protection and would gravitate to the established concerns which would be free to appropriate all developments.

The competitive atmosphere in research and development has a unique value in forcing the exploration of alternatives. Of course experience teaches—and we can look to the organizations and persons experienced in a particular field normally to point the way to improvement. To a surprising extent, however, this same experience gives rise to fixed notions, self-satisfaction, and an erroneous conception of what can be accomplished by alternative techniques. The result is that the most experienced workers often do not explore what ought to be explored and doggedly adhere to the thinking of the past. It remains for the nonconformist—often an inexperienced outsider—to take the steps that lead to significant development.

History is replete with incidents of this kind. The experienced designers of shoe manufacturing machinery considered and underestimated the cement process. The engineers of a smaller less experienced concern recognized the potentialities and made a success of the process.[59] It was the "practical" worker and "tinkerer" in a comparatively small company who devised the first successful adhesive cellophane tape, and not the Du Pont scientists who were working on the same problem.[60] General Electric and Westinghouse—research conscious organizations with large research budgets—both misjudged the value of the wire type photoflash lamp. The result was that a comparatively small company, Wabash Appliance Co., exploited this product and for a time enjoyed a major proportion of the photoflash lamp business.[61] And even Edison was hopelessly and stubbornly wrong with respect to the phonograph and the motion picture—two of his most significant inventions.[62]

Experience with Government-sponsored research and manufacture—where the pressures of competition are normally absent—also brings out the value of competition in research. It was a group of "outsiders" who insisted that the gaseous diffusion process be pursued to

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[59] "* * * Compo with a much smaller organization indicates how much research can be done on a smaller scale. Yet since Compo is limited to the simpler cement process machines, too much reliance should not be placed on this comparison. Nonetheless, one point is worth recalling. Compo's inventors first found practical ways to introduce the cement process which United had considered and rejected. This experience illustrates the familiar truth that one of the dangers of extraordinary experience is that those who have it may fall into grooves created by their own expertness. They refuse to believe that hurdles which they have learned from experience are insurmountable, can in fact be overcome by fresh, independent minds." per Judge Wyzanski in *U. S.* v. *United Shoe Machinery Corp.*, 110 F. Supp. 295, 346 (D. Mass. 1953). And see And There's a Company Called Compo, Fortune, September 1953, pp. 42, 114.

[60] *Technical Tape Corp.* v. *Minnesota Mining and Mfg. Co.*, 143 F. Supp. 429, 432 (S. D. N. Y. 1956).

[61] See Bright, The Electric Lamp Industry, 1949, pp. 340–1. Ironically, when Wabash brought patent infringement suit against General Electric on the patents, General Electric prevailed. See *Wabash Appliance Corp.* v. *General Electric Co.*, 187 F. 2d 577 (2d Cir. 1951). And see Kottke, Electrical Technology and the Public Interest (1944), p. 127.

[62] Edison discarded the disk type phonograph record in favor of the cylinder because of the advantage of the latter in providing a constant speed stylus movement. Berliner, financed by investors relying upon his patents, introduced the reproducible disk type record that has since become standard. Edison continued to manufacture the obsolescent cylinder machines until he quit the business in 1929. See Evolution of the Phonograph, Radio and Television News, May 1956, p. 72 and Gelatt, The Fabulous Phonograph (1955). Edison made a similar mistake in connection with the motion-picture machine. He correctly realized that the film must be caused to dwell momentarily while the shutter is opened to expose the separate frames. But he erroneously assumed that the developed film must be moved continuously for viewing purposes. The result was that Edison's motion-picture machines never progressed beyond the penny arcade stage. It took an outsider to recognize that the very same mechanism used in the camera must also be provided in the projector—and until this was done projection motion pictures could not exist. A most significant additional illustration of an important technical development misjudged by the existing industry is found in the turbo-jet aircraft engine. The development of this engine is reported in detail in Schlaifer and Heron, Development of Aircraft Engines (Harv. Univ., 1950), pp. 321–508. They conclude that "nowhere in the world was the first development of this new type of engine due to an established producer of conventional aircraft engines" (p. 85).

separate isotopes in the atomic bomb development—and this process ultimately proved most successful.[63] In the wartime synthetic rubber program the RFC—thinking primarily in monetary terms—first authorized only the construction of butadiene plants based on petroleum as the raw material. Yet it turned out that 80 percent of the butadiene produced in 1943 came from the alcohol base plants constructed under pressure from the Congress.[64] The postwar experience in synthetic rubber is even more revealing. The Government invested from $4 million to $8 million annually over a period of years in sponsored research projects conducted by private companies, universities, and research institutions. An analyst of research progress in the industry reports that all of the 6 major postwar technical developments, however, have come in large measure from 4 companies that did not participate in the Government program and conducted research in a competitive atmosphere.[65] Similarly unsatisfying experience has been reported in connection with Government-contracted development of aircraft engines.[66]

The lesson of history is clear—society must positively compel the exploration of alternatives and must give effective encouragement to such activities. The competitive process is uniquely adapted to this end—for it exploits self-interest in a field where no one can point with assurance to the best approach and all effort is necessarily subject to considerable risk of failure. The patent system is a powerful force toward maintenance of the competitive atmosphere. Existing concerns are forced—upon pain of payment of royalties or even foreclosure from a successful development—to explore all alternatives with an open mind.[67] On the positive side, the availability of patent protection encourages the entrance into an industry of new companies with fresh approaches unbiased by the mental blocks that often result from experience.

These considerations not only dictate a patent system, but they also demand a meaningful system. None of these objectives is achieved by the mere issuance of a ribboned certificate of invention. Nor can they be attained if letters patent is little more than a ticket to go to court—or the patentee is hemmed about by technical legal rules that drain all practical economic value from the grant. And—while we must always be alert to the possibilities of improving and strengthening the patent system—proposed changes must be carefully measured in terms of their practical effects on the business community and particularly the competition the system generates.

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[63] See, The High Cost of Secrecy to Science, Wall Street Journal, May 1, 1956, p. 10. See also, Business Week, August 25, 1956, p. 139.

[64] See Solo, Research and Development in the Synthetic Rubber Industry, 54 Quart. J. of Econ. 61, 66–68 (1954). In justice to the RFC it should be noted that its conclusion was correct within the monetary framework in which it was taken, and that the petroleum based process has since proven most economical. The RFC overlooked, however, some more important nonmonetary aspects of the problem and in consequence it undervalued the alcohol process in the particular wartime setting in which the decision was made.

[65] Id. at pp. 70–82.

[66] Schlaifer and Heron, Development of Aircraft Engines and Fuels (1950), especially at p. 83.

[67] A specific example of research triggered by the expense of patent royalties is found in the development of fluid catalytic cracking by Esso Research & Engineering Co. The company reports that it was interested in the processes of regenerating catalysts used in the solid catalytic cracking process but "the new process was inherently more expensive than normal refinery operations, and the royalty charges involved in obtaining a license were enough to justify a research program looking for a less expensive process." Typically, the fluid catalytic cracking process proved not only less expensive in terms of royalties but far superior to the earlier process. Introduced in 1940, it now accounts for 70 percent of the total installed catalytic cracking capacity in the United States. Esso reports that it currently employs 3,000 people in research and spends $30 million a year in that activity. See, Keys to Progress, Esso Research & Engineering Co., 1956.

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PART II—THE PATENT SYSTEM IN RELATION TO THE COMPETITIVE ECONOMY

> In my opinion, it is a vital necessity that there be effective competition among the companies in research and development, as well as in market trade. The consuming public has much to gain from technological improvements, and the security of the country, as well as national prosperity, are largely dependent upon continued scientific advances. And market competition, itself, can be readily impaired if a single company secures patent control of the industry. * * * [68]

American economic public policy is based on a general rule of freedom to compete in the manufacture of any product and in the use of any process. The assumption—generally valid—is that when restraints on competition are eliminated normal economic forces will give rise to the desired highly competitive order. The antitrust law proscriptions against restraint of trade and monopolization constitute the major general implementation of this policy. The right to exclude others incident to letters patent is superficially inconsistent with this broader economic public policy. Questions accordingly arise with respect to the place of these apparently unlike concepts within the framework of a single economic order.

The cue to resolution of these questions lies in recognizing that the patent system is a stimulus to competitive activity in research and development. Such competition demands a limitation on the general rule of complete freedom. Otherwise freedom to compete becomes freedom to appropriate the research accomplishments of others—and the value of development as a competitive effort is greatly reduced. In short, this is a case where some restraint is necessary to encourage the competitive activity desired. The patent right to exclude precludes appropriation of research efforts to the extent of the subject matter covered by patent rights—leaving all other areas open. In consequence competitive effort in research and development is made worthwhile and an increased pace of competition in such activity maintained. Over-all, the patent system serves the same broad public purpose of stimulating competition as the general rule of freedom from restraint.

It follows that the patent system is an integral part of the competitive order. However—since patents serve as a business asset to be used in competing—the permissible use of such rights must be defined. The following sections deal with these matters—all analyzed in the light of the practicalities of the patent system and the competition the patent system encourages.

A. PATENTS AND ECONOMIC POWER

An understanding of the actual economic power conferred by letters patent lies at the root of any meaningful discussion of the place of the

[68] Per Judge Knox in *U. S.* v. *Aluminum Co. of America*, 91 F. Supp. 333, 410 (S. D. N. Y. 1950).

patent system in a competitive economy. The economic and legal literature abounds in discussions touching on this subject, much of it abstract and centering about application of terms such as "monopoly" to the rights associated with an issued patent.[69] The power to exclude conferred by a patent is meaningful in a market context only to the extent that it gives a practical commercial advantage to the patentee. The focal point of the matter is not whether one word or another more aptly describes what the patent may be theoretically said to confer. Rather, our attention should be directed to the competitive impact of particular patents in the particular market settings of which they are a part. We will therefore look to some of the recent judicial decisions shedding light on this subject, bearing in mind that it is only in the context of actual events that analysis of the economic power associated with letters patent can have significance in relation to a competitive economy.

A dramatic illustration of the vigor of product competition incident to the patent system is found in the leakproof dry cell litigation and its aftermath.[70] In 1940 Anthony patent 2,198,423 issued to Ray-O-Vac Co., then a comparatively small manufacturer of dry cells for flashlight and other uses. The patent included broad claims to a dry cell with a "protecting sheet-metal sheath * * * tightly embracing" the cell proper to prevent leakage.[71] Despite its simplicity, the battery was a marked break from past thinking. Previously both the industry and users had accepted the propensity of exhausted cells to swell and leak—as indeed most persons know from sad personal experience. Most manufacturers had applied notices to their flashlight batteries warning of this effect. The Anthony patent construction went far to overcome this problem. Indeed, Ray-O-Vac was able to advertise the new battery as "leakproof" and to guarantee replacement of the entire flashlight if damaged by a leaky cell. The battery was an immediate commercial success. When a competitor adopted the patented construction, Ray-O-Vac brought a patent infringement suit which ultimately resulted in 1944 in affirmance by the Supreme Court of the lower court decisions of patent validity and infringement.[72] Ray-O-Vac issued no licenses, and realized its profits from the patent by way of manufacture of the patented cell, both for sale under its own name and for private brand sale.

The net effect of the Supreme Court decision and the Ray-O-Vac policy was to create a crisis in the industry. The Ray-O-Vac competitors—the leading battery manufacturers—faced an important patent to which they could not gain access. Hard pressed, they turned their attention to the development of noninfringing batteries which they could advertise as leakproof. By 1948 one of the defendants in the

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[69] For a collection of the materials see Oppenheim, Cases on Federal Antitrust Laws (1948), p. 464 et seq. On the futility of analysis based on the term "monopoly" compare the following passages:

"Though often so characterized, a patent is not, accurately speaking, a monopoly, for it is not created by the executive authority at the expense and to the prejudice of all the community except the grantee of the patent. * * * The term monopoly connotes the giving of an exclusive privilege for buying, selling, working or using a thing which the public freely enjoyed prior to the grant. Thus a monopoly takes something from the people. An inventor deprives the public of nothing which it enjoyed before his discovery, but gives something of value to the community by adding to the sum of human knowledge. * * *" per Mr. Justice Roberts in *U. S.* v. *Dubilier*, 289 U. S. 178, 186 (1933).

"* * * It is the protection of the public in a system of free enterprise which alike nullifies a patent where any part of it is invalid * * * and denies to the patentee after issuance the power to use it in such a way as to acquire a monopoly which is not plainly within the terms of the grant. The necessities or convenience of the patentee do not justify any use of the monopoly of the patent to create another monopoly. * * *" per Mr. Justice Douglas in *Mercoid* v. *Mid-Continent*, 320 U. S. 661, 665 (1944).

[70] *The Goodyear Tire & Rubber Co.* v. *Ray-O-Vac Co.*, 321 U. S. 275 (1944).

[71] Claim 1, patent 2,198,423. See also claims 2, 4, and 5.

[72] Footnote 70, supra.

litigation had such a battery in quantity production.[73] Another competitor had a battery on the market in 1950 for which it gave the same flashlight replacement guarantee that had been emphasized by Ray-O-Vac in obtaining the patent from the Patent Office and before the courts in securing the favorable decisions.[74] Throughout there has been vigorous competition and effective selling by all manufacturers. When Ray-O-Vac contended that the term "leakproof" was distinctive of its batteries, competitors satisfied the Patent Office that this was not true.[75] Ray-O-Vac has moved up in the industry, but it has not enjoyed any broad range freedom from competition in the sale of flashlight batteries. And now—with the patent expiring early in 1957—the company faces not only competition in the manufacture of the patented construction, but also competition based on improvements made by others in efforts to design around the Anthony patent.

When we turn to the Linde case [76]—the most recent Supreme Court decision upholding a patent—we find the same pattern within the confines of the case itself. The patent related to a welding flux particularly desirable and unusual in that it permitted welding of plates of great thickness and produced no visible arc during the welding process.[77] The District Court, the Court of Appeals, and the Supreme Court, all held the patent valid and infringed.[78] And in decision on rehearing the Supreme Court in sweeping language adhered to the "doctrine of equivalents" to place a broad construction on the patent claims.[79] Yet, by the time the case was again before the district court on remand, the defendant had devised an "unreacted" flux which it sold in competition with the patented flux. This "unreacted" flux was ultimately held to be outside the scope of the patent.[80] While we cannot here pass judgment on the merits of the "unreacted" flux vis-a-vis the patented flux, the fact that it was sold in competition with the patented flux and was charged as an infringement on the basis that it did the same thing, indicates that the practical differences, if any, were minor.

The recent Cellophane decision [81]—though not a patent infringement action—brings out even more forcefully the limitations on the

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[73] *General Dry Batteries, Inc. et al* v. *Ray-O-Vac Co.*, 104 U. S. P. Q. 347 (Comm'r of Patents, 1955).
The General Dry Batteries case gives a particularly interesting picture of the developments in the industry after the Supreme Court decision. It arose on an opposition filed by four competitors of Ray-O-Vac to a trademark application to the term "leakproof." Assistant Commissioner Leeds found that the term "leakproof" had acquired no secondary meaning as indicating dry cells made by Ray-O-Vac. In partial support of this conclusion the decision lists a great number of patents directed to "leakproof" dry cells (104 U. S. P. Q. 349–350). Burgess Battery Co. rested its position in the opposition in part on the fact that "Burgess has been for some 10 years engaged in the development, manufacture, and sale of truly leakproof dry cells and batteries" (104 U. S. P. Q. 349).
On May 7 and 8, 1956, the writer purchased flashlight batteries at a number of stores in downtown Chicago. The batteries bore seven different trademarks. Four (Ray-O-Vac, RCA, Sears, and Wards) were manuactured by Ray-O-Vac under the Anthony patent. Three (United States Electric Manufacturing Co., National Carbon Co., and Burgess Battery Co.) were not made under the patent. The United States Electric battery bore patent number 2,410,826, issued in 1946. All of the batteries except the RCA battery bore the same guaranty that a complete new flashlight would be supplied if damaged by the battery.

[74] *General Dry Batteries, Inc. et al* v. *Ray-O-Vac Co.*, 104 U. S. P. Q. 347, 353 (Comm'r of Patents, 1955).

[75] Footnote 73, supra.

[76] *Graver Tank & Mfg. Co.* v. *The Linde Air Products Co.*, 366 U. S. 271 (1949), on rehearing (339 U. S. 605 (1950).

[77] See 86 F. Supp. 191, 192. The patent in suit also involved a number of claims to a method of welding. These were held invalid by the district court (86 F. Supp. 191, 196, et seq.); held valid by the Court of Appeals (167 F. 2d 531); and held invalid by the Supreme Court (336 U. S. 271).

[78] Footnotes 76 and 77, supra.

[79] 339 U. S. 605 (1950).

[80] The district court held that the new flux was an infringement. *Union Carbide and Carbon Co.* v. *Graver Tank & Mfg. Co.*, 106 F. Supp. 389 (1951). The Court of Appeals reversed at 196 F. 2d 103 (1952). The district court concluded that the new fluxes "are substantially the same with respect to silicates as required by the patent; that such fluxes infringe because the elements in the compositions are, first, substantially the same thing as required by the Jones et al. patent; second, operate substantially the same way; and, third, they substantially accomplish the same results" (106 F. Supp. 393). The Court of Appeals decision rests on disclaimers made earlier by the plaintiff to distinguish the prior art and not on any contrary conclusion as to the similarity of operation.

[81] *United States* v. *E. I. du Pont de Nemours and Co.*, 76 Sup. Ct. 994 (June 11, 1956).

practical economic effect of even a basic patent. It also brings into focus the relationship of the patent system and the antitrust laws in fostering product competition. The case arose on a Government charge that Du Pont had monopolized the business of manufacturing and selling cellophane in violation of section 2 of the Sherman Act. Du Pont entered the industry in 1923 through a secret process license from the French concern La Cellophane. Du Pont promptly undertook a sustained research program to improve the product and to develop its uses. The company enjoyed a sales volume in excess of 75 percent of the cellophane sales in the United States. The only other substantial cellophane producer was Sylvania which, during the pre-1947 period in question, operated under patent license from Du Pont which included provisions for sharply increased royalties for sales in excess of a fixed percentage of Du Pont sales.[82] In short, if the case turned on cellophane as a separate commodity insulated from the competition of other products, there were all the earmarks of "monopoly power."

Nevertheless the district court concluded that Du Pont had not "monopolized" in violation of the Sherman Act. Turning to the test of monopoly power developed by the earlier Sherman Act cases—power to fix prices and exclude competitors from the relevant market—the court concluded that Du Pont lacked such power. Rather, glassine, waxed paper, aluminum foil, pliofilm, polyethylene, saran, Cry-O-Rap, and other materials all competed with cellophane for packaging candy, bread, meats, cigarettes, and other products.[83] The record contained instances where customers had shifted from these other materials to cellophane, changed back, and subsequently had shifted to cellophane again.[84] In short, Du Pont, faced with the competition of these other flexible packaging materials to which customers could and did turn, could not set a monopolistic price or exclude others from the significant market for flexible packaging materials generally. The majority of the Supreme Court affirmed the district court judgment.[85] In answer to the Government contention that the market should include only alternatives that are "substantially fungible with the monopolized product and sell at substantially the same price," the Court pointed to the practical fact that the various flexible packaging materials were "reasonably interchangeable by customers for the same purpose" and hence necessarily were part of the market to be considered in measuring monopoly power.[86]

The Cellophane decision not only stands as judicial recognition of the significance of product competition under the antitrust laws, but also shows vividly the relationship of patents to such competition. Du Pont's pioneering research did result in the issuance of an important patent—the moistureproof cellophane patent. The district court characterized the patent as a "basic product patent," as indeed it was in view of the evidence that moistureproof cellophane was the key to the successful development of a market for cellophane

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[82] *United States* v. *E. I. du Pont de Nemours and Co.*, 118 F. Supp. 41, 156 (D. Del. 1953). The Sylvania patent license provided for a royalty rate of 2 percent of net selling price until a fixed percentage of the combined annual sales of Du Pont and Sylvania was exceeded, at which time the royalty rose to 20 cents per pound or 30 percent of net selling price, whichever was greater. Actual sales by Sylvania were well below the percentage at which the royalties increased.

[83] Id., pp. 111–114.

[84] Id., pp. 200–204.

[85] Footnote 81, supra. Chief Justice Warren and Justices Black and Douglas dissented. Justices Clark and Harlan did not sit.

[86] Footnote 81, supra, at pp. 1006–1007.

in the United States.[87] One would suppose that if ever a patent could give rise to broad economic power, it would have done so in this instance. Yet both the district court and the Supreme Court concluded that Du Pont had not enjoyed monopoly power in the Sherman Act sense, and thus necessarily held that even in connection with Du Pont's position as leading domestic producer of cellophane the patent had failed to confer such power.[88] Indeed, in describing what the proofs showed to have actually happened, the district court said: [89]

> As cellophane got recognition in the trade, others entered various phases of the business as converters, users, suppliers of raw materials, manufacturers of equipment, and the like. Cellophane creates competition. Throughout the flexible packaging markets this competition is felt. It stimulates efforts of other producers to manufacture more efficiently. It stimulates research. The consumption of flexible packaging materials, including cellophane, has grown at a rapid rate. Within these markets the competition is intense. New producers have entered. No one material or one supplier controls—certainly not Du Pont, which has neither the power to raise prices nor to exclude competitors.

It might be added that even if the market is defined narrowly for antitrust purposes—as was done by the dissenting Supreme Court Justices—the case still shows that the actual market power attending even the "basic" cellophane patent was closely circumscribed by competing substitutes.

We find another pertinent recent case in *Cole* v. *Hughes Tool Company*.[90] Here, Hughes had brought action for infringement of three patents to oil well drilling bits. As one defense and basis for counterclaim, Cole argued that Hughes had monopolized the manufacture of such bits in violation of section 2 of the Sherman Act. Again we have a charge of monopolization levied against a company that was a pioneer in the field, had engaged in sustained active research, and enjoyed a position of leadership in the industry. Moreover, Hughes had a litigious history of aggressive enforcement of its patent rights and apparently refused to grant licenses on terms acceptable to competitors.[91] In short, if patent rights based on research were capable of imparting a monopoly position in the industry, Hughes should have acquired such position. Yet when the court examined the activity of competitors, the competing products, and the other facts of the industry, it concluded that "any notion that Hughes controls the market or enjoys a monopoly in the rotary-drilling-bit

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[87] "Validity of these claims and other broad claims contained in the basic-product patent was conceded. They are reinforced by basic and equally valid process patents. There is no proof any moistureproof cellophane could have been or in fact ever was made during the life of the product patent which was not equally covered by its claims. Indeed, this patent covered the entire field of moistureproof cellophane, and its strength and broad coverage was recognized" (118 F. Supp. 41, 214).

"Du Pont's development of moistureproof cellophane was stimulated by du Pont's inability to sell nonmoistureproof cellophane in competition with waxed glassine and waxed paper for wrapping cookies, crackers, candies, biscuits, and baked goods." Finding 94 (118 F. Supp. 41, 76).

[88] Since the majority of the Supreme Court found no monopoly power it did not go on to determine whether the patent would form a defense to the monopolization charge, where monopoly power was shown to exist. The district court did go into this question and concluded that the patent was alone a defense to the charge. See 118 F. Supp. 41, 213–214.

[89] 118 F. Supp. 41, 54.

[90] 215 F. 2d 924 (10th Cir. 1954).

[91] See, *Chicago Pneumatic Tool Co.* v. *Hughes Tool Co.*, 97 F. 2d 945 (10th Cir. 1938); *Robertson Rock Bit Co.* v. *Hughes Tool Co.*, 176 F. 2d 783 (5th Cir. 1949); *Williams* v. *Hughes Tool Co.*, 186 F. 2d 278 (10th Cir. 1950); *Chicago Pneumatic Tool Co.* v. *Hughes Tool Co.*, 197 F. 2d 620 (10th Cir. 1951).

industry is clearly refuted by the record." [92] With regard to bits of one general type, the court observed: [93]

> * * * The Hughes bits which have enjoyed the greatest market success are those designed for drilling in the medium and hard formations. There, Hughes comes into competition with cross-roller bits and cone bits of other manufacturers. Diamond bits also come into direct competition with the Hughes bits designed for drilling in the harder formations. Many of the large oil developing companies have ceased to use Hughes bits and are using diamond core bits in certain types of the harder formations for the reason that the diamond core bit drills faster and is more economical, since it is not necessary to pull it out and change bits.

The Glen Raven case [94] illustrates the actual economic power of a patentee in a different setting. The patent in suit was directed to the so-called picture frame heel design for women's hosiery. It was based upon the invention of one Bley who assigned an interest to his partner Spurgeon. The patented stocking enjoyed most impressive commercial success. Spurgeon Hosiery Co., a licensee, had 20 employees in March 1948 when it took a license. Despite a somewhat higher price than that of comparable quality hose, it rapidly expanded to four times its size due to increased sales volume. The Sanson Hosiery Mills, Inc., to which a part interest in the patent was assigned by Bley and Spurgeon, offered the patented stocking in late 1948. Prior to that time the company was in an unprofitable condition and had reduced its customer accounts to 15 or 20. Within 16 months Sanson's customer accounts rose to 3,981, and in the first year its sales increased from 3,000 dozen pairs a month to 48,000 dozen pairs a month. By the end of 1949 Sanson's stockings were to be found in all of the 48 States, in the Territories and possessions of this country, and in 26 foreign countries. By 1950 its annual sales were estimated at $10 million.

When a patent-infringement suit was brought on the Bley patent the defendant contended that the plaintiffs had entered into illegal price-fixing agreements. It was shown that they were selling the patented stockings under "fair trade" resale price maintenance statutes, which in terms permit such price maintenance only with respect to commodities "in free and open competition with commodities of the same general class produced and sold by others." [95] The argument was that the resale price maintenance statutes could not apply to the patented stocking because—if patented—the stocking was of necessity not in the same general class as other stockings. The court rejected this contention with the pragmatic view that "it defies common sense to say that the addition of a design to a stocking takes it out of the same general class of stockings of its competitors." [96]

No discussion of practical length can explore all of the variations of economic power associated with letters patent. The cases discussed above are illustrations of patents which proved to be important competitive instruments. Ray-O-Vac vigorously advertised and emphasized the advantages of its patented battery to increase its share

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[92] Footnote 90, supra, at p. 938.
[93] Footnote 90, supra, at p. 939.
[94] *Glen Raven Knitting Mills, Inc.* v. *Sanson Hosiery Mills, Inc.*, 189 F. 2d 845 (4th Cir. 1951).
[95] Id., at p. 854. The statute quoted is the Miller-Tydings amendment to the Sherman Act (50 Stat. 693). Essentially the same language is embodied in the McGuire amendment to the Federal Trade Commission Act (66 Stat. 631).
[96] Footnote 94, supra, at p. 854.

of the market while competitors searched for noninfringing leakproof constructions; Linde did likewise with respect to the patented welding flux; Du Pont enjoyed a commanding position in moistureproof cellophane manufacture; Hughes Tool has had the exclusive manufacture of a number of important patented bits and has made impressive profits; and the owners of the Bley design patent have had phenomenally increased sales and substantial license income because of the customer preference for the patented design. Absent economic advantages of this kind, the patent system would fail to encourage the research and development expenditures necessary to bring forth the inventions and the investment necessary to market them; [97] would fall short of bringing in new competitive enterprise based on inventions; and in many instances business would find secrecy more advantageous than going through comparatively meaningless patent procedures. Yet, despite the importance of the patent in each instance, vigorous competition prevailed.

There is of course a statistical chance of a patent which constitutes the key to a distinct industry free from significant product competition. One can point to historical examples of such patents.[98] Usually patents

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[97] The illustrations discussed in part I, above, compel the conclusion that some form of exclusivity is requisite to bring forth competitive effort in research and development. The point is brought out in the unusual setting of Government-owned patents by the second report of the National Patent Planning Commission 27 J. P. O. S. 76 (1945). Impressed by experience of the Department of Agriculture and other agencies that potentially valuable inventions were not exploited because of Government policy against issuing exclusive licenses, the Commission recommended that Government agencies be empowered to grant such licenses, or even assign patents, in appropriate cases (27 J. P. O. S. 80–85). See also, report of the Subcommittee on War Mobilization, pursuant to S. Res. 107 (78th Cong.), January 23, 1945, pp. 14 and 202. In the final report of the Attorney General to the President on Government Patent Practices and Policies, 114, 116–122 (1948), Government-financed research, development, and promotion is recommended as an alternative to the grant of exclusive licenses or assignments.

The late Professor Schumpeter is the leading exponent among economists of the need for exclusiveness. In Capitalism, Socialism and Democracy, he states:

"* * * largest-scale plans could in many cases not materialize at all if it were not known from the outset that competition will be discouraged by heavy capital requirements or lack of experience, or that means are available to discourage or checkmate it so as to gain the time and space for further developments.

"The introduction of new methods of production and new commodities is hardly conceivable with perfect—and perfectly prompt—competition from the start. And this means that the bulk of what we call economic progress is incompatible with it" (3d ed. 1950, p. 106).

Schumpeter looks upon the patent system as one way this exclusiveness is provided and concludes that it is "on balance a propelling and not an inhibiting factor" (Capitalism, Socialism and Democracy, 3d ed. 1950, p. 88).

Conclusions consistent with those of Professor Schumpeter are reached with respect to the radio industry by W. Rupert Maclaurin (Invention and Innovation in the Radio Industry (1949) pp. 250–265) and with respect to the electric-lamp industry by Arthur A. Bright, Jr. (The Electric Lamp Industry (1949), pp. 202–203, 451–482). More generalized empirical evidence supporting the Schumpeter approach is found in Hale and Hale, Monopoly in Motion: Dynamic Economics in Antitrust Enforcement (41 Virginia L. Rev. (1955), pp. 431, 448–460).

One school of economists questions Schumpeter's approach. A statement of this contrary view reads as follows:

"* * * the hired inventor is another employee on a salary and the grant of a patent on an invention in which he participated has little or no causal relation to his efforts. The expense of such research—salaries, laboratories, etc.—for the going concern is like the expense of time and motion studies, market research, and the like in that it is necessary in order to keep up or stay ahead. In a competitive setup the reward of corporate research is the advantage, however temporary, a company has in taking advantage of its findings. In all instances it must conceive, develop, and reduce ideas to practice, whether they be improvements in machinery, assembly line, or sales technique; patents apparently play little or no part as an incentive. The grant of patents to a corporation via its employees is another inane effort to adapt the legal theory of a corporate person to a law originally intended for the individual. The corporation has largely usurped the patent system as it once did the 14th amendment. Insofar as the big corporation and the hired inventor, one receiving the patents and the other wages or salary, has replaced the independent inventor, the 'promotion of the progress of science and the useful arts by securing for limited times to inventors, the exclusive rights to their respective discoveries' has ceased" (Vaughan, The United States Patent System—Legal and Economic Conflicts in American Patent History (1956), p. 288).

[98] See, e. g., Bell patent 174,465—covering the only practical method of communication by telephone—and Hall patent 400,665—covering the process of electrolytic manufacture of aluminum using a solution of alumina in a cryolite bath.

"With exceptions too rare to be significant, patents do not individually cover businesses, nor even new kinds of products which a manufacturer might make. Individually they will seldom support a new industry and almost never stop one. Patents (with these rare exceptions) are for mere improvements in known things, which compete with one another for adoption in going enterprises" (Ballard, There Is No Mystery About Patents (1946), p. 19).

When asked with regard to the problem of a revolutionary key patent in the automobile industry, Charles Kettering replied:

"I don't see how that thing could ever happen, you see, because any very, very radical departure doesn't come suddenly. They came very slowly and you couldn't just reach in your pocket and flash a new one out like that, especially in a highly developed art like the automobile business * * *" (pt. 2, TNEC hearings, p. 348)

of such sweeping scope issue so far in advance of the commercial development of the industry that they expire before substantial use or production can be developed.[99] If, however, the patentee has made a step so far beyond the current stream of development as to obtain such a patent—and nevertheless succeeds in bringing the invention to a commercially practical form and in building up substantial use before the patent expires—we have the strongest case for patent protection. Of necessity there has been an exhibition of the highest order of both inventive effort and successful commercialization of the kind that the patent system and public policy generally should alike encourage.

The great bulk of patents, however, confer much less economic power than the examples discussed above—either because they are directed to specific improvements or because use of the invention itself is not economically justified. A measure of the number of patents of this kind is found in the antitrust decisions where the courts have been confronted with issues turning on the effect of large groups of patents but have found comparatively few worthy of discussion as competitively important.[100]

Patents to specific improvements predominate in fields where there is a well developed body of prior art. They serve a useful purpose in stimulating competition in improvement and in the manufacture of products incorporating improvements. In such instances, however, competitors can manufacture directly competitive noninfringing alternatives, either based on the prior art or on the exercise of a modest degree of technical effort. Occasionally a particularly talented inventor will make an improvement rising considerably above the level of the art and receives a patent of comparatively great importance. Such patents are unusual, and in any event leave the competitors free to make a wide range of competing alternatives.

Improvement patents predominate in a vast number of fields. Virtually all articles of common household use—clothes washers, dishwashers, irons, coffeemakers, lawn mowers, refrigerators, etc.—are covered in all their basic respects by expired patents free for use by anyone. To illustrate a specific art of this kind, as well as the unusual occurrence of competitively important patents, we may take refrigerator ice cube trays. The problem of removing ice from a freezing container has always been troublesome. It was early encountered in commercial ice production, where inventors devised antistick sur-

[99] With respect to the 17-year patent term in the case of a pioneer invention, Charles Kettering testified: "* * * I think you would have to take the individual case, because if an inventor is very smart and alert, right up to the minute, 17 years isn't long enough, because he will be ahead of the times * * *" (pt. 2, TNEC hearings, p. 348).

Dr. Kettering further testified that he did not know of an instance where a revolutionary invention had caused serious dislocation of an established industry. Id., p. 351.

The classic examples of delay in the Patent Office appear to have been largely motivated by the thought that the inventions were ahead of the times. See, e. g , *Woodbridge* v. *United States*, 261 U. . . 627 (1923); *Overland Motor Co.* v. *Packard Motor Car Co.*, 274 U. S. 417 (1927); *Columbia Motor Car Co.* v. *Duerr & Co.*, 184 Fed. 893 (2d Cir. 1911). The turbo-jet aircraft engine provides an excellent ill stration of a more rec nt experience. A 1921 French patent showed a complete turbo-jet engine, b t develo ment of s ch an engine for act al aircraft did not begin until more than a decade later in Germany and England, and al ost 20 years later in the United States. See Schlaifer and Heron, Development of Aircraft Engines (Harvard Univ., 1950).

[100] See, e. g. *United States* v. *General Electric Co.*, 82 F. Supp. 753, 807–808 (D. N. J. 1949) (only 10 patents discussed in connection with "bread and butter" lamps manufactured by General Electric, all of which had either expired or represented inventions no longer used by 1948); *United States* v. *Aluminum Co. of America*, 91 F. Supp. 333, 386–389 (S. D. N. Y. 1950) (only 11 patents "competitively significant" of 775 owned by Alcoa). "The patent may not be an outstanding one; it may be entitled to but a narrow construction. It may in fact be easily avoided. We do not say. But it may not be infringed. Patents are not void because they are small or narrow. The public is benefited by both narrow and broad patents, directly and indirectly. They are directly beneficial for they result in better machines. Indirectly they cause competitors to get busy and produce a still better machine. And finally, the larger improvements come as the result of many short step inventions. At least Congress evidently so believes, for it retains a patent system that rewards those who contribute to the public welfare by new and useful products." Per Judge Evans in *National Slug Rejectors* v. *A. B. I. Mfg. Corp.*, 164 F. 2d 333, 340 (7th Cir. 1947).

faces, wedging devices, and other arrangements to facilitate removal of ice from the container.[101] Later—as the home refrigerator came into use—inventors devised a variety of constructions particularly adapted to home use. These applied eccentric, cam, or wedging devices to lift the divider bodily out of the tray, divider constructions that could be deformed or flexed to free the cubes, flexible trays that could be twisted or peeled away from the ice, and many other arrangements.[102] All of these patents have now expired, leaving the constructions freely available to the industry. At the present writing a tray construction using a two-part longitudinal divider enjoys considerable popularity.[103] While this construction has been unusually successful, it shares the field with a variety of arrangements based directly on the principles of the expired patents—and the great bulk of currently live ice cube tray patents are directed to very specific and competitively unimportant variations on the expired art.[104]

Little need be said about patents to inventions not economically worthy of use. Such patents exist because it is impossible to predict which inventions will become commercially important and which will not. A patent may be directed to a product in use and of importance at the time of filing which has since been displaced by subsequent developments. Or a patent may relate to an invention having apparently great promise which has not materialized. Patents of this kind serve a useful purpose in encouraging the exploration of all avenues. In terms of economic power they are unimportant.

The inescapable over-all fact is that the practical economic reach of letters patent is limited. Even the patents of comparatively great commercial importance—such as those of the above examples—fall short of conferring "monopoly" in the antitrust law sense or in any odious respect. Rather, they operate in a market context within which product competition can and does take place. Far from being free to fix a monopolistic price, or otherwise ignore the activities of competitors, the owners of even these important patents must face the competition of alternatives—each having its own advantages and disadvantages in relation to the patented product or process—as well as the all-important fact that competitors will devise superior non-infringing products and processes.

B. COMPULSORY LICENSING—MYTH VERSUS FACT

The subject of compulsory licensing is a false issue that has long plagued discussions of the patent law. To some the subject has become a rallying point for criticism of the patent system and uninformed conjecture about "suppressed" commercially valuable inventions.[105] Others have with equal vehemence regarded compulsory licensing of any kind and in any setting as a departure from all that

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[101] See, e. g., patents 529,346 (1894) and 961,781 (1910). For a partial collection of the patents in this field see Smith, Supplementary Material on Patent Law, Overbeck Co. (1953).

[102] See e. g., Patents 1,675,599 (1928); 1,738,162 (1929); 1,830,260 (1931); 1,879,400 (1932); 1,932,731 (1933); 1,930, 680 (1933); 2,028,047 (1936).

[103] The two-part longitudinal divider construction is shown in principle in patent 2,196,476, expiring in April 1957.

[104] The automobile industry illustrates another broad field where narrow improvement patents predominate. See, e. g., the analysis of the patents of General Motors Corp. at pt. 2, TNEC hearings, pp. 691–697. Again, there is an occasional improvement patent of considerable commercial importance. See, e. g., *Kesling* v. *General Motors*, 164 F. 2d 824 (8th Cir. 1948).

[105] See, e. g., Vaughan, Economics of Our Patent System (1925) p. 172 and Vaughan, The United States Patent System, Legal and Economic Conflicts in American Patent History (1956) p. 241.

has made the American patent system effective.[106] The result is often a debate between theoretical extremes in complete disregard of the practical facts.

Two basic considerations bring the matter into perspective. The first is the fact that effectiveness of the patent system in certain areas—notably the small manufacturer or the newcomer—rests on freedom from compulsory licensing. The second is the fact that at the present time the patent right of exclusion is limited in various respects. Indeed, all the legal tools required to handle abuses of patent rights that might otherwise justify a compulsory licensing statute are presently available.

The difficulty with unqualified compulsory licensing is that it would reach phases of patent system operation that depend for their economic value on the patent right to exclude. The newcomer or small manufacturer needs more than the mere right to royalties—when and if the invention proves successful. Success with a new product or process entails investment in research, development, and marketing, and a willingness to move forward despite uncertainties and the ever-present risk of failure. In this area a patent subject to compulsory licensing would have little effect in promoting competition, for the possible license royalties would provide slight incentive and in most instances would not serve to justify the effort and risk involved.

And when we consider the patent system in terms of its research-compelling effect on established business, the threat of possible foreclosure from some activity is far more significant than the risk of penalty in the form of patent royalties. Compulsory licensing would greatly reduce or eliminate this risk. Established business could then relax with the assurance that it could promptly adopt new developments after others had made the investment and effort required to prove their value. This is the very kind of relaxation that a broad competitive public policy should prevent.

Nor can this difficulty with compulsory licensing be overcome by limiting the statutory scheme to cases where the patented invention is not being used. Nonuse of a patented invention is neutral, and should not be equated with any sinister or undesirable purpose.[107] To be sure, a superficially appealing argument can be made that the patentee ought either to use the invention or permit others to do so.[108] Thinking of this kind lies behind the court of appeals decision in the Special

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[106] See, e. g., Separate Views on Patents of Congressman Cole in Report 2181, House of Representatives, 83d Cong., 2d sess., July 12, 1954, to accompany H. R. 9757, amending the Atomic Energy Act of 1946; Spencer, Thinking Ahead: Threat to Our Patent System, 34 Harv. Bus. Rev. 21 (1956).

[107] Report of the Attorney General's National Committee to Study the Antitrust Laws, p. 229 (1955).

[108] For a judicial expression of this thought see *Hoe* v. *Knap*, 27 Fed. 204, 212 (C. C. N. D. Ill. 1886). The unqualified expression of *Hoe* v. *Knap* was rejected by the Supreme Court in *Continental Paper Bag Co.* v. *Eastern Paper Pag Co.*, 210 U. S. 405 (1908), where the defendant in a patent infringement suit contended that relief should be denied because the plaintiff was not using the patented invention. With respect to the argument that the patentee must use the invention or permit others to do so, the court stated:

"But, granting all this, it is certainly disputable that the nonuse was unreasonable, or that the rights of the public were involved. There was no question of a diminished supply or of increase of prices, and can it be said, as a matter of law, that a nonuse was unreasonable which had for its motive the saving of expense that would have been involved by changing the equipment of a factory from one set of machines to another? * * *" (210 U. S. at p. 429).

The Court of Appeals for the First Circuit had reached a similar conclusion. Judge Aldrich in the Court of Appeals had dissented because he considered the evidence to show that "the complainant stands in the common class of manufacturers who accumulate patents merely for the purpose of protecting their general industries and shutting out competitors," (150 Fed. 741, 745 (1st Cir. 1906). For more complete discussion of this and other cases bearing on the subject see Frost, Legal Incidents of Non-Use of Patented Inventions Reconsidered, 14 Geo. Wash. L. Rev. 273, 435 (1946).

Equipment case, overruled by the Supreme Court.[109] The difficulty with thinking of this sort lies in the fact that it ignores the realities of product competition and the inventive process.

Product competition is defined in terms of competing technologies, not in terms of patents. A single competitive technology may encompass a number of patents. The patent law has long and properly encouraged patent disclosures and claims to variations.[110] These may appear in a single patent, or in a group of patents.[111] The inventive process normally leads to such variations, such as the related compositions found in the Jones, Kennedy, and Rotermund patent involved in the Linde case,[112] the various dry cell constructions shown in the Anthony patent of the Ray-O-Vac case,[113] or the numerous amplifying vacuum tube constructions shown in the basic DeForest vacuum tube patent.[114] From the standpoint of investment—and of competition in the developmental process—these variations are usually so closely related as to amount to the same thing. They represent like rather than competing technologies. It is accordingly small solace to the inventor that he can have exclusive rights to one variation if his competitors—especially the established concerns—can use variations essentially equivalent to the one chosen for manufacture. In such instance the patent owner's own inventiveness will be turned against him to destroy the value in the patent rights and preclude the economic benefits required to generate product and research competition.

Of course this does not dispose of the persistent myth of the patent system—the commercially important invention suppressed by the patent owner for some ulterior purpose. Here the important consideration is the present state of the law, particularly in relation to injunctive relief for patent infringement, for without such relief such suppression necessarily must fail.

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[109] *Special Equipment Co.* v. *Coe*, 144 F. 2d 497 (App. D. C. 1944), reversed at 324 U. S. 370 (1945). This case arose on bill in equity to require the commissioner to issue a patent to "subcombination" claims to a pear preparing machine. The complete machine served to peel, core, and split pears for canning and it was in this form that the machine was marketed. Claims had been allowed in the application to the complete machine. The claims sought on the bill in equity were to the machine without the splitting knife. It was the reasoning of the applicant that these claims represented patentable invention and that one otherwise an infringer could escape the claims allowed by splitting the pears by hand. The Court of Appeals reasoned that "two distinct inventions are disclosed in the applicant" and that the patentee intended to use only one, namely the complete combination with the splitting knife. It accordingly considered the case one where the claims were sought for purposes of nonuse and to protect a different invention that was used. Considering only the narrow question thus posed, the court concluded that the public interest demanded that the subcombination claims be refused.

On certiorari, the Supreme Court looked to the overall situation. The Court concluded that the "intended use of the patent (to the subcombination) to prevent others from appropriating it and by that means from appropriating an essential part of his complete machine is in no way inconsistent with petitioner's making other permissible uses of the subcombination patent" (324 U. S. at p. 379). The Court also noted that "* * * we think it plainly is legitimate to use a patent on the subcombination as a means of preventing appropriation by others of petitioner's more important complete invention which he is using, where there is absent, as there is here, any purpose to enlarge the monopoly of either invention" (324 U. S. at p. 376).

[110] An important example of this policy is found in 35 U. S. C. 112. The last paragraph of this section specifically provides that a "means" claim "shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." Obviously this language encourages the patent applicant to show as many variations as possible.

[111] Whether the several claims of a single patent, or the various claims of a group of patents, are involved should be immaterial. In some instances the Patent Office itself may be responsible for the issuance of several patents rather than one. Section 121 of the Patent Code is intended to make this matter largely discretionary with the Office. And even where there is no question of a Patent Office "division" requirement a number of patents may issue representing a common inventive theme.

[112] Patent 2,043,960: This patent resulted from "experiments with welding composition which they hoped would give a better weld than was being obtained by the Robinoff process, which undoubtedly involves an electric arc phenomenon," *Linde Air Products* v. *Graver Tank & Mfg. Co.*, 86 F. Supp. 191, 193 (N. D. Ind. 1947). The patent contains product claims 18, 20, 22, and 23 which were held valid and infringed (336 U. S. 271, 339 U. S. 605). Other product claims, namely 19, 21, 25, 28 and 29 were not at issue in the case.

[113] Patent 2,198,423: This patent shows, at figures 1, 8, and 11, three separate forms of the invention. The claims sustained by the Supreme Court covered all three forms.

[114] Patent 841,378: This patent covered the crucially important development of the amplifying electron tube. DeForest's concept was to achieve amplification by varying the electron flow between the heated cathode and the anode. The 6 figures of the patent show 6 separate ways of carrying out this concept. Figures 2 and 4 show the three electrode form of the invention that has since become standard practice.

Injunctive relief became a part of the patent statutes in the 1819 Patent Act.[115] This act provided that in patent and copyright cases the court—

> shall have authority to grant injunctions, according to the course and principles of courts of equity * * * on such terms and conditions as the said courts may deem fit and reasonable * * *.

The injunction provision of the 1952 Patent Code in similar language provides that:

> The several courts having jurisdiction of cases under this title may grant injunctions in accordance with the principles of equity to prevent the violation of any right secured by patent, on such terms as the court deems reasonable.[116]

The courts have never felt compelled to grant injunctive relief under any and all circumstances. Rather, considerations of public interest have dictated refusal of injunctive relief on numerous occasions. The most well-known of these cases are the patent misuse cases, where the courts have regarded the activity of the patentee as so contrary to the public interest as to require refusal of all patent relief. As Mr. Chief Justice Stone stated in *Morton Salt* v. *Suppiger*:[117]

> It is a principle of general application that courts, and especially courts of equity, may appropriately withhold their aid where the plaintiff is using the right asserted contrary to the public interest.
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> * * * * * * *
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> It is the adverse effect upon the public interest of a successful infringement suit in conjunction with the patentee's course of conduct which disqualifies him to maintain the suit, regardless of whether the particular defendant has suffered from the misuse of the patent. Similarly equity will deny relief for infringement of a trademark where the plaintiff is misrepresenting to the public the nature of his product either by the trademark itself or by his label. * * * see also, for application of the like doctrine in the case of copyright, *Edward Thompson Co.* v. *American Law Book Co.* * * * The patentee, like these other holders of an exclusive privilege granted in the furtherance of a public policy, may not claim protection of his grant by the courts where it is being used to subvert that policy.

Reasoning along the lines of the Morton Salt and other misuse cases was applied in the dictum in the Vitamin Technologists case.[118] Suit was there brought by Wisconsin Alumni Research Foundation under the Steenbock patents on the ultraviolet irradiation of foods to produce vitamin C. The court concluded that the patent owner was refusing to license irradiation of oleomargarine under the patents in

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[115] 3 Stat. 481.

[116] 35 U. S. C. 283. By way of contrast, the copyright law is in terms unqualified with respect to injunctive relief (17 U. S. C. 101 (a)). However, with respect to the statutory compulsory licensing applicable io musical recordings when the owner of a musical copyright permits recording, the statute provides that injunction may be granted "upon such terms as the court may impose" (17 U. S. C. 101 (e), cf. 17 U. S. C. 1 (e)).

[117] 314 U. S. 488, 492 (1942).

[118] *Vitamin Technologists* v. *Wisconsin Alumni Research Foundation*, 146 F. 2d 941 (9th Cir. 1945), cert. den. 325 U. S. 867).

order to promote the sale by Wisconsin farmers of natural butter. Even though the suit was brought against a defendant in no way related to irradiation of oleomargarine, the court nevertheless expressed the view that the activity of the patent owner was such as to preclude the grant of any relief for patent infringement.[119]

A second case of significance is based directly on considerations of public health and welfare.[120] Here action for patent infringement was brought against the city of Milwaukee on the ground that the sewage-disposal system used to treat sewage prior to discharge into Lake Michigan infringed the patent. The court found the patent valid and infringed. It nevertheless refused injunctive relief because the public health and safety would be prejudiced by an interruption in the operation of the system. The court decision in this instance accordingly amounted to a judicial grant of compulsory license in favor of the city of Milwaukee and against the plaintiff—a compulsory license no less effective than if granted under some statute directed to that end.[121]

Additionally, since 1910 the Government has had the statutory right to use patented inventions free from injunctive relief,[122] and since 1918 that right has also extended to manufacture and sale of patented products for use by the Government.[123] These statutes in effect subject the patents involved to compulsory licensing, as does a similar statute respecting the Tennessee Valley Authority.[124] And the Atomic Energy Act likewise provides for compulsory licensing of patents.[125]

An additional and very important form of compulsory licensing has developed through the antitrust laws. Where practices relating to patents are a part of a proven violation of the Sherman Act, it is reasonable that a decree under section 4 of that Act—intended to dissipate the effects of the violation and restore competition—should include provisions directed to the use of the patents. In many cases these decree provisions have required the compulsory grant of patent licenses. While the power of a court to order such licenses on a royalty-free basis is unsettled, there is no present question with respect to the power to order such grant on a reasonable royalty basis.[126] It is also well settled that where a patent is used as an integral part of activity in violation of the antitrust laws, such as an attempt to monopolize, relief for patent infringement will be denied.[127]

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[119] The court held the patent invalid and accordingly did not actually deny relief because of the refusal to license irradiation of oleomargarine.

[120] *City of Milwaukee* v. *Activated Sludge*, 69 F. 2d 577 (7th Cir. 1934), cert. den. 293 U. S. 576, and see *Bliss* v. *City of Brooklyn*, 3 Fed. Cas. 706 No. 1 (E. D. N. Y. 1871), and *Nerney* v. *New York, N. H. & H. Ry. Co.*, 83 F. 2d 409 (2d Cir. 1936).

[121] Cf. Report of the National Patent Planning Commission of June 18, 1943, recommending a statutory provision precluding injunctive relief "whenever the court finds that the particular use of the invention in controversy is necessary to the national defense or required by the public health or public safety." The Commission tendered this recommendation with the suggestion that it was intended to "remove any possible doubt on the subject." 25 J. P. O. S. 455, 459.

[122] 36 Stat. 851, now incorporated in 28 U. S. C. 1498. See note 54 Harv. L. Rev. 1051, 1054–1057 (1941).

[123] 40 Stat. 705, now incorporated in 28 U. S. C. 1498. See note 54 Harv. L. Rev. 1051, 1054–1057 (1941).

[124] 48 Stat. 68.

[125] 68 Stat. 919, 945. The history of the compulsory licensing provisions of the Atomic Energy Act of 1946 (60 Stat. 768) and those of the present statute is steeped in controversy that illustrates the intense feelings that the subject of compulsory licensing evokes. As one commentator—analyzing the subject along the lines of the analysis herein—states:

"In view of (the limitations in the 1946 Atomic Energy Act) * * * it is somewhat surprising that this proposal for compulsory licensing, restricted as it is, evoked the controversy which it did during the debates on the act. Compulsory licensing in various restricted forms is not new to the American patent system. * * *" (Ooms, Patent Provisions of the Atomic Energy Act, 15 Univ. of Chicago L. Rev. 822, 832 (1948)).

And see Ooms, Problems of Patent Policy, 1952 University of Michigan Summer Institute 155, 173–174; The Constitutionality of the Patent Provisions of the 1954 Atomic Energy Act, 22 Univ. of Chic. L. Rev. 920 (1955).

[126] Report of the Attorney General's National Committee To Study the Antitrust Laws, pp. 255–259 (1955).

[127] E. g., *Kobe, Inc.* v. *Dempsey Pump Co.*, 198 F. 2d 416 (10th Cir. 1952), cert. den. 334 U. S. 837.

In the light of these existing statutes and judicial doctrines the subject of compulsory licensing becomes more academic than real.[128] The courts need no new power to handle abuses of patent rights that might otherwise justify a statute. It would be incredible, for example, to find an injunction issued where the public safety or health required otherwise. In like measure there are clear indications that in a proven case, of unreasonable "suppression"—such as a patent used to "block" or "fence in" a competitor exploiting a competing technology—would be similarly treated.[129] And any compulsory licensing statute reaching beyond cases of this general kind would in like measure reach situations where the patent system would otherwise induce competition in research and development.[130]

To be sure, it can be argued that there is a need for a compulsory licensing statute until some court specifically and in so many words denies injunctive relief in a patent case involving anticompetitive "suppression." But this argument proves too much, for the failure of litigants to raise the issue is itself a persuasive indication that practical considerations prevent the matter from arising. Whatever the reason for this history—whether economic, patent law, antitrust law, public relations or otherwise—the important point is that if a case arises that really involves "suppression" justifying compulsory licensing, the defendant in the infringement suit involved would surely raise the point. The Paper Bag case—now half a century old—is an open invitation to prove the unreasonableness of a nonuse, and more recent decisions such as the Vitamin Technologists case drive home the point. Even if we assume—contrary to the trend and reasoning of the decisions—that the courts would somehow countenance what is plainly contrary to the objectives of the patent system there can be no doubt that the point would be raised in any case where arguably warranted by the facts.

The most meaningful argument in favor of compulsory licensing is that it might silence the contentions about what would happen if the theoretical case that has not come up did in fact arise. If the Congress had an excess of time and an inclination to pursue this essentially theoretical and highly controversial matter, there might be some point in doing so. However, so many pressing tasks of unquestionable public importance demand the attention of Congress that it seems clearly unsound to pursue the matter of a statute for which the need is at best debatable.

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[128] Compulsory licensing by statute is considered in some quarters to be equivalent to destruction of the patent system. Small manufacturers, particularly, generally feel that a statute—regardless of built-in safeguards—would enable their larger competitors to take advantage of them. See, e. g., hearings before the Committee on Patents, House of Representatives, on H. R. 9259, H. R. 9815, and H. R. 1666, 75th Cong., 3d sess., March 21–25 and 28–31, 1938.

It is of interest that the compulsory licensing statutes of foreign countries have rarely been invoked. See, e. g., Wyss and Brainard, Compulsory Licensing of Patents, 6 Geo. Wash. L. Rev. 499 (1938); Vojacek, A Survey of the Principal National Patent Systems (1936); Frost, Legal Incidents of Nonuse of Patented Inventions Reconsidered, 14 Geo. Wash. L. Rev. 273, 435, 449–459 (1946); Penrose, The Economics of the International Patent System (1951), pp. 162–204; Federico, Compulsory Licensing in Other Countries 13 Law and Contemp. Prob. 295 (1948).

"* * * These provisions (for compulsory licensing) have been steadily widened over many years, so as to abolish one by one limitations put upon them by judicial interpretation, but the legislature has never yet succeeded in making compulsory licensing of real importance." White, Patents for Inventions, London, (1955), p. 271.

[129] See, e. g., Report of the Attorney General's National Committee To Study the Antitrust Laws 230, note 34.

[130] An example of such statute is found in H. R. 9259, 75th Cong., 3d sess., which contains no significant limitations on the grant of compulsory license other than an amorphous statement that there be a finding that the public interest be served. See also the recommendation of the TNEC that all patents be subjected to unlimited compulsory licensing. Final Report, p. 36 (S. Doc. No. 35, 77th Cong., 1st sess.).

C. PATENTS AND THE ANTITRUST LAWS—TOOLS TO A COMMON END

A major value of the patent system in today's economy is that it injects competition of a kind that otherwise would not exist. Competition of new products manufactured by new entrants into existing industries, competition in product and process improvement and cost reduction between existing firms, research competition by royalty-supported organizations—all these are stimulated by the patent system. And all of these are forms of competition precluding the quiet repose that the antitrust laws seek to prevent. Of course the patent system operates in one sphere by the grant of exclusive rights and the antitrust laws operate in another sphere by keeping the channels of trade open. But in ultimate objective—a competitive atmosphere—there is identity.[131]

This fundamental fact is too often overlooked. Instead of emphasizing the similarity of object and seeking to make the patent laws and the antitrust laws both more effective, there has been much discussion based on the assumption that they represent rival philosophies and conflicting policies. And too often the assumption has been that strengthening the patent laws weakens the antitrust laws, and vice versa.

While the patent laws operate in a different manner and in a different environment than the antitrust laws, practical business practices are not so easily classified. Accommodation must accordingly be made. It is this accommodation—and not any conflict in over-all objective—that forms the subject matter of the patent-antitrust problems.

There is no need here to discuss in comprehensive fashion the various patent-antitrust problems, or to dwell on the many ramifications of antitrust enforcement that raise questions with respect to the patent system.[132] A few general observations, however, will be helpful in bringing out the broad considerations that should bear on the subject.

The first determination in relation to any patent-antitrust question must be directed to the nature and character of the patent rights involved. For example, the patent to a sieve used in making vitreous enamelware cannot justify agreements excluding second grade ware from the market, or fixing the price at which the first grade ware is sold.[133] Plainly the patent right to exclude as to the sieve cannot warrant agreements of this kind as to the unpatented ware produced through its use. Similarly patents to parking meters form no basis upon which the price of unpatented accessories can be fixed.[134] However, the fact that an agreement or practice reaches outside the area of the patent should not render it automatically illegal. Rather, the inquiry should then go to the legality of the agreement or practice as

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[131] See, e. g., Oppenheim, Patents and Antitrust: Peaceful Coexistence?, 54 Mich. L. Rev. 199 (1955), Wood, Premises and Scope of the Patent Chapter (Report of the Attorney General's National Committee To Study the Antitrust Laws), 104 U. of Pa. L. Rev. 243, 244 (1955). ("* * * The two sets of statutes take obviously different routes, but their goals—of stimulating progress and achievement on the one hand, and stimulating and protecting competition on the other—are much the same.")

[132] See, e. g., Report of the Attorney General's National Committee To Study the Antitrust Laws, March 31, 1955, ch. V; Wood, Patents and Antitrust Law (1942); and Oppenheim, Cases on Federal Antitrust Laws (1948), pp. 464–597 and 637–710.

[133] *Standard Sanitary Mfg. Co.* v. *United States*, 226 U. S. 20 (1912) ("The agreements clearly, therefore, transcended what was necessary to protect the use of the patent or the monopoly which the law conferred upon it. They passed to the purpose and accomplished a restraint of trade condemned by the Sherman law * * *.")

[134] *United States* v. *Vehicular Parking*, 54 F. Supp. 828 (D. Del. 1944).

a matter of general law. The patent is one factor to consider in such inquiry. But to condemn conduct otherwise legal merely because it is associated with—but outside the scope of—some patent or patents is to penalize the fact of the patent and discourage rather than encourage the research that brought forth the patent in the beginning.[135]

Secondly, in dealing with practices and agreements relating to patents few absolute rules should be applied. A major value of the antitrust laws as a control over anticompetitive practices lies in their flexibility. Conduct licit in one setting may be illicit in another. The decisions on grant-back clauses in patent licenses bring out the point. Such clauses, by giving to the patent licensor some advance rights to the inventions of the licensee, necessarily exert at least some depressing effect upon the incentive of the licensee to engage in research and development. Yet even a patent assignment grant-back provision has a proper area of use—as, for example, to provide adequate security in connection with the sale of a business.[136] And in most instances a simple nonexclusive license grant-back represents no more than part of the agreed exchange for the main license.[137] On the other hand, in a decree to dissipate the effects of a proven violation of the Sherman Act it may be necessary to prohibit even nonexclusive license grant-backs.[138] To take another—and especially significant—illustration, the newcomer or small manufacturer in a field may well insist upon license clauses designed to protect the return of his own manufacturing activity that would almost certainly transgress the antitrust laws if incorporated in patent license agreements between established oligopolistic concerns.[139]

Third, the practical problems arising under the patent system should not be disregarded in enforcing the antitrust laws. In the nature of things, the patent system leads to some conflicts—situations wherein an interchange agreement between the owners of the two or more patents is essential to permit the practical manufacture of the most desirable product. In such situations the antitrust laws should not preclude agreement, provided the over-all effect does not reduce the access of outsiders to the respective patents or competition between the parties to the agreement.[140]

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[135] The cases display some tendency to find a per se antitrust violation in any patent misuse situation. Such result can be superficially justified by applying a formula that a patent by definition is a "monopoly" and misuse is an "abuse of monopoly power." This syllogistic reasoning is fallacious for it overlooks the fact that the term "monopoly" is used in one sense in the major premise and in another sense in the minor premise. The existence of a patent ought not to foreclose inquiry—if otherwise appropriate—as to actual market power and effect, for this is necessary to establish whether there is indeed "monopoly power" in the antitrust sense and to support any conclusion that there is in fact an abuse of "monopoly power." See Report of the Attorney General's National Committee To Study the Antitrust Laws, p. 254, and Frost, Misuse as a Per Se Violation, Conference on the Antitrust Laws and the Attorney General's Committee Report, Northwestern University, p. 113. 1955.

[136] *Transparent-Wrap Machine Corp.* v. *Stokes & Smith Co.*, 329 U. S. 637 (1947) (grant-back not a patent misuse), and *Stokes and Smith Co.* v. *Transparent-Wrap Corp.*, 161 F. 2d 565 (2d Cir. 1947) (holding on remand that the same grant-back was not shown to be a violation of the antitrust laws).

[137] See, e. g., *United States* v. *National Lead Co.*, 332 U. S. 319, 359 (1947).

[138] See, e. g., *United States* v. *Aluminum Co. of America*, 91 F. Supp. 333, 409–410 (S. D. N. Y. 1950).

[139] The case of the newcomer or small manufacturer is the classic example of competition made possible by the patent system. The encouragement in this instance necessarily depends on a broad-range freedom from compulsion to license. Accordingly, in this special case the patentee ought to have a very broad right to license on nearly any terms it deems necessary to avoid prejudice to its manufacturing business. In such instances the principal inquiry should be directed to the presence of a bona fide effort on the part of the licensor to preserve its own manufacturing opportunities.

[140] There has been some tendency to insist that considerations of antitrust enforcement should preclude settlement of patent controversy by agreement. See dissent of Louis B. Schwartz, Report of Attorney General's National Committee To Study the Antitrust Laws, p. 247. But see *United States* v. *Imperial Chemical Industries, et al.*, Civil 24–13, unreported decision at hearing of June 4, 1954, United States District Court, Southern District, New York, where a patent interference settlement agreement was approved over the protests of the Department of Justice that the parties should have been forced to litigate the matter. It is difficult to perceive the basis for this contention—for the fundamental need is for competitive effort and not needless controversy. Where agreement does not foreclose competitors or eliminate competition between the parties, long-run competition is best served by such agreement rather than controversy. The courts have in effect so held. See Report of the Attorney General's National Committee To Study the Antitrust Laws, pp. 242–247.

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Fourth, the antitrust laws should be vigorously enforced as to practices in connection with patents, just as in other areas. The patent system itself needs antitrust law enforcement to preclude the over-all monopoly that ultimately depresses competitive endeavor in innovation. At the same time, however, antitrust enforcement should not degenerate to antipatent enforcement. The focus should not be on the fact of a patent or patents, but rather what has been done with them. Activities that are essentially the exercise of patent rights should be immune to antitrust attack.[141] Compulsory licensing on any terms is a fundamental departure from the norms of the patent system and should not be the automatic demand or the automatic relief in cases involving patents. Royalty-free compulsory licensing is of doubtful validity,[142] but in any event is in the nature of a forfeiture and is so antagonistic to patent stimulation of competitive research activities that it ought not to be decreed.

Perhaps effective antitrust law enforcement demands an acceptance of some zeal on the part of the prosecutor. Nevertheless, it would seem possible to have both aggressive enforcement and a recognition that the patent system in itself is a source of competition. To categorize patents as in conflict with the antitrust laws discourages rather than encourages full scale competition. In the long run it defeats the objects of both laws.

D. THE PATENT MISUSE DOCTRINE AND THE CLASH OF CONCEPTS

Few legal doctrines have developed so fast or have been carried so far as the patent misuse doctrine. While the origins of the doctrine can be traced far back in the decided cases, the doctrine has for all practical purposes been the development of the past two decades.[143] In brief, the courts have refused to grant any relief for patent infringement where the patentee uses the patent in connection with tying or similar practices to control the sale of products outside the scope of the patent. As expressed by the Supreme Court in a leading case, in such instance "the successful prosecution of an infringement suit even against one who is not a competitor in such sale (of unpatented goods) is a powerful aid to the maintenance of the attempted monopoly of the unpatented article.[144]"

The misuse doctrine has a broad sweep and many facets. These cannot be treated in detail here. Consideration will accordingly be confined to the underlying conceptual considerations bearing on the

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[141] See, e. g., *United States* v. *L. D. Caulk Company, et al.*, 126 F. Supp. 693 (D. Del. 1954).

[142] There has been much controversy on the question of whether, in any case, royalty-free compulsory licensing, dedication, or some equivalent is proper relief under sec. 4 of the Sherman Act. *Hartford-Empire* v. *United States*, 323 U. S. 386, 414 (1945), held such relief confiscatory and reversed the district court as to it. A few years later, in *United States* v. *National Lead Company*, 332 U. S. 319, 349 (1947), the Court rejected a Government request for royalty-free licensing on the ground that the district court had not abused its discretion in denying the relief. The Supreme Court opinion implied that the question of availability of such relief might still be open. Subsequently, royalty-free compulsory licensing was decreed in *United States* v. *General Electric Company*, 115 F. Supp. 835 (D. N. J. 1953). It has been denied in a number of cases. See, e. g., *United States* v. *Imperial Chemical Industries, Ltd.*, 105 F. Supp. 215, 225 (S. D. N. Y. 1952).

The majority of the Attorney General's Committee To Study the Antitrust Laws considered royalty-free compulsory licensing and dedication "penal rather than remedial in character, and hence beyond the Sherman Act's authority to 'prevent and restrain' violations." Report, p. 256. For commentary on this point see Ooms, Remedies, Analysis of Chapter V, Proceedings of the Section of Antitrust Law, American Bar Association, August 22, 1955, p. 114.

[143] The leading cases are *Motion Picture Patents Co.* v. *Universal Film Mfg. Co.*, 243 U. S. 502 (1917); *Carbice Corp. of America* v. *American Patents Devel. Corp.*, 283 U. S. 27 (1931); *Leitch Mfg. Co.* v. *Barber Asphalt Co.*, 302 U. S. 458 (1938); *B. B. Chemical Co.* v. *Ellis*, 314 U. S. 495 (1942): *Morton Salt Co.* v. *Suppiger*, 314 U. S. 488 (1942); *Mercoid Corp.* v. *Mid-Continent Inv. Co.*, 320 U. S. 661 (1944); *Mercoid Corp.* v. *Minneapolis-Honeywell Regulator Co.*, 320 U. S. 680 (1944).

[144] *Morton Salt Co.* v. *Suppiger*, footnote 143, supra, p. 493.

subject and to the clash of theory that should be borne in mind in all applications of the doctrine.

The fundamental misuse logic finds support in well-accepted judicial decisions. Carried too far, however, the logic departs from reality and effectively destroys the patent right. Virtually any practical use of a patent in some measure influences the sale of products outside the scope of the patent. If the presence of such influence is to be the test of "misuse" there will remain few, if any, patent infringement cases not subject to this defense. To take an illustration, the Polaroid Land camera, discussed above, is sold in a carton—and the purchaser must buy the carton if he is to buy the camera. Obviously we have, in theory, a "tying" arrangement and strictly speaking a use of the patent to the camera to sell something outside the scope of the patent.[145] From an economic point of view—and from the standpoint of the functioning of the patent system—this sort of "tying" is obviously as innocuous with respect to the sale of a patented article as it is with respect to the sale of an unpatented article. And if relief for patent infringement is to be denied because of this type of sale, there would be little left of the patent system.[146] In short, the misuse doctrine must rest on practical economics as well as on legal concepts.

The Supreme Court went far in applying a purely conceptual misuse doctrine in the Mercoid cases.[147] The patents involved related to complete home heating systems using special thermostatic controls. The controls were not patented as such, although they did have special constructions and temperature settings for use in making the patented combinations. Mercoid was sued for contributory patent infringement on the ground that sale of the special switches necessarily led to the making of a complete patented combination—as the switches were the heart of the invention, had no other significant use, and were sold by Mercoid with instructions for assembling the infringing combinations. The Supreme Court denied relief on the ground that it was the systems and not the thermostats that were patented. While other factors—such as the industry status of Minneapolis-Honeywell and the price-fixing clauses used—may account for the decisions, the language used went far toward indicating that any contributory infringement action would necessarily offend the misuse doctrine.

The unsound character of the Mercoid decisions if thus broadly construed is brought out by the subsequent judicial treatment of the subject of contributory infringement. The courts simply could not agree as to the residuum of the contributory infringement doctrine.[148] In some cases the Mercoid reasoning was broadly and rigidly applied.[149] In others a broad construction was rejected and contributory infringement relief granted.[150] And in some instances the courts

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[145] For actual cases involving an analogous argument of misuse, compare *Cardox Corp.* v. *Armstrong Coalbreak Co.*, 194 F. 2d 376, 382 (7th Cir. 1952) (misuse found in practice of leasing complete coal dislodging systems rather than just the patented cartridge) and *Electric Pipe Line, Inc.* v. *Fluid Systems, Inc.*, 231 F. 2d 370, 371 (2d Cir. 1956) (no misuse found in practice of insisting that unpatented components of complete patented system be purchased from the patent owner).

[146] The Report of the Attorney General's National Committee To Study the Antitrust Laws, at footnote 60, p. 144, qualifies its broad comments as to tying clauses by classifying cases like the above illustration as not "tying" clauses.

[147] Footnote 143, supra.

[148] "The result of this decision, together with those which have preceded it, is to limit substantially the doctrine of contributory infringement. What residuum may be left we need not stop to consider." Per Mr. Justice Douglas in *Mercoid Corp.* v. *Mid-Continent Inv. Co.*, 320 U. S. 661, 669.

[149] See, e. g., *Stroco Prod. Inc.* v. *Mullenbach*, 67 U. S. P. Q. 168 (S. D. Cal. 1944); *I. D. Russell Co.* v. *Dr. Salsbury's Laboratories*, 198 F. 2d 473 (1952).

[150] See, e. g., *Florence-Mayo Nuway Co.* v. *Hardy*, 168 F. 2d 778, 785 (4th Cir. 1948).

resorted to dubious patent constructions to escape the rigidities of the doctrine.[151] In this connection an opinion of Judge John P. Barnes, who decided one of the Mercoid cases in the first instance, is especially significant for its forthright rejection of the conceptual approach.[152]

All of this illustrates the fallacy of dealing in absolutes in this area. The Supreme Court itself rejected an absolute approach to the misuse theory in the Transwrap case.[153] In addition to the contributory infringement cases, the lower courts have done likewise in a substantial number of decisions.[154] And in section 271 of the 1952 Patent Code the Congress has similarly rejected absolutes by setting forth a specific doctrine of contributory infringement.[155] The doctrine embodied in the statute recognizes a freedom in the businessman to sell a "staple article or commodity of commerce suitable for substantial noninfringing use." It also confines contributory infringement relief to cases where the article sold is "a material part of the invention." Also, independently of any questions of sale, the Code makes one who "actively induces infringement of a patent" an "infringer." These provisions effectively preserve the rights of the patentee—and thus attain the objective of stimulating research and development activity—while at the same time assuring that the free flow of commerce outside the economic scope of the patent is preserved.

These relaxations of the strict misuse theory represent a sound trend. They should be continued—for the patent misuse doctrine is at the same time both necessary and limited. It should only be applied with a full realization of both the practical economics of the situation and the aims and purposes of the patent system in the modern economy.

E. MONOPOLY BY PATENT ACCUMULATION

The technological competition stimulated by the patent system is based upon both opportunity and threat. Where a concern carries on research activity effectively—and successfully markets the resulting new products and processes—it can anticipate patent rights affording greater profits, an increased share of the industry business, and attractive opportunities to enter new fields of activity. Where a concern is inactive in research, its research efforts are misdirected, or it fails to carry developments to a marketable form, its market position will be encroached upon by the competitors which have succeeded in obtaining patent rights to the superior products and processes they have developed. An acute consciousness of these prospects by alert business executives lies at the heart of effective research and new product and process competition.

It is inherent in the competitive process that some firms will forge ahead of others. Unusual success in recognizing technological opportunities, in foreseeing public demand, and in meeting this demand may result in patent rights apparently crucial to important techniques responsible for success. In virtually all instances these rights—

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[151] E. g. *Refrigeration Eng. Co.* v. *York*, 168 F. 2d 896 (9th Cir. 194[8]) cert. den. 334. U. S. 859.

[152] *Amalgamated Dental* v. *The William Getz Corp.*, 90 U. S. P. Q. 339 (N. D. Ill. 1951).

[153] Footnote 136 supra. See Frost, Misuse of Patents in Relation to the Patent Code, University of Michigan 1953 Summer Institute. p. 71.

[154] See e. g. *Refrigeration Eng. Co.* v. *York*, footnote 151 supra; *Electric Pipe Line, Inc.* v. *Fluid Systems Inc.*, footnote 145 supra; *Coats, Loaders & Stackers, Inc.* v. *Henderson et al.*, 233 F. 2d 915, 926 (6th Cir. 1956). And see Frost, op. cit., footnote 153 supra.

[155] 35 U. S. C. 171. See, Report of the Attorney General's National Committee To Study the Antitrust Laws, pp. 252–253 and Frost, op. cit., footnote 153 supra.

whether in the form of a single patent or the accumulation of a number of patents—leave the owner subject to the effective competition of alternative products and techniques. Yet the possibility of an accumulation of patent rights imparting a dominant market position, or even monopoly, demands reconciliation with the general functioning of the patent system in the competitive economy.

This possibility—market dominance or even monopoly generated by successful competitive effort—is not unique to the competition here considered. Rather, it is a possibility inherent in the competitive process as a whole. The antitrust laws do not prohibit even monopoly when so acquired. On the contrary—as the courts have repeatedly pointed out—the successful competitor will not be turned upon simply because the success has led to the disappearance of business rivals.[156] The antitrust law prohibitions are properly limited to acts tending to displace the competitive order, or tending to deter the processes of competition that will otherwise work to destroy monopoly when it exists. Experience amply supports this policy of relying upon competition rather than Government control as the Nation's principal protection against monopoly, for it provides a continuing incentive to all business to meet public need, and allows business enterprise to enjoy the legitimate benefits that size (large or small) confers.

Like considerations apply to the research and new product and process competition in which the patent system plays a part. If we are to have the competition we cannot foreclose attainment of the competitive end. It does no good to encourage concerns to employ scientists and engineers, provide the laboratories in which to work, obtain patents, promote the products and processes developed, and then brand the resultant competitive position as illegal. Nor will the competitive atmosphere be maintained by legal doctrines giving competitors free access to the technology so developed, for this would impair the stimulus to compete, both as to the successful competitors and those which would receive a free ride on what the leader has done. Plainly, the objective must be to assure that competitors really do compete and to rely upon the normal forces of competition to assure that either dominant market position or monopoly—if attained—will be effectively and promptly threatened by others. In short, the same over-all philosophy applies as much to research and new product and process competition and the operation of the patent system as applies to business affairs generally.

Nor can any useful end be served by distinguishing "big" research and other research. We need both. The records are replete with examples of clever inventors—scientifically trained and otherwise—who have upset the theories of the well trained and methodical scientists of the large laboratories.[157] We can also point to many instances where comparatively small businesses have successfully

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[156] See, e. g., *Standard Oil Company* v. *U. S.*, 22; U. S. 1, 62 (1911); *U. S.* v. *Griffith et al.*, 334 U. S. 100, 107 (1948); *U. S.* v. *Aluminum Co. of America*, 148 F. 2d 416, 429 (2d Cir. 1945); *U. S.* v. *United Shoe Machinery Co.*, 110 F. Supp. 295, 342 (D. Mass. 1953), *aff'd. per curiam*, 347 U. S. 521 (1954). The more recent decisions, especially the *Aluminum* case, supra, go far in applying a structural test in determining the presence of "monopolization" under the Sherman Act. See: Report of the Attorney General's National Committee To Study the Antitrust Laws, pp. 56–60 (1955); Rostow, The New Sherman Act; A Positive Instrument of Progress, 14 Univ. of Chicago L. Rev. 567 (1947); Levi, A Two Level Anti-Monopoly Law, 47 Northwestern Univ. L. Rev. 567 (1952). The important point, however, is that all the decisions have required something more than the disappearance of business competitors to make out "monopolization" in violation of the Act. And in decrees under the Sherman Act the courts have placed major emphasis upon assuring the opportunity of competing business to form and to grow, and—with the exception of a comparatively small number of extreme cases—have refused to dismember enterprise found to have "monopolized" in violation of the Act. See, e. g. *U. S.* v. *Aluminum Co. of America*, 91 F. Supp. 333, 416–18 (S. D. N. Y. 1950).

[157] See p. 9 et seq., supra.

seized upon technological opportunities overlooked or even rejected by their larger competitors.[158] On the other hand there are research jobs that demand big enterprise—problems yielding only to the "team" approach based on the contributions of minds steeped in various techniques. Color television has demanded research in optics, communication theory and technique, electronics, circuitry, psychology, and other fields.[159] The transistor developed from explorations in semiconductor physics but at an early stage required the talents of a team including two physicists, a physical chemist, and an electronic circuit engineer, and its successful manufacture has required solution of numerous problems in metallurgy and manufacturing technique.[160] The successful development of nylon was not only based upon laboratory experiments to confirm a theoretical concept relating to the behavior of molecules, but also the application of principles of physics and a high order of production and mechanical engineering skill.[161] With respect to the comparatively large-scale research activities of Aluminum Company of America, Judge Knox—despite an expressed desire to reduce the research disparity between the company and its competitors—concluded:

> "When account is taken of the personnel and equipment presently employed in research, an equally grave problem must be faced. It would be a singular disservice to the public if the skill and technique of Alcoa's research department were impaired. Any divestiture which would extend to this activity, almost surely would have a baneful effect upon the future of the industry. Nor would independence be fostered by tying two firms to the same research department. Yet, to recruit, outfit, and finance a research organization which would not be under a serious disadvantage to that of Alcoa would, indeed, be close to an impossible task." [162]

There has been some tendency to overlook these considerations, and to regard with suspicion the patent rights associated with either big research or successful research. Perhaps this is because the patent is obviously and directly a Government grant—and in that respect is unlike the assembly of physical property, contract, and other rights that make up the tools of competition generally. Possibly also the abuses of patent rights recorded in the judicial decisions of the past two decades have led to a reaction. Whatever the reason for doubt, the basic considerations discussed above indicate that the cure for industry dominance or even monopoly arising from patent grants does not lie in tinkering with the patents, providing technological giveaways, or in looking for some nonexistent measure of proper laboratory size, but rather in making certain that research and new product and process competition can continue to develop and flourish.

Competition in research and development is characterized by a number of factors that work against maintenance of an industry position based upon patent rights. The patents themselves are of

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[158] Id.

[159] See p. 6 et seq, supra.

[160] See, e. g., Bown, The Transistor as an Industrial Research Episode, Scientific Monthly, January 1955, p. 43; Transistors: Big Push Coming, Business Week, January 30, 1954, p. 58; Growing Pains, Scientific American, June 1953, p. 48; Breakthrough on Transistors, Business Week, January 14, 1956, p. 136. Drs. Brattain, Bardeen, and Shockley received the 1956 Nobel Prize in Physics for their work on the transistor. See Bell System Technical Journal, November 1956, p. 1; New York Times, December 11, 1956, p. 24.

[161] See, e. g., Heckert, Synthetic Fibers, 30 J. of Chemical Education (1953), pp. 166, 167–168.

[162] *U. S.* v. *Aluminum Co. of America*, 91 F. Supp. 333, 417 (S. D. N. Y. 1950).

limited life. As an industry matures—or a segment of an industry passes beyond the era of pioneer development—the important patents are replaced by competitively less important improvement patents. A technology changes fast, and what may appear to be an important patent position may suddenly disintegrate to a collection of patents to obsolescent techniques. Moreover, no matter how successful a concern may be in besting its immediate rivals in technological competition, there will always remain research-minded companies in related fields, as well as new business firms, any one of which may seize upon an overlooked technology to obtain its own patent rights and challenge the leader. It is for these reasons that any industry position based upon patent rights is most precarious—especially as compared to an industry position maintained by reason of high cost of entry or expansion, an established large and well organized sales force, supplier relations based on long experience, or like factors.

These considerations account for the fact that the courts have found patents of secondary importance in recent monopoly cases. Alcoa had about 800 patents, but only 11 were considered "competitively significant." With respect to the Alcoa patents, Judge Knox stated:

> Moreover, in a mature industry like aluminum, patents are more apt to have a specific nature than a broad coverage, and, as such, quite likely to fall by the wayside because of the introduction of some other more desirable specific items. For the same reason—and especially among patents covering chemical processes and compositions of matter—it is sometimes necessary to file a great number of applications in order to cover what is really one laboratory development, in which event many consecutively numbered patents may issue, and of which only a small proportion will find use. Thus, of the three sets of consecutively numbered Alcoa patents, totaling 64, only one is now employed. Some patents are alternatives, and others are outmoded design patents. * * *[163]

United Shoe Machinery Company had nearly 4,000 patents, budgeted over $4 million for research, and in a number of instances had purchased patent rights from outsiders. Yet Judge Wyzanski concluded that "it is clear that United's present dominance does not rest primarily on patents.[164] The most striking illustration of all is found in the *General Electric* case where the lack of patents effectively covering the "bread and butter" incandescent lamps was the focus of the Government challenge to General Electric's licensing and sales policies as to such lamps.[165]

The above considerations point to the policy that should be followed in relation to patent accumulations. First, emphasis should be placed upon the acquisition of patent rights through the process of original research and development. Second, a market position based on patent rights should be always open to challenge by actual or potential competitors. In both respects we have direct analogy to the operation of the antitrust laws generally. As to acquisition it is well settled that original creation of resources such as mines, factories, and sales and management organization is favored while purchase of such facilities

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[163] Id. at p. 387.
[164] *U. S.* v. *United Shoe Machinery Co.*, 110 F. Supp. 295, 333 (D. Mass. 1953), aff'd per curiam, 347 U. S. 521 (1954) and see Kaysen, *U. S.* v. *United Shoe Machinery Co.* (1956), pp. 78–91.
[165] *U. S.* v. *General Electric Co.*, 82 F. Supp. 753, 805 (D. N. J. 1949).

is suspect.[166] Similarly, the antitrust laws prohibit both agreements and other actions that cut off the normal challenge to competitive position.[167] We can be confident that so long as this twofold policy is followed monopoly, or even dominance, arising from patent rights will be rare and unimportant in relation to the over-all economy.

Various decided cases bring out illegal patterns of conduct with respect to the acquisition of patent rights. In a number of instances the courts have found that firms have embarked upon programs to buy up all competitive or potentially competitive patent rights, thus arresting the growth of competition that would otherwise develop.[168] In many instances the purchases have been coupled with assignments of future inventions, agreements to stay out of the business, and the like, that label them as devices to thwart competition as distinguished from simple sales of patent rights.[169] By way of contrast the courts have looked with favor upon the acquisition of patent rights resulting from original research.[170]

The recorded cases also point to various types of agreements that are inconsistent with the competitive challenge to accumulations of patents. One arrangement—conspicuous in the early Sherman Act cases—is the pooling by competitors of their patent rights, coupled with a policy of refusing licenses to outsiders.[171] In many instances these agreements have incorporated provisions dividing product fields or otherwise assuring to each participant an area free from likely challenge.[172] The courts have also considered and have held illegal quota provisions exacted by patent owners with initially important patent rights with the effect of depressing the incentive of the licensees to engage in research and development.[173] In all of these instances the courts have found violations of the Sherman Act in activity which serves to suppress competitive research challenge that would otherwise exist.

One aspect of multiple patent ownership warrants particular consideration. Mere numbers of patents have little significance.[174] However, a block or package of patents may have a competitive value as an entity apart from the merits of the respective patents. Typically, one patent in a group is comparatively basic, and the other patents are directed to improvements of relatively small value. The owner of the patents may consider it advantageous to insist upon the taking of a license to the entire package as a condition to grant of a license to the basic patent. Such insistence may be motivated by supposed or real advantages in terms of increased royalty income, avoiding challenge to the improvement patents, prolonging the period of royalty income, or a feeling that the package license policy will deter the rise

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166 See e. g., *U. S.* v. *Columbia Steel Co.*, 334 U. S. 495 (1948); *U. S.* v. *E. I. DuPont DeNemours and Co.*, 76 S. Ct. 994, 1001 (June 11, 1956).

167 See e. g., *U. S.* v. *American Tobacco Co.*, 221 U. S. 106 (1911); *American Tobacco Co.* v. *U. S.*, 328 U. S. 781 (1946).

168 See e. g., *U. S.* v. *Besser Mfg. Co.*, 96 F. Supp. 304 (E. D. Mich. 1951), aff'd. 343 U. S. 444 (1952); *Kobe* v. *Dempsey Pump Co.*, 198 F. 2d 416 (10th Cir., 1952).

169 Id.

170 See e. g., *D. B. Cole* v. *Hughes Tool Co.*, 215 F. 2d 924 (10th Cir., 1954).

171 *Blount Mfg. Co.* v. *Yale and Towne Mfg. Co.*, 166 Fed. 555 (C. C. Mass. 1909); *National Harrow Co.* v. *Hench*, 83 Fed. 86 (3d Cir. 1897); *U. S.* v. *New Departure Mfg. Co.*, 204 Fed. 107 (D. C. W. D. N. Y. 1913). For a more recent case in part involving a "closed" patent pool, see *Kobe* v. *Dempsey Pump Co.*, footnote 168, supra. For a decision holding a closed patent pool arrangement unenforceable on grounds of public policy see *Pope Mfg. Co.* v. *Gormully*, 144 U. S. 224 (1892).

172 See e. g., *Blount Mfg. Co.* v. *Yale and Towne Mfg. Co.*, footnote 171, supra.

173 *U. S.* v. *General Electric Co.*, 82 F. Supp. 753, 814–16 (D. N. J. 1949).

174 Thomas A. Edison personally obtained over 1,000 patents in his lifetime. Norwig, the Patents of Thomas A. Edison, 36 J. P. O. S. 213,275 (1954). Polaroid owns some 400 patents and 150 applications relating in large measure to the research that made possible entry of the company into the camera business. Hearings, October 10–12, 1955, pursuant to S. Res. 92, p. 265. Hazeltine has some 600 patents and 200 applications. *Automatic Radio Mfg. Co.* v. *Hazeltine Research*, 339 U. S. 827, 829 (1950).

of a technological rival. The frequency with which this situation occurs has been exaggerated, but it has happened. Whatever the actual importance of the problem, however, all hands can agree that when there is coercion to take a multiple patent license it is likely to work against the objectives of the patent system in promoting technological competition. It is now well settled that coercion of this kind to secure licensees to the "package" violates the patent misuse doctrine and, in most instances, the Sherman Act as well.[175] The patent owner is accordingly compelled to exploit the patents as separate entities and to issue licenses and otherwise conduct his business accordingly.

Finally, we should not classify the patent system as an aid to the survival of big business. Quite the opposite is usually true. Were the system abolished, established business concerns—and especially leaders in relatively mature industries—would become more secure rather than less secure. In an atmosphere permitting free appropriation of developments, considerations of going concern, established customer and supplier relations on a large scale, and existing large productive capacity would be decisive. They would insure the place of the industry leaders against both the growth of new enterprise and against a raiding of their domains by existing concerns in other fields. The risk of sudden obsolescence resulting from the patented innovations of others would disappear. Considerations of this kind led a student of the electrical industry to state:

> In general, the leading concerns have more to gain and less to lose by a repeal of the patent law than have smaller competitors. On the one hand, they are exceedingly vulnerable to suits for infringement, and for purely defensive purposes they must go to considerable expense to patent every aspect of each innovation. On the other hand, they are far less dependent on patents for a sheltered market in which to recoup research and engineering expenses and such capital losses as may result from changes in technique.[176]

To be sure, none of these considerations precludes attainment of an actual dominant market position—or even a monopoly position—by reason of patents resulting from research of such scope and success that competitors fall by the wayside. If we are to retain the incentive for technological progress by all concerns we cannot destroy this chance. In the last analysis what is needed is a policy that assures that research and commercialization by all firms offers an opportunity for profit—and that in each instance the merit of the research and commercialization itself is the measure of the reward. Big research can then enjoy a place in the spectrum to the extent it does a superior job—little research will likewise enjoy the place that its merit dictates. And over-all the combined operation of the patent law effectively administered and the antitrust laws effectively enforced should reduce the chance of actual monopoly by patent accumulation to the rare event that serves as an incentive but does not alter the over-all makeup of research and new product and process competition, and

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[175] *U. S.* v. *Paramount Pictures, Inc.*, 334 U. S. 131,138,157 (1948); *Automatic Radio Mfg. Co.* v. *Hazeltine Research*, footnote 174, supra, at p. 834.

[176] Kottke, Electrical Technology and the Public Interest (1944), p. 59. And see the like comment as to General Motors Corp. at pt. 2, TNEC hearings p. 330.

should preclude continuance of such monopoly against the normal competitive challenges that can be expected to lead to its destruction.

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It is no accident that the nation with the strongest patent system is also most dedicated to the principles of competition. Patents in fact stimulate competition. Far from being the beneficiary of a broad and far-reaching escape from competition, the patent owner is circumscribed by various economic, patent law, and antitrust law considerations. At most the patent accords an incentive to develop the patented technology to the fullest. It confers no freedom from the product and process competition inevitably generated as business rivals observe success. Actual histories of recent cases—such as Ray-O-Vac, Linde, and Cellophane—demonstrate beyond doubt that the economic power actually associated with even important patents is consistent with competition and falls short of conferring monopoly power.

These considerations are too often overlooked. As a nation we have fallen into the habit of looking upon patents and competition as antagonistic. Too frequently patent victories are viewed as affronts to competition, or enforcement of the antitrust laws is regarded as necessarily weakening the patent system. The fact is that we need both an effective and viable patent system and a vigorous policy of antitrust law enforcement—for only in this manner can we enjoy the benefits of competition extending over the full spectrum of business activity.

PART III—ADMINISTRATION OF THE PATENT SYSTEM

An effective patent system necessarily entails procedures by which patentable subject matter is defined, patents are issued for such subject matter, and remedies are made available in the event of infringement. These must be related to the nature and character of the patent system in the economic and legal order of which it is a part. They must also reflect both the interests of the patent owner and the interests of others. Space limitations preclude exhaustive consideration of the manifold technical aspects of the patent law, or any extensive reconciliation between the patent practice as it exists and the economic purposes of the patent system. We can explore, however, some of the more significant current problems in the light of the general considerations discussed above. This analysis points to some matters requiring positive corrective action, to some demanding changes in approach within the framework of existing legal doctrine, and to some that involve inherent limitations as to what can be done.

Our task is made easier by enactment of the Patent Code in 1952.[177] This statute—enacted on the basis that the patent law is fundamentally sound—includes revisions relating to patentable subject matter, the standard of invention, the form of patent claims, reissues, disclaimers, contributory infringement, and other matters. It was the result of a cooperative effort by the Congress, officials of the Patent Office, and the bar. While many controversial matters were put to one side, the code overcomes many procedural and technical difficulties that had crept into the patent law over the years. Additionally—and contrary to common impression—the code incorporates a large number of desirable substantive changes in the law.[178] Because of these various revisions it is unnecessary here to discuss a number of practical problems, both substantive and procedural, that existed prior to enactment of the code.

In evaluating the mechanisms by which the patent system is administered, due regard must be given to the problem of complexity and the expense the system necessarily entails. This is a problem of first importance, and one demanding the attention of all concerned. Patents have been characterized as one of the most difficult legal documents to prepare.[179] One might add that the conduct of a Patent Office interference—with the effective handling of the preliminary statement, the motion period, testimony, and final hearing—ranks with the most complicated of litigation in terms of demands for the careful marshaling of facts, intensive study and planning, and skill

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[177] 66 Stat. 792. For general discussion of the code see Federico, Commentary on the New Patent Act (35 U. S. C. A. (West edition), p. 1); and Harris, Some Aspects of the Underlying Legislative Intent of the Patent Act of 1952, 23 Geo. Wash. L. Rev. 658 (1955).

[178] As examples of provisions of the code involving what are unquestionably substantial changes in the law the following may be listed: Sec. 112 (last paragraph modifying or rendering obsolete the decision in *Halliburton Oil Well Cementing Co.* v. *Walker*, 329 U. S. 1 (1946)); sec. 116 (providing for application in appropriate circumstances by less than all of a group of joint inventors and for dropping a person named by mistake); sec. 118 (providing for the filing of a patent application by the assignee or one with sufficient proprietary interest when the inventor cannot be found or refuses to sign); sec. 121 (providing for a requirement of restriction by the Commissioner and in effect making the decision final as to the matter in future infringement suit). The above are but a few of the changes that could be listed.

[179] See, e. g., Arthur M. Smith, Patent Law (1954), preface, p. viii.

in execution. And a patent infringement case, with the inherent problem of presenting a technical issue in relation to the industry pattern of technical development to a court unacquainted with the subject, necessarily requires detailed preparation, careful pretrial proceedings, and often a lengthy trial.

Two additional matters accent the complexity. One is the doctrine that a patent can only go to the first inventor as defined by the provisions of the patent law.[180] The second is the requirement that the patent applicant particularly point out and distinctly claim the subject matter claimed as the invention.[181] On their face these provisions appear simple. In practical effect they introduce numerous difficulties, and account for much of the lore that has been built up in the patent practice. For example, the preparation of the patent claims in the first instance must be undertaken with an appreciation of the possibility of some unknown "reference" coming up—either in the Patent Office or in connection with the searches of an accused infringer. Investigation of the prior art before filing—always desirable—necessarily has an economic limit and can never preclude the chance of some new "reference" being discovered in the future. The result is that preparation of the patent document demands skill in the technology involved, a knowledge of the intricacies of the Patent Office practice, an ability to express technical matters in succinct effective language, and finally a lively imagination and ability to predict what will take place in the future.

One may well ask why all of this is necessary, and why the patent system cannot be based upon a simple informal document, coupled with court enforcement based on simple doctrines of equity and justice. In large measure the patent system approached this arrangement in the period between 1793 and 1836, when patent applications were merely registered and not examined. Experience proved it to be unworkable, for the result was a host of conflicting and worthless patents, endless controversy, and an over-all condition accomplishing few of the objectives of the system. It was largely for this reason that the select committee of the Senate investigating the matter in 1836 recommended the passage of what became the 1836 Patent Act which set the general pattern of the patent system as it has existed to this day.[182]

An additional reason for precision in patent matters is created by the modern economy. The competition in research and product improvement engendered by the patent system must be based on reasonably adequate definitions of what is and what is not within the compass of a patent. Doctrines that hold the patentee strictly to an expression in a patent claim, for example, inherently lead to some inequities, but they do make possible a definite fixing of the scope of a

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[180] A long line of judicial decisions has evolved the rule of priority of invention now expressed in sec. 102 (g) of the 1952 Patent Code. As between two rival inventors, the one who is both first to conceive and first to reduce to practice is the first "inventor." Where the first to conceive is the last to reduce he is regarded as the first "inventor" only if he can trace "diligence" back from his date of reduction to practice to the conception date of the rival. Filing of a patent application is regarded as a "constructive reduction to practice," and has the same effect as an actual reduction on that date. See, for the history of this doctrine, *Automatic Weighing Machine Co.* v. *Pneumatic Scale Corp.*, 166 Fed. 288 (1st Cir. 1909). This whole matter becomes even more intricate when it is recalled that actual reduction to practice requires proofs of "testing" and corroboration, together with a showing that what was done "meets" the claims of counts in question. See, e. g., *Honer* v. *Stine*, 95 U. S. P. Q. 373 (Board of Interference Examiners, 1952); *Kraft Foods Co.* v. *Walther Dairy Products*, 118 F. Supp. 1 (W. D. Wis. 1954); and *Jepson* v. *Egly and Harris*, 231 F. 2d 947 (C. C. P. A. 1956).

[181] 35 U. S. C. 112. See, e. g., *General Electric Co.* v. *Wabash Appliance Co.*, 304 U. S. 364 (1938).

[182] See S. Doc. No. 338, 24th Cong., 1st sess., reprinted at 18 J. P. O. S. 853 (1936).

patent.[183] The competition can then proceed to "design around" the patent and to develop freely what is not covered. This is activity that cannot be dismissed as mere maneuvering—it is the essence of active research and development competition. And its continued existence depends in large measure on the status of the patent document as a workable definition of the scope of the right to exclude. It may be added that this same definition is of importance in fixing the character of the permissible conduct of the patentee in the exploitation of the patent.

In considering the administration of the patent law two extremes should be avoided. One is resistance to change simply because it is change. It is surely unsound to insist upon a continuance of time-honored patent practices solely because they are traditional. The patent system is too important to a viable research-minded competitive order to permit this kind of approach. No matter how radical proposals may be, they should be considered with an open mind.[184] At the other extreme, an attitude of unenlightened criticism is equally unsound. It is easy to criticize patentees for what on the surface appears illogical and unsound. It is likewise easy to criticize the patent system as a whole for the expense involved in patent matters generally. None of this criticism solves the problems, nor does it point the way to an effective simplification of patent procedure and practice. The path of improvement is necessarily controversial and difficult, but if these unsound extremes can be avoided the prospects of useful change consistent with the continued effectiveness of the patent system will be greatly enhanced.

In the ensuing pages a number of the more acute problems of the administration of the patent law are considered under three broad categories: First, the invention question is discussed, and the various proposals for modifying the "skill of the art" test considered. Secondly, the Patent Office function is taken up and a number of steps directed to the improvement in the performance of the Office are discussed. Finally, the subject of patent litigation is considered. While these matters are representative rather than exhaustive, their consideration should point the way to what can be done.

A. THE MEASURE OF INVENTION

The concept of invention is a focal point of current discontent with the patent system. Many thoughtful persons feel that in recent years the courts—especially the Supreme Court—have imposed an unreasonable standard of invention that depresses rather than encourages scientific progress. Some judicial opinions have expressed considerable impatience with the performance of the Patent Office and the lower courts respecting the issue. Numerous proposals have been made for

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[183] See *Merrill* v. *Yeomans*, 94 U. S. 568, 573–574 (1876). An outstanding example of rigid construction of patent documents is found in the "file wrapper estoppel" doctrine. In substance, the doctrine provides that where a patentee—in response to rejection of patent claims on the prior art—cancels or amends the claims, the patentee may not look to the doctrine of equivalents to encompass any of the difference in scope between the claims as actually allowed and those sought. The patentee is not in this situation permitted to argue that the Patent Office erred in the initial rejection. See, e. g., *Exhibit Supply Co.* v. *Ace Patents Corp.*, 315 U. S. 126 (1942).

[184] The Report of the Committee for the Study of Amendment of the Procedure for Granting Patents, dated April 17, 1956, concerning the Netherlands patent system, illustrates a rather radical proposal worthy of consideration. In order to overcome the Patent Office workload problem the authors of the report propose an initial 5-year patent term based on an abbreviated examination procedure, with an opportunity to request a full examination within that period, followed by extension of the patent for the full term. While the writer does not regard this proposal as feasible under the conditions of the United States patent system, it is nevertheless typical of the type of proposals that should be considered and not rejected simply because of their unusual character.

improving the test of invention, or for the substitution of schemes eliminating the test entirely.

It would be a happy thing if some practical suggestion could be made to eliminate the invention problem. Unfortunately many years of experience have failed to bring forth a proposal that conforms to the economic objectives of the patent system and at the same time avoids the source of difficulty. Nevertheless there is a value in tracing briefly the history of the invention concept and the lessons to be derived from that history; exploring the practical way the question arises; and in evaluating possible improvements in the light of these considerations.

The patent law deals with technical change. Its economic function is to induce and compel that change at a maximum rate by rewarding those who accelerate the pace. Of necessity the law itself must contemplate a measurement of the degree of change and the application of that measurement in fixing the legal consequences. Broadly, this is accomplished by evaluating the differences between what has been done and a defined body of knowledge known as the "prior art." [185] The evaluation thus made determines whether there is sufficient change to justify a patent in the first instance, measures the adequacy of the patent document itself as a disclosure, bears heavily on questions of infringement, and indeed is pivotal to the resolution of nearly every patent question.

Despite the importance of the invention concept, 150 years of patent experience have failed to give us a satisfying quantitive test as to the degree of invention necessary for patentability. The ability of the mythical man "skilled in the art"—a test now over a century old—remains the basic measure. Experience tells us that the courts and the Patent Office in many instances have encountered serious difficulties in practically applying this test. In the words of Judge Learned Hand:

> * * * [invention] is * * * as fugitive, impalpable, wayward, and vague a phantom as exists in the whole paraphernalia of legal concepts.[186]

It will be helpful to trace briefly the development of the invention test. The 1790 Patent Act took the terms "invention" and "discovery" from the Constitution, but did not define either.[187] However, it charged the Secretaries of State and War, and the Attorney General, with the duty of issuing a patent "if they shall deem the invention or discovery sufficiently useful and important." [188] The burden of other duties imposed on these individuals made the issuance of letters patent intolerably slow, and led to the discontent that generated the unhappy 1793 Patent Act.[189] This act substituted a registration system for the examination system and shifted to the courts the entire problem of determining what was and what was not subject to patent. The 1836 Patent Act, [190] passed after the 1793 act had shown the

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[185] The "prior art" is defined in sec. 102 of the Patent Code (35 U. S. C.). The principal components are that "the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent" (35 U. S. C. 102a) and that "the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States" (35 U. S. C. 102b).

[186] *Harries* v. *Air King Products, Inc.*, 183 F. 2d 158 at 162 (2d Cir. 1950).

[187] 1 Stat. 109. See Federico, Operation of the Patent Act of 1790, 18 J. P. O. S. 237 (1936).

[188] 1790 Patent Act, sec. 1 (1 Stat. 109).

[189] 1 Stat. 318. See Federico, The Patent Act of 1793, 18 J. P. O. S., 77 (1936).

[190] 5 Stat. 117. See The Patent Act of 1836, 18 J. P. O. S., 91 (1936).

inadequacies of the registration system, assigned responsibility for issuing patents to a Commissioner of Patents and directed him to issue patents only after examination and then only if he deemed the invention "sufficiently useful and important." [191]

However, it was not until the decision in *Hotchkiss* v. *Greenwood* [192] in 1850 that the Supreme Court laid down a general standard of patentable invention. Earlier decisions had recognized that the patent statutes did define a body of knowledge—the "prior art"—with respect to which some advance was required. But the Court had not previously come to grips with the question of how much change was necessary. The patent involved was to a door knob, identical with the door knobs of the prior art as to its physical conformation, but with a porcelain or clay knob rather than the wood or metal construction of the earlier door knobs of like physical conformation. Moreover, clay had been used as a knob material in other types of door knobs before the invention in question.

To the patentee in the Hotchkiss case it was enough that the patented knob was new and useful and provided an article "better and cheaper than the knobs made of metal and other materials." The defendant insisted that something more must be present—and heartily endorsed the charge given to the jury that there must be "more ingenuity or skill required to construct the knob in this way than that possessed by an ordinary mechanic acquainted with the business." [193]

It was on this posture of the case that the Supreme Court took up issue. Was the trial court correct in charging the jury that there must be something more than the skill of the "ordinary mechanic"? Or was it enough that the new knob possessed a measure of utility and was "better and cheaper"? In the majority opinion, delivered by Mr. Justice Nelson, the Court endorsed the action of the lower court. It looked first to the nature of the change represented by the patent, noting with emphasis that "the only novelty which could be claimed * * * was the adaption of this old contrivance to knobs of potter's clay or porcelain; in other words, the novelty consisted in the substitution of the clay knob in the place of the one made of metal or wood, as the case may be." [194] And after noting that judgment and skill may have been exercised but "nothing more" the Court concluded:

> Now, if the foregoing view of the improvement claimed in this patent be correct, it is quite apparent that there was no error in the submission of the question presented at the trial to the jury; for unless 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 a skillful mechanic, not that of the inventor.[195]

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[191] 1836 Patent Act, sec. 7 (5 Stat. 117).
[192] 11 How. (52 U. S.) 248.
[193] Id. at p. 265.
[194] Id. at p. 265.
[195] Id. at p. 267. Mr. Justice Woodbury dissented on the ground that the test ought to be whether "the invention was new, and better and cheaper than what preceded it" (11 How. (52 U. S.) at p. 268). With respect to the skill of the art test enunciated in the majority opinion Mr. Justice Woodbury stated that "* * * it seems open to great looseness or uncertainty in practice." (Id. at p. 270).

Since the decision in *Hotchkiss* v. *Greenwood* a multitude of judicial decisions have passed upon the invention question. In the Cuno case [196] argument was made that—

> * * * degree of invention or ingenuity is not a test contemplated by the Constitution and the patent laws to determine whether or not an invention or discovery shall receive protection * * * Congress could have entailed limitations as to the degree of invention to be rewarded by patents but it has never done so.[197]

In a sweeping opinion famous for the extreme language used, this argument was rejected and the patent held invalid because:

> "* * * the new device, however useful it may be, must reveal the flash of creative genius, not merely the skill of the calling. If it fails, it has not established its right to a private grant on the public domain." [198]

More recent decisions, as well as the Cuno case considered as a whole, suggest that this expression really conveyed only the traditional "skill of the art" test of invention.[199] In any event section 103 of the 1952 Patent Code reinstates the substance of the *Hotchkiss* v. *Greenwood* test in the following language:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title [the prior art], 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 negatived by the manner in which the invention was made.[200]

The skill of the art test of invention has merit and a basic soundness that is too often overlooked. All hands agree that patents should not lightly be granted. The economic value of the patent system is destroyed rather than enhanced by loose standards in this regard. Conversely, an unduly high standard would make valid patents so rare as to reduce the system to one of little economic value. And with respect to the quantitative measure of the test it should be recalled that the modern value of the system lies in inducing and compelling forms of technological development that would not otherwise take place—in short, activity that involves more than the skill of the art in making routine improvement. Perhaps it is historical accident that the current economic value of the system and the *Hotchkiss* v. *Greenwood* test of invention are in accord as to point of emphasis—but it is undeniably necessary that such consistency exist if law and economic reality are to be in accord. It should be added that the skill of the art test is the same test that measures the adequacy of the patent disclosure and is the standard applied as to other patent ques-

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[196] *Cuno Eng. Co.* v. *Automatic Devices Co.*, 314 U. S. 84 (1941).
[197] Brief for Petitioner, No. 6, October Term 1941, pp. 42–43.
[198] Footnote 196 supra at p. 91.
[199] See e. g., *In re Shortell*, 142 F. 2d 292 (C. C. P. A. 1944); *Falkenberg* v. *Bernard Edward Co.*, 175 F. 2d 427, 428 (7th Cir. 1949). But see *Picard* v. *United Aircraft Corp.*, 128 F. 2d 632, 636 (2d Cir. 1942) and *Trabon Engineering Corp.* v. *Dirkes*, 136 F. 2d 24, 27 (6th Cir. 1943).
[200] 35 U. S. C. 103. See *Lyon* v. *Bausch and Lomb*, 224 F. 2d 530, 543–7 (2d Cir. 1955).

tions.[201] Again the test has the merit of providing consistency between related aspects of the law.

In our frustration over the difficulty of applying the skill of the art test of invention in some instances, and with the vagaries of Patent Office and judicial decisions on the subject, we should not overlook one practical fact. The question of invention is usually decided one way or the other without recourse to the courts or any real doubt as to the result. *Hotchkiss* v. *Greenwood* furnishes an example of what—should it arise today—would issue as a patent only by reason of Patent Office mistake; if issued would not be honored by the industry; and if the patentee were so foolish as to file suit, the case would be subject to motion for summary judgment.[202] And in the area of business practice generally it is very common for an accused infringer to come forth with a prior art "reference" either showing what he is using or showing what is in the patent—and in nearly all cases this is sufficient to end the matter. Conversely, many patents are of the kind that clearly rest on pioneer advances for which there cannot be serious debate as to the presence of invention. While it is a truism that there is no such thing as a patent wholly free from possible argument of noninvention—it is certainly accurate to state that in many instances such arguments are so specious that the industry does not challenge the patent.

Of course these considerations do not eliminate the deceptive simplicity of the skill of the art test when applied to borderline cases, nor do they aid the trier of facts confronted with the necessity of making a determination in such cases. They do, however, demand that the nature of the test be fully explored in its modern setting before alternatives are considered.

The most important practical aspect of the invention question as it arises in the court decisions is that it need not be considered in a vacuum. Rather, the court ordinarily has before it evidence of a number of collateral factors bearing on the question. These may be appropriately designated "commercial" tests of invention, to indicate that they do not rest on the necessarily subjective determination of whether the "skill of the art" is exceeded. These factors include commercial success of products embodying the invention,[203] a long-felt want satisfied by the invention,[204] the prior unsuccessful efforts of others,[205] and recognition of the invention by the conduct of the defendant, the taking of licenses by the industry, and the like.[206] Conversely, lack of commercial success has been used to support findings of noninvention.[207] While—in the presence of factors other than the merit or lack of merit of the step forward—these tests may give false indications, they do in the aggregate provide a substantial background in which the invention question may be considered. And in many borderline cases they effectively tip the scales one way or the other.

The nature of the infringement charge constitutes an additional factor shedding light on the invention question. Indeed, considera-

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[201] For example, the test of the sufficiency of the patent specification is whether it is "in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains * * * to make and use the same * * *" (35 U. S. C. 112).

[202] See *Magee* v. *Coca Cola*, 232 F. 2d 596 (7th Cir. 1956); *Syracuse* v. *Paris*, 234 F. 2d 65 (9th Cir. 1956).

[203] E. g., *Hunt* v. *Armour and Co.*, 185 F. 2d 722 (7th Cir. 1950); *The Goodyear Tire & Rubber Co.* v. *Ray-O-Vac Co.*, 321 U. S. 275 (1944).

[204] Id.

[205] See e. g., *The Goodyear Tire & Rubber Co.* v. *Ray-O-Vac Co.*, footnote 203 supra.

[206] See e. g., *Eibel Process Co.* v. *Minnesota and Ontario Paper Co.*, 261 U. S. 45 (1923).

[207] *Clark* v. *Wright Aeronautical Corp.*, 162 F. 2d 960, 966 (2d Cir. 1947).

tion of the nature of the infringement charge often points to the solution of what would otherwise be a most difficult invention question—and many seemingly extreme cases become less perplexing when the infringement charge is considered in relation to the prior art and the patent in suit. There is often a marked difference between what the patent shows and what is accused as an infringement. Of necessity the patentee must argue that this measure of difference is unimportant and trivial. A like degree of difference in relation to the prior art is then fatal—for by the patentee's own yardstick the claimed invention then lies within the skill of the art. While it is difficult to carry the "skill of the art" test from the factual setting of one case to that of another, a consistent measure can more readily be applied within the confines of the factual setting of a particular case and often points to the result that must follow. As the Supreme Court has expressed the point "that which infringes, if later, anticipates if earlier." [208]

The decision in *Smith* v. *Hall* [209] brings out the point in an unusual setting. The patent there involved related to an egg-incubation method in which the eggs are exposed to a current of air under prescribed conditions. In an earlier case [210] the patentee had successfully urged that the method did not depend upon the particular arrangement of the eggs shown in the patent, but rather extended to any arrangement of the eggs in the chamber. In the later suit, however, the defendant proved that the same method had been in public prior art use without the particular order of the eggs shown in the patent. The patentee then sought to argue that the particular arrangement of eggs was important and constituted a feature of invention over the public use. The Court rejected this contention on the ground that the patentee itself had defined the reach of the patent and could not inconsistently seek to support the patent on a different theory at a later date.[211]

A similar occurrence took place in the *Linde* case,[212] discussed above. There the patentee distinguished the prior art on the ground that it did not show the "fully reacted" flux. When the defendant went to a partially reacted flux the court refused to find infringement on the ground that what had been earlier characterized as the inventive feature was now lacking. Again, the later decision turned not so much on whether "skill of the art" was involved in one flux or another, but rather on the ground that the patentee itself had defined what was the "skill of the art" and could not depart from that definition in order to reach the new flux.[213]

Conversely, if there is little or no difference between what the patent shows and the accused infringement, there may be a persuasive indication of patentability. It is futile to look to simplicity, or to the apparently minor character of a change, as the test of what is and what is not invention—for what would seem obvious is often just what the industry overlooks. The Eibel Process case [214] illustrates the point. Prior to the Eibel invention fourdrinier papermaking machines were well known to the art. Efforts had been made over a considerable period of years to increase the speed of operation of such machines. A ceiling apparently existed at a speed of about 500 feet per minute,

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[208] *Knapp* v. *Morss*, 150 U. S. 221, 228 (1893).
[209] 301 U. S. 216 (1937).
[210] *Waxham* v. *Smith*, 294 U. S. 20 (1935).
[211] 301 U. S. at p. 232.
[212] *Graver Tank & Mfg. Co.* v. *The Linde Air Products Co.*, 336 U. S. 271 (1949).
[213] *Union Carbide & Carbon Co.* v. *The Linde Air Products Co.*, 196 F. 2d 103 (7th Cir. 1952).
[214] *Eibel Process Co.* v. *Minnesota and Ontario Paper Co.*, 261 U. S. 45 (1923).

at which point the pulp laden slurry flowing onto the moving belt tended to become wavy and uneven. Efforts to overcome the problem had met with little success until Eibel made what in retrospect seems most obvious—he tilted the belt slightly downward so that the slurry naturally tended to move faster in the same direction as the belt. The result was an increase of effective operating speed to 600 or 700 feet per minute. The change—tilt of the belt—was physically small, and the increased speed, though important, was not quantitatively immense. However, the industry recognized the invention by taking licenses and by widespread adoption of Eibel's exact principle. The infringer used a degree of tilt essentially like that shown in the patent.[215] Eibel's contribution may have been narrow, but it was exactly what the industry adopted and the infringer used, and there was no need to go beyond that narrow contribution in measuring infringement.

From the viewpoint of the effective operation of the patent system the Eibel decision is sound. The Eibel step—if made in the normal course of usual effort to increase the speed of fourdrinier machines—would hardly be impressive. And from a public policy point of view there would be no occasion to grant a patent directed to such a step. But this is not what happened, for Eibel obviously introduced a new concept that had eluded the skilled workers in the art. The economic value of what Eibel received from the patent was measured by the specific change and nothing more. And with respect to the industry as a whole, the example of Eibel impelled open-minded future exploration of all possibilities of development as well as efforts to achieve Eibel's result by other constructions.[216]

A closely related matter deserves consideration. It is often said that the courts must either find validity or invalidity in the absolute, and that no compromise is possible.[217] If we seek to isolate the question of invention, this may be true. And of course no court should rewrite a patent beyond the fair intendment of what the patentee has said.[218] But these broad statements hide an important practical fact. As the above illustrations show, more often than not the questions of invention and of infringement are integrally connected. A court need not face a dilemma of enforcing a patent as to all constructions or none. Rather, the question is whether the patent as applied to a specific construction embodies invention. In terms, the court is called upon to determine whether there is or is not "invention." In practical effect it may well determine that there is invention to a certain extent and enforce the patent to that extent only. Within the confines of a single case it is perhaps more important to be sure that a consistent measure is applied to the questions of infringement and invention than to dwell unreasonably on the question of whether

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[215] The Eibel patent (No. 845,224) stated that the degree of tilt be "substantial" and the drawing showed an elevation of 12 inches in a 30-foot fourdrinier machine. 261 U. S. at p. 50. Prior to the suit the defendant had used a 15-inch elevation. After the adverse district court decision the elevation was reduced to 6 inches. When the defendant won in the circuit court of appeals, the tilt was increased to 15 inches. See 261 U. S. at p. 71.

[216] By way of contrast, the patent involved in *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U. S. 84 (1941), showed a cigar lighter quite different from that accused as an infringement and the lighter construction that had been commercially successful. The major difference lay in the fact that the patent showed a cumbersome arrangement requiring the user to rotate the lighter in the socket, whereas the accused and commercially successful form of the lighter utilized a much more simple arrangement that needed only be pushed in to initiate the cycle of operation. Because of this difference the patentee was forced to take the position that invention lay in the mere use of a thermostatic release to de-energize the lighter when heated and to argue that the patent was entitled to the benefit of commercial success of a construction quite different from that of the patent. See the concurring opinion of Chief Justice Stone at 314 U. S. p. 92.

[217] See, as touching on this matter, Stedman, Invention and Public Policy, 12 Law and Contemp. Prob. 649, 667 (1947).

[218] See, e. g., *Borg-Warner Corp.* v. *Mall Tool Co.*, 17 F. 2d 850, 856 (7th Cir. 1954).

the test of invention, as applied, can be supported upon the basis of some all-inclusive criterion.

A number of patent law doctrines reflect this thinking. One of particular interest is the doctrine of equivalents. Where the invention is fundamental and broad, the courts have looked to this doctrine to—

> * * * temper unsparing logic and prevent an infringer from stealing the benefit of the invention.[219]

Conversely, apparently all-inclusive patent claims have been narrowed to save the patent from invalidity, or to save it from being infringed by a product or process not reasonably within the described step forward from the prior art.[220] In each of these instances the court is in effect measuring the departure of the invention from the prior art and enforcing the patent to that extent, rather than dwelling on an absolute determination of what is the "skill of the art." [221]

To be sure, these considerations do not resolve the cases that remain doubtful after all the tests have been applied, nor do they suggest ways to formulate more universally decisive standards. Nor has the long-term recognition of the limitations of the skill of the art test led to any satisfying proposals. A fundamental difficulty explains this history; namely, that any apparently more all-inclusive rule either says nothing or injects an undesirable rigidity into determinations of invention.[222] This was recognized by the Supreme Court many years ago.[223] While there have been efforts to use expressions other than the "skill of the art" as a rule of invention,[224] none of these has been generally accepted to date, and the framers of the Patent Code ultimately decided merely to express the hope that some criteria of invention might be worked out.[225]

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[219] *Royal Typewriter Co.* v. *Remington Rand, Inc.*, 168 F. 2d 691, 692 (2d Cir. 1948).

[220] See e. g., *Chas. Peckat Mfg. Co.* v. *Jacobs*, 178 F. 2d 794 (7th Cir. 1949); *The Texas Company* v. *Globe Oil & Refining Company*, 225 F. 2d 725 (7th Cir. 1955).

[221] It is also significant that the courts have encountered no difficulty resolving cases where the question of patent validity is foreclosed or patent validity is admitted. Many of these decisions are based on consideration of the prior art in relation to the accused infringement and apply the rule that a structure based on the prior art cannot be an infringement. Thus, in *Cimiotti Unhairing Co.* v. *American Fur Refining Co.*, 198 U. S. 399, 407 (1905)—where patent validity was not contested—the Court concluded that there could be no infringement because the device accused was derived from the machine of a prior art patent. Similar analysis was applied in *Scott Paper Co.* v. *Marcalus Mfg. Co., Inc.*, 326 U. S. 249 (1945), where the defendant was estopped to deny validity of the patent. The Court there concluded that there was no infringement because it considered the accused device to be a copy of a prior art patent.

[222] Over the years a series of "negative rules of invention" have evolved and are frequently applied. They relate to changes of the kind that rarely constitute invention, such as change of size, form, or degree, reversal of parts, aggregations, and the like. See, e. g., Walker, Patents (Deller edition) pp. 183–234. Since each of these rules carries its own exceptions, the rules are at best a short-hand expression that invention is not likely to be present.

[223] "* * * What shall be construed as invention within the meaning of the patent laws has been made the subject of a great amount of discussion in the authorities, and a large number of cases, particularly in the more recent volumes of the reports, turn solely upon the question of novelty. By some, invention is described as the contriving or constructing of that which had not before existed; and by another, giving construction to the patent law, as 'the finding out, contriving, devising, or creating something new and useful, which did not exist before, by an operation of the intellect.' To say that the act of invention is the production of something new and useful does not solve the difficulty of giving an accurate definition, since the question of what is new as distinguished from that which is a colorable variation of what is old, is usually the very question in issue. To say that it involves an operation of the intellect, a product of intuition, or of something akin to genius, as distinguished from mere mechanical skill, draws one somewhat nearer to an appreciation of the true distinction, but it does not adequately express the idea. The truth is the word cannot be defined in such manner as to afford any substantial aid in determining whether a particular device involves an exercise of the inventive faculty or not. In a given case we may be able to say that there is present invention of a very high order. In another we can see that there is lacking that impalpable something which distinguishes invention from simple mechanical skill. Courts, adopting fixed principles as a guide, have by a process of exclusion determined that certain variations in old devices do or do not involve invention; but whether the variation relied upon in a particular case is anything more than ordinary mechanical skill is a question which cannot be answered by applying the test of any general definition." *McClain* v. *Ortmayer*, 141 U. S. 419, 426 (1891).

[224] See, e. g., testimony of G. Wright Arnold at pp. 46–51, 58, and 68, hearings, October 10–12, 1955, pursuant to S. Res. 92.

[225] See Revisor's notes to 35 U. S. C. 103.

It has been suggested that the concept of invention be stricken from the patent law and "copyright principles" substituted.[226] Under this proposal, the test of infringement would be one of copying and the only requirement of ingenuity or creativeness would be the "irreducible minimum" of originality required by the copyright law.[227] In one sweep this approach would remove virtually all the difficulty associated with the concept of patentable invention and substitute the radically different approach that has proven practical in the copyright field.

Whatever practical advantages may accrue from the application of copyright concepts to the patent law, the proposal is subject to a fatal defect of misplaced emphasis. The question of patent infringement cannot be based solely on the element of copying. Such rule would work against rather than for the objectives of the system—and would put a premium on deliberate ignorance in product and process improvement. All risk of patent infringement liability could be avoided by resorting to a research laboratory in a cloistered place carefully kept free from all contact with the industry, the scientific publications, and—most of all—the issued patents. But this would deprive society of a most important aspect of scientific progress—the cross-fertilization that comes from seeing the approach taken by others and the progress they have made.

Moreover, the patent system actually encourages some forms of copying. When a patent issues, competitors are encouraged to study it and to do their utmost to take from it all they can. So long as they stay clear of what is staked out as the domain of the patent, they are entirely free to copy. This is a most fruitful form of competitive activity, and is one of the principal ways the patent system serves as a stimulus to a rapid pace of technological development.

As stated by a judge particularly experienced in patent matters:

> The patent system encourages invention, not only in that it rewards the inventor with a patent, but it spurs the competitors to put forth their mightiest effort to produce a product as good, yet different from the patentee's. Thus, defendant may have quickly realized that Joyce had brought forth something which would dominate the trade unless met by an equally satisfactory gauge. * * * It must be admitted that in an effort to avoid infringement of a patent, as much skill is often displayed as is shown in the conception or development of invention itself. There is, however, nothing objectionable in this. In fact, it is thus that the patent system is working at its best. For it is then that we have competition between a holder of a legal monopoly and his competitors. It illustrates how the legal monopoly evidenced by a patent excites the competitors to their best to meet or excel the product covered by the existing patent. Competition among industrial rivals and inventors is thus incited.[228]

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[226] See, e. g., testimony of Judge Learned Hand at p. 114, hearings, October 10-12, 1955, pursuant to S. Res. 92.

[227] *Alfred Bell & Co. Ltd.* v. *Catalda Fine Arts, Inc.*, 191 F. 2d 99 (2d Cir. 1951)).

[228] Per Judge Evans in *James P. Marsh Corp.* v. *United States Gauge Company*, 129 F. 2d 161, 165 (7th Cir. 1942).

This does not mean that copying can or should be ignored in patent cases. If the accused structure constitutes a servile reproduction of a patented product—or the defendant has tried alternatives without success—the fact of the copying stands as a most impressive indication that something more than the skill of the art is involved.[229] Such proof accordingly bears on the question of invention.

In one area of patent system operation the coypright approach has a great deal of merit. This is the field of design patents. Here the "skill of the art" test is especially elusive and the considerations of scientific progress applicable to other phases of patent system operation do not usually apply. The decision in *Mazer* v. *Stein* goes far to place designs within the scope of the copyright law itself.[230] A statute placing the entire field of ornamental designs on copyright principles would seem the most practical way to eliminate the vagaries of applying the invention concept in this most difficult area.

When all the alternatives are considered we return to the "skill of the art" test as the only reasonably adequate general measure of what is and what is not invention. Accordingly, attention should be directed towards minimizing the controversy associated with its application, and to facilitating its practical use. In great measure the opportunity for improvement here lies more in the area of recognizing the nature of the question and the circumstances in which it arises than in looking for new formulae for its application. Even within this limited compass, however, there is reason to believe that much can be accomplished.

It is futile to look for absolute consistency between invention determinations. The fictitious man "skilled in the art" is necessarily indefinite. What one person considers to exceed his capacities another may regard as common engineering skill. This condition is not unique to the law. Rather, there are endless examples of fact issues upon which reasonable minds may differ—as well as questions that in the last analysis are decided on little more than educated guess. An example of the latter kind is found in the decisions on proximate cause in the law of torts—such as the McAllister case recently decided by the Supreme Court.[231] As the Court there recognized, the question of whether the plaintiff had caught polio from the Chinese was at most a matter of "balance of probabilities." [232] The field of negligence law relies heavily upon the conduct of the fictitious "reasonably prudent man," a concept that has defied definition as stubbornly as the traditional test of invention. And in those instances where the courts have attempted to set forth positive rules—such as the "stop,

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[229] See e. g., *Colgate-Palmolive Co.* v. *Carter Products, Inc.*, 230 F. 2d 855 (4th Cir. 1956).

[230] 347 U. S. 201 (1954). Cf. *Continental Art Company* v. *Bertolozzi*, 232 F. 2d 131 (7th Cir. 1956).

[231] *McAllister* v. *United States*, 348 U. S. 19 (1954) ("Of course no one can say with certainty that the Chinese were the carriers of the polio virus and that they communicated it to the petitioner. But upon balance of the probabilities it seems a reasonable inference for the district court to make from the facts proved, supported as they were by the best judgment medical experts have upon the subject today, that petitioner was contaminated by the Chinese who came aboard the ship on November 11, 1945, at Shanghai. Certainly we cannot say on review that a judgment based upon such evidence is clearly erroneous. * * * We think it was an allowable judgment of the district court, and the judgment of the court of appeals is reversed" (348 U. S. at p. 22)). Mr. Justice Frankfurter dissented on the ground that the writ should have been dismissed as improvidently granted in view of the factual nature of the issue.

[232] Id. at p. 22.

look, and listen" rule enunciated by Mr. Justice Holmes three decades ago [233]—the effort has proven fruitless.

With respect to these analogous issues it is frankly recognized that reasonable men may reach differing conclusions. Uniformity is not attainable. For this reason the law has long followed the formula that the finding of the trier of fact—if within the bounds of reason—is final. The invention question should be given like treatment.[234]

In the first instance, the question of invention arises at the Patent Office level. The patent examiner searches the prior art and rejects or allows claims in accordance with his conclusion as to whether they represent more than the "skill of the art" in relation to the prior art before him. Necessarily, there are limitations in his decision. As a practical matter the examiner is confined almost entirely to the published "prior art"—and cannot consider public uses, prior knowledge, and similar items. Many elements of evidence that may ultimately bear on the invention question—particularly items of commercial success or its lack—have yet to come into being or are known only in part at the time the application must either be allowed or denied. Also, the examiner cannot be aware of the liberty the patent applicant may ultimately take with respect to claim language or assertions of "equivalents" to reach some accused infringer. Finally, the whole determination is made on an ex parte basis, a procedure that long experience has demonstrated often leads to failure to consider the matter in the same perspective it acquires when subject to the heat of partisan controversy.

Plainly, the Patent Office determination should not be considered conclusive. Nor does the test that "every reasonable doubt" be resolved in favor of the patentee fairly represent the situation.[235] Rather, the simple test of section 282 of the 1952 Patent Code that "a patent shall be presumed valid" most nearly conforms to the real nature of the matter.

Any generalization, however, tends to obscure a fundamental and unique aspect of the situation. A distinction must be drawn between what the Patent Office has passed upon and what it has not. To the extent that the facts are the same, there is reason to believe that the courts have been in accord with Patent Office determinations, and have

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[233] *Baltimore & Ohio R. R.* v. *Goodman*, 275 U. S. 66 (1927). But see *Pokora* v. *Wabash Railway Co.*, 292 U. S. 98 (1934). And see Prosser, Torts 284 (1941).

[234] The question of whether the step forward exceeds the "skill of the art" is necessarily a fact question. The courts have so held. See, e. g., *United States* v. *Esnault-Pelterie*, 299 U. S. 201, 205 (1936); *Goodyear Tire & Rubber Co. Inc.* v. *Ray-O-Vac Co.*, 321 U. S. 275, 278 (1944); *Graver Tank & Mfg. Co., Inc.* v. *Linde Air Products Co.*, 336 U. S. 271, 274 (1949). The last case contains the following passage:

"Rule 52 (a) of the Federal Rules of Civil Procedure provides in part: 'Findings of fact shall not be set aside unless clearly erroneous, and due regard shall be given to the opportunity of the trial court to judge of the credibility of the witnesses.' To no type of case is this last clause more appropriately applicable than to the one before us, where the evidence is largely the testimony of experts as to which a trial court may be enlightened by scientific demonstrations. This trial occupied some 3 weeks, during which, as the record shows, the trial judge visited laboratories with counsel and experts to observe actual demonstrations of welding as taught by the patent and of the welding accused of infringing it, and of various stages of the prior art. He viewed motion pictures of various welding operations and tests and heard many experts and other witnesses. He wrote a careful and succinct opinion and made findings covering all the factual issues" (336 U. S. at p. 274).

Cf. *Great Atlantic & Pacific Tea Co.* v. *Supermarket Equip. Corp.*, 340 U. S. 147, 153 (1950).

[235] The Supreme Court came close to adopting this test in *Radio Corporation of America* v. *Radio Eng. Laboratories*, 293 U. S. 1, 7 (1934). As discussed in footnote 236, infra, however, this case involved a situation where the issue was one of priority of invention and had been decided in earlier patent interference proceedings between the rival inventors.

given them respect appropriate to their status.[236] On the other hand, when the facts before the court are significantly different, a new determination is being made—and the Patent Office decision may be completely honored and yet a different ultimate conclusion reached as to the question of invention. In such instances there is no reason to regard the court decisions as contrary to accepted doctrines of administrative finality, for the logical justification for such finality is largely destroyed.

One may well ask whether it is really necessary to have a patent system wherein the opportunity exists for a decision on one set of facts in the Patent Office and another set of facts in court. The answer lies in experience that has shown that very frequently the Patent Office does not locate references that later become important in court; commercial success and like factors come to bear heavily on the issue of invention and cannot be considered in full perspective in the Patent Office; and prior use and like evidence inherently is not usually available in the Patent Office. It is just as unsound today to think in terms of foreclosing judicial inquiry on the invention question as it is to think in terms of repeating the unhappy experience of the Patent Act of 1793, when Patent Office consideration of this question was foreclosed.

A different question arises with respect to the review of district court decisions on the invention issue. Here the facts before the appellate court coincide with those upon which the lower court decision is based. Whatever may be said of the difficulties of reaching the decision on the invention question in the district court, it is certainly a fact decision of the kind that should be treated as such on review and not overturned unless "clearly erroneous."

Finally, in all consideration of the invention question the basic nature and purpose of the requirement should not be overlooked. The extent of changes over the prior art vary from exceedingly rare giant strides forward, to the common day-to-day engineering improvement. A patent system based on patents solely to the giant strides would fail of its purpose for the prospect of patent protection would be too remote to stimulate research and development effort and investment. On the other hand patents extending to simple engineering improvement would result in a hopeless multiplicity of patent rights and the system would serve to deter rather than encourage activity. Between these extremes there is a proper place for patent protection. Again, the emphasis must be upon individual fact situa-

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[236] See Frost, Patent Office Performance in Perspective, 54 Mich. L. Rev. 591 (1956).

The interference decisions form a particularly interesting illustration of respect for Patent Office decisions. Here the initial decision is based on an inter partes proceeding in the Patent Office and there are usually no new issues and no significant new evidence when the matter of priority arises in a subsequent case on direct review of the Patent Office under title 35 United States Code, section 141 or section 146, or in an infringement suit where the defense is that the losing party in the interference was really the first inventor (35 U. S. C. 102 (g)). The Supreme Court early laid down the rule that the Patent Office decision must stand in any subsequent suit between the same parties "unless the contrary is established by testimony which in character and amount carries thorough conviction" (*Morgan* v. *Daniels*, 153 U. S. 120, 125 (1894)). The Court held in *Radio Corporation of America* v. *Radio Eng. Laboratories*, footnote 235, supra, that this rule applies in considerable measure when the litigants are strangers to the proceeding in the Patent Office. Considering the various expressions as to the presumption of validity of the patent the Court stated: "* * * Through all the verbal variances, however, there runs this common core of thought and truth, that one otherwise an infringer who assails the validity of a patent fair upon its face bears a heavy burden of persuasion, and fails unless his evidence has more than a dubious preponderance" (293 U. S. at p. 8). It is of interest that in the Radio Corporation case the Patent Office had awarded priority to Armstrong and that it was the reversing decision of the Court of Appeals for the District of Columbia in favor of DeForest (298 Fed. 1006) that gave rise to issuance of the patent and hence was the decision the Court was relying upon.

For a recent decision squarely refusing to follow the Patent Office on the art before the Patent Office see *Wilson Athletic Goods* v. *Kennedy*, 233 F. 2d 280 (2d Cir. 1956). See also, pp. 176–185 and 287–293, hearings, October 10–12, 1955, pursuant to S. Res. 92 (reporting the results of a study by Mr. P. J. Federico of the Patent Office of 50 recent cases where patents were held invalid by courts of appeals, and showing that of the 40 cases where the patents were held invalid on prior art only six involved such holdings on the same art as was before the Patent Office).

tions and the skill of the art test—coupled with the thought that the opportunity for patent protection should be sufficiently real to give rise to the research and development competition that lies at the heart of the whole system.

Much has been said of the "standard of invention" and the high level assertedly demanded by recent Supreme Court decisions.[237] Indeed, one segment of the Supreme Court takes the position that the Constitution itself embodies a particular and very severe standard in this connection.[238] Yet, on their facts, it is at least arguable that the Supreme Court decisions really impose no new standards,[239] and statistics may be assembled to show that current decisions are no less favorable to the Patent Office determination than those of an earlier day.[240]

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[237] See e. g., cases cited at footnote 199, supra.

[238] "The standard of patentability is a constitutional standard; and the question of validity of a patent is a question of law. * * * The Court fashioned in *Graver Mfg. Co.* v. *Linde Co.*, 336 U. S. 271, 275, a rule for patent cases to the effect that this Court will not disturb a finding of invention made by two lower courts, in the absence of a very obvious and exceptional showing of error. That rule, imported from other fields, never had a place in patent law. Having served its purpose in *Graver Mfg. Co.* v. *Linde Co.*, it is now in substance rejected. The Court now recognizes what has long been apparent in our cases: that it is the 'standard of invention' that controls. That is present in every case where the validity of a patent is in issue. It is that question which the Court must decide. No 'finding of fact' can be a substitute for it in any case. The question of invention goes back to the constitutional standard in every case. We speak with final authority on that constitutional issue as we do on many others." Mr. Justice Douglas, concurring in *Great Atlantic and Pacific Tea Co.* v. *Supermarket Equip. Corp.*, 340 U. S. 147, 156 (1950). Cf. *Alfred Bell & Co. Ltd.* v. *Catalda Fine Arts, Inc.*, footnote 227, supra.

[239] The two decisions most frequently referred to as indicating a new standard of invention are *Cuno Eng. Corp.* v. *The Automatic Devices Corp.*, 314 U. S. 84 (1941), and *Great A. & P. Tea Co.* v. *Supermarket Equip. Corp.*, 340 U. S. 147 (1950).

In the Cuno case counsel argued that the "skill of the art" test laid down in *Hotchkiss* v. *Greenwood*, 11 How. (52 U. S. 248 (1850)), was wrong and that "degree of invention or ingenuity is not a test contemplated by the Constitution and the patent laws to determine whether or not an invention or discovery shall receive protection * * *." See footnote 197, supra. The sweeping statements of the opinion appear to be more in the nature of an emphatic answer to this contention than an effort to establish a new standard. Indeed, the last sentence of the opinion states that the considerations set forth in the opinion "prevent any relaxation of the rule of the Hotchkiss case," (314 U. S. at p. 92). As the concurring opinion points out, the infringement charged was quite different in construction than the showing of the patent. It should also be noted that the case came up after two circuit courts of appeal had reached conflicting opinions on validity.

In the A. & P. case the structure of the patent was the three sided bottomless frame used in supermarket checking counters. The device had enjoyed great commercial success. Nonetheless, it is in that class of articles that are of obvious simplicity and tend to evoke violent reactions—one way or the other—as to the presence of invention. In any event, the district court and the court of appeals had both concluded that "the bottomless tray is not novel," and had sustained the patent on the ground that the extension provided on the counter to receive the three-sided rack was "decidedly a novel feature" (78 F. Supp. 391) Claim 4 in suit did not refer to the extension. Claims 5 and 6 arguably referred to it, but a majority of the Supreme Court considered otherwise. Reversal followed—on the theory that what had been relied upon below to sustain the patent (the extension) was not in the patent claims. The Court added that merely increasing the length of the counter could not of itself be invention. The major discussion of the majority opinion, however, was directed to the requirement that the elements of a combination must "cooperate" to produce something unusual—a point not considered by the lower courts. The concurring opinion of Mr. Justice Douglas, famous for its sweeping criticism of the Patent Office, was joined in only by Mr. Justice Black.

[240] The following tabulation shows the trends:

Period	Years	Number of adjudications	Not infringed		Valid and infringed		Invalid	
			Number	Percent	Number	Percent	Number	Percent
1876–80	5	51	18	35	14	28	19	37
1881–85	5	88	27	31	12	14	49	55
1886–90	5	99	25	25	11	11	63	64
1891–95	5	102	26	25	15	15	61	60
1896–1915	20	22	9	41	5	23	8	36
1916–25	10	28	5	18	5	18	18	64
1925–29	5	7	1	14	2	29	4	57
1930–34	5	18	2	11	2	11	14	78
1935–39	5	33	3	9	4	12	20	61
1940–44	5	20	7	35	3	15	10	50
1945–49	5	13	4	31	2	15	7	54
1950–54	5	2	----------	----------	----------	----------	2	100

Figures for the 1926–54 period are taken from p. 183, hearings, October 10–12, 1955, pursuant to S. Res. 92. Other data are taken from tabulations prepared on a generally similar basis. Due to the effects of the institution of circuit courts of appeal in 1895, the introduction of discretionary certiorari jurisdiction in patent cases in 1926, and the statistically insignificant number of cases in some periods, the above data are

While it is thus possible to discount the "new doctrinal trend," the fact remains that the sweeping language used in some of the recent Supreme Court decisions reveals in at least some measure an attempt to impose more rigorous standards upon the Patent Office and the lower courts. The statutory expression of section 103 of the 1952 Patent Code should aid in eliminating the confusion that has been generated in this fashion. The recent opinion of Judge Learned Hand in *Lyon* v. *Bausch and Lomb* [241] is noteworthy in this connection because it squarely discards the statements of the recent Supreme Court decisions as the measure of invention. While there may yet be some occasion for additional legislative declaration of policy or an amendment to the statutes, the matter is now in a state of flux offering substantial prospect that the problem will be worked out within the confines of the present statutes.

The above comments do not point to any new formula by which the invention question may be resolved. They do not even provide a hope for uniformity between invention decisions in different cases. They do, however, suggest that the emphasis ought to be placed on the factual nature of each decision in question—and that it be given a degree of finality in accord with the extent the factual basis is the same in future decision. The Patent Office decision is not and should not be final—but on the facts before the Office it certainly deserves great weight. The district court decision should be treated as a fact decision and so honored on review. And above all, there should be no confusion between what is essentially fact determination and what is law. Finally—cutting across all of these concepts—the courts in many cases can find considerable light on the nature of the invention question by comparing the position of the patentee as to the prior art with that respecting asserted infringement and insisting that consistent standards be applied.

One general consideration deserves final emphasis. It should not be assumed that some overriding public purpose is served every time an excuse is found to overturn a patent. In nearly every instance the real question is not whether the defendant shall stay in business but rather whether it can make the particular structure in question or use the particular process of the patent. Experience with the decisions—such as the Ray-O-Vac case discussed above—shows that a decision of patent validity is more likely to lead to desirable research effort than otherwise. More often than not such effort leads to improvements superior to that which has been patented. There may be endless points of view on the question of whether a specific change exceeds the "skill of the art"—but there should be little doubt that if the change is of the kind that a trier of fact reasonably can classify as inventive the public interest is served more by honoring the holding made than striking it down because of the doubt that is rarely absent in litigated cases.

B. THE PATENT OFFICE

The Patent Office occupies a crucial position in the operation of the patent system, for it is charged with the task of initially passing upon

not truly comparable. Nevertheless, they do show that current experience is not such a departure from the past as is sometimes suggested.

Some commentators have found that the decisions really display only a trend toward earlier and stricter views on patentability. See, e. g., Smith, Recent Developments in Patent Law, 44 Mich. L. Rev. 899 (1946). Compare Davis, The Impact of Recent Supreme Court Cases on the Question of Patentable Inventions, 44 Ill. L. Rev. 41 (1949).

[241] 224 F. 2d 530, 543–7 (2 Cir. 1955).

applications for letters patent to determine whether a patent should issue and to fix the scope of the patent, if issued. The unfortunate experience from 1793 to 1836 amply demonstrates that patents must be subject to examination before issuance. Current experience additionally shows that the interests of all parties, as well as the maintenance of research and development competition, demand that the Patent Office be reasonably current with its work and in step with the courts on the issues it decides.

For some time the Patent Office has been fighting a losing battle with the influx of new patent applications and has been falling behind on the equally important task of effectively classifying the patents and other items in the search files. An 8-year program has been established to work off the backlog and bring operations to a current basis.[242]

It is of crucial importance that the Patent Office receive appropriations adequate to its task. More than private interests are involved. As a storehouse of technical knowledge the Office serves all industry. However, the patents and other items are so numerous that an adequate classification system is of paramount importance. Today—due to inadequate budgets over a long period—the classification system is out of date. This same classification system is necessary to serve the patent examiners making searches on patent applications. Here the inadequacies of classification turn up in the form of a failure to cite the best prior art.

The Patent Office budget should also be adequate to assure prompt and complete patent examination. Every consideration demands that patents issue as promptly as possible after filing. In many instances the patent disclosure is the first teaching of a new development to the trade. Prompt patent issuance serves to trigger competitive effort based on the patent and thus speeds the all-important pace of competition in technical development. An adequate budget should additionally free the patent examiners from an unreasonable case load and thereby permit more thorough and effective search effort before patent issuance. We do not know what the patent mortality in the courts will be when the Patent Office is current in its work, the classification problem is overcome, and the workload on the examiners is reduced from the present level. We do know, however, that at the present time the great bulk of decisions of patent invalidity are based on art not considered by the patent examiner.[243] There is reason to predict that improved Patent Office search activity will lead to a more favorable court record. Additionally, it may well turn out that the collection and citation of more complete prior art in the Patent Office, coupled with a less pressing work load, will lead to more precise patent claims and file wrapper arguments serving to improve the court experience with patents to an extent greater than analysis based on the patent invalidity decisions might indicate.

The Congress has recently passed a substantially increased Patent Office appropriation. This is a step in the right direction. While it will take time for the backlog of the past to be cut down and the effects of the increased budget to be felt in full, it is nevertheless most encouraging that the trend is in the direction of improvement.

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[242] Hearings, October 10–12, 1955, pursuant to S. Res. 92, pp. 162, 198.
[243] Id. at p. 183.

1. Reducing the Patent Office load at its source—defensive patent applications

There is also an opportunity to relieve the Patent Office load at its source. Currently many patent applications are filed for "defensive" purposes—to minimize the risk of patent infringement charges based on later filed applications. Most, if not all, Government patent applications fall in this category.[244] Industry likewise files many patent applications of this kind.[245] The number of such applications has been estimated at one-third the total of all patent applications.[246] Whether this figure is high or low is not important—for by any standard the number is substantial and they necessarily interfere with Patent Office work on other applications.

The odd fact is that the law now places such a premium upon patent applications as a defensive measure that common prudence dictates their use whenever a manufacturer or the Government develops and intends to use an arguably patentable product or process. At the application stage the defensive application is ordinarily thrown into interference with any adverse patent application which, if issued, would give rise to infringement charges.[247] The issue of priority can then be resolved at the Patent Office level—with the full benefit of a "constructive reduction to practice" as of the filing date,[248] before any question of damages has arisen,[249] and in a procedural atmosphere generally more favorable than court proceedings.[250] If there is no interference it is still to the advantage of the applicant to make every effort to persuade the Patent Office to issue the defensive application, for in that event the issued patent relates back to become a constructive reduction to practice as of its filing date and with respect to all that it discloses.[251] It thus gives defensive assurance that is available in no other way.

The result is that we have a great body of patent applications filed for defense only—applications which the patent examiners must study for technical sufficiency even though no rights turning on such sufficiency are really sought; claims for which the patent examiners must make regular prior art searches even though the applicant has no desire to enforce the claims, if allowed; applications demanding the preparation of office actions rejecting or allowing the claims; and

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[244] See Government-Owned Patents and Inventions of Government Employees and Contractors, Second Report of the National Patent Planning Commission, 27 J. P. O. S. 76, 78 (1945). ("The main, if not the sole, purpose of any proprietary interest of the Government in patents has been one of protection against interference with the performance of governmental functions.") See also, Department of Justice, Investigation of Government Patent Practices and Policies, Vol. 1, pp. 126–131 (1947) and *Kear* v. *Roder*, 115 F. 2d 810 (C. C. P. A. 1940) (publication of invention made by Bureau of Standards employee not a reduction to practice).

[245] See e.g., McHugh, Bell System Patents and Patent Licensing, Bell Telephone Magazine, January 1949. ("It is the practice to apply for United States patents upon the more important of these inventions so that the Bell System's right to use its own inventions in furnishing communications service may receive the assurance provided by the patent laws.") And see pt. 2, TNEC hearings, p. 256 (Ford Motor Co.), pp. 363–364 and 692 (General Motors Corp.).

[246] Davis, Proposed Modifications in he Patent System, 12 Law and Contemp. Prob. 796, 799–800 (1947).

[247] It is the practice of the Patent Office to conduct an interference search after an application is found to contain allowable subject matter. Such search systematically covers the other pending applications with the objective of avoiding issuance of an application containing matter interfering with another application. See sec. 1101.01 (c), Manual of Patent Examining Procedure. In addition, the owner of an application on file can copy the claim of an issued patent for interference purposes at any time within 1 year of issuance of the patent. See 35 U. S. C. 135.

[248] Footnote 180, supra.

[249] The patent right to exclude—and the opportunity to recover damages—begins with issuance of the patent (35 U. S. C. 154). Cf. *Hoeltke* v. *Kemp Mfg. Co.*, 80 F. 2d 912, 923 (4th Cir. 1936).

[250] Over the years the Patent Office has evolved numerous procedures to protect the parties to an interference. Principal among these is the practice of refusing access to filing dates until after "preliminary statements" giving dates of invention have been filed. See Patent Office Rules of Practice, rules 215–227.

[251] *Alexander Milburn Co.* v. *Davis-Bournonville Co.*, 270 U. S. 390 (1926). On the insufficiency of equivalent knowledge not in the form of a patent application see *In re Schlittler and Uffer*, 234 F. 2d 882 (C. C. P. A., June 21, 1956).

applications for which the applicant is forced to argue for allowance with tenacity in an effort to obtain a maximum prospect of issuance in what is necessarily a marginal case.

In 1949 the Patent Office instituted a practice intended to minimize the number of defensive patent applications. The plan was to permit applicants to file applications in the usual manner, abandon the applications, and have them printed in abstract form in the Official Gazette.[252] Detailed administrative provisions were made for handling these applications, especially with respect to the conduct of an interference search and the declaration of an interference.[253]

Two problems arose in connection with the practice of publishing abandoned patent applications. First, the failure to publish the entire application and the lack of legislative sanction for the practice gave rise to doubts as to the status of such applications as "constructive reductions to practices.[254] The Patent Office itself accented these doubts by treating the abstracted applications as "publications" as of the date the abstract was published and not as "constructive reductions to practice." [255] Second, the practice was in concept antithetical to conventional patent practice and for this reason was criticized.[256] It was largely for these reasons that—while the practice was used to some extent by both Government and industry—the number of applications brought under the procedure was not deemed sufficient to justify its continuation and it was discontinued.

It is difficult to perceive any rational basis for continuing to burden an overloaded Patent Office with defensive patent applications which must be handled in the same fashion as other applications. Surely some equitable way can be devised to relieve this load. A provision in one draft of the Patent Code was directed to this matter, but was later deleted.[257] Efforts, partially successful, have been made to relieve the Government of the risk.[258] To be sure, there are practical problems to resolve—and nothing can make an applicant use a special procedure if it is bound and determined to follow the conventional route. Yet if a practical statute were passed it would assure that all reasonable steps have been taken to relieve the Patent Office of an unnecessary load, would provide an opportunity to reduce over-all patent expenses of both Government and industry, and in some respects would provide defensive protection not now available.[259]

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[252] Notice of January 25, 1949 (619 O. G. 258).

[253] Manual of Patent Examining Procedure (1949 edition), par. 711.06 to 711.06 (f).

[254] See Abstracts of Abandoned Applications Should Be Discontinued, 34 J. P. O. S. 695 (1952).

[255] "These abstracts will be used by the examiner as a basis for rejection only as printed publications effective from the date of publication in the Official Gazette. (This is similar to the practice with respect to applications published for the Alien Property Custodian, see notice of May 14, 1943.)" Manual of Patent Examining Procedure (1949 edition), par. 711.06 (f). Cf. Federico, The Use of Abandoned Applications as References, 28 J. P. O. S. 160 (1946).

[256] See Abstracts of Abandoned Applications Should Be Discontinued, 34 J. P. O. S. 695 (1952). But see Mayers, Publishing Abstracts of Abandoned Applications, 34 J. P. O. S. 690 (1952).

[257] Sec. 121, H. R. 9133, 81st Cong., 2d sess. (July 17, 1950). ("Pending applications for patents may be printed and published by the Commissioner, at the request and at the expense of the applicant or owner. Such publication shall have the same effect as an issued patent for the purposes of sec. 102 (e) of this title.")

[258] H. R. 8445, 76th Cong., 3d sess. See hearings, June 25, 1940, before the Committee on Patents, House of Representatives.

Sec. 155 of the Atomic Energy Act of 1954 (68 Stat. 919, 947), reads:

"PRIOR ART.—In connection with applications for patents covered by this chapter, the fact that the invention or discovery was known or used before shall be a bar to the patenting of such invention or discovery even though such prior knowledge or use was under secrecy within the atomic energy program of the United States."

[259] Under present practice the applicant in the case of a defensive patent application must make the same representations of patentability as any other applicant—and must press arguments of patentability in the hope of achieving maximum defensive protection in the form of an issued patent. In a later infringement suit brought by an adverse party these representations and arguments can be emphasized as admissions of patentability. It would seem possible to devise a procedure under which these representations would be unnecessary.

Statutory provisions relating to defensive patent applications are one of several ways to decrease the Patent Office workload. A broad field for improvement—helpful to the Patent Office, the public, and applicants alike—lies in simplifying and streamlining the preparation and prosecution of patent applications. Excessive numbers of patent claims, for example, extend the time required for the examiner to pass on an application and, if embodied in the issued patent, they unnecessarily complicate the efforts of competitors to evaluate the patent and labors of a court in enforcing it. However, with an understandable abundance of caution—and in some instances because of inadequate care in preparing the applications—patent applicants may file a number of claims greatly in excess of those called for by the circumstances. No categorical rules can overcome this difficulty—for there are occasions when many claims are necessary. The solution to the problem accordingly lies in giving the Patent Office ample authority to control the number of claims and in placing a substantial incentive upon the applicant to submit only such claims as are really necessary.

For some years the Patent Office has had a settled policy, supported by court decision, of refusing to examine patent applications when claims are unduly multiplied.[260] There is also a rather mild incentive to limit claims inherent in the additional charges now made for claims in excess of 20.[261] More importantly, experienced patent solicitors usually find that in the long run more effective patent protection is obtained by filing applications with modest numbers of very carefully prepared claims.[262] Finally—of major importance to any current consideration of the matter—the 1952 Patent Code includes provisions designed to give the Patent Office final authority to demand restriction of the subject matter of patent claims and assures the applicant that compliance will not prejudice his interests.[263]

A thorough review of patent application proceedings looking toward simplification of patent preparation—especially with respect to numbers of claims—should be a long-term subject of consideration by the Congress. The Patent Office itself has done much to improve the practice, but it is always subject to charges of arbitrary action if it goes too far. There is reason to believe that the Patent Code may have a desirable effect in minimizing this problem. Other legislation—such as the "20 year" bill [264]—may well ease the problem. If after a period of time there is a continuing difficulty more drastic legislation should be considered.[265]

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[260] Patent Office Rules of Practice, Rule 75 (b); *Ex parte Schwartz*, 1935 C. D. 23 (C. C. P. A. 1935).

[261] The charge is an additional $1 for every claim filed in excess of 20 and a like charge for every claim in the issued patent in excess of 20. 35 U. S. C. 41. In relation to the other expenses of preparing and prosecuting a patent application these charges are very small.

[262] Excess claims usually irritate the patent examiner with adverse consequences to the applicant. The courts have on a number of occasions displayed impatience with the number of claims in a patent. See, e. g., dissenting opinion of Mr. Justice Black in *Williams Co.* v. *United Shoe Machinery Corp.*, 316 U. S. 364, 375–6 (1942). Mr. Harry R. Mayers, general patent counsel, General Electric Co., has listed the disadvantage of excessive patent claims as (1) "adverse effect upon court's approach to validity" (citing *Carlton* v. *Bokee*, 84 U. S. 463 (1873) and *Stromberg* v. *Benecke*, 10 F. 2d 405 (7th Cir. 1926)), (2) "adverse effect on infringement holding" (citing *Thomson Houston Electric Co.* v. *Elmira Horseheads Ry. Co.*, 71 Fed. 886 (C. C. N. D. N. Y. 1895)), and (3) "adverse effect on application of doctrine of equivalents" (citing *Graver* v. *Linde*, 339 U. S. 605 (1950)). Lecture before the Practising Law Institute, July 9, 1956.

[263] 35 U. S. C. 121. Prior to this statute the patent applicant could argue with some justification that a Patent Office requirement for restriction as to claim subject matter would lead to loss of rights because a patent obtained containing the deleted claims would be invalid for "double patenting."

[264] See e. g., S. 3745, 84th Cong., 2d sess., discussed at p. 70, infra. Since statutes of this kind fix a maximum patent term as measured from the filing date of the application, they work against tactics—such as poorly prepared or excessive claims—that tend to prolong the period of patent pendency.

[265] One possibility is a substantial charge for claims in excess of a rather modest number. This has been proposed as a Patent Office revenue measure. See 35 J. P. O. S. 710–756 (1953). It would seem that a provision along these lines—though harsh in some instances—would accommodate the unusual cases requiring many claims to a desirable strong incentive in all cases to limit patent claims to those absolutely necessary.

2. Opposition proceedings

The suggestion has been made that some form of opposition or cancellation proceeding might serve to reduce the examination burden on the Patent Office or at least prevent the issuance or continued existence of patents when bars to validity exist.[266] A number of foreign patent systems, notably those of England and Germany, include provisions for this purpose.[267] In England the number of proceedings has been small and there is some feeling that they usually aid the patent applicant rather than the opposer.[268] In Germany the number of opposition proceedings has been so great, and the existence of multiple oppositions against the same application so frequent, that the figures tend to support the criticism that proceedings of this kind are availed of for obstructive purposes.[269]

Experience with the American patent system throws some light on the prospect of applying opposition proceedings to our practice. For example, experience with interferences and public use proceedings [270] amply demonstrates that inter partes opposition proceedings are much too cumbersome for practical use and would intolerably increase the burden on the Patent Office. Additionally, existing experience shows that the opportunity for obstructive tactics cannot be ignored.[271] Such tactics would be especially disadvantageous to small companies and might well serve as a medium by which established concerns could thwart the efforts of such competition by filing oppositions to force settlements that would reduce the risk of adversely held patents.

In 1936 the Science Advisory Board recommended a procedure whereby patents would be published before issuance and interested parties would then be permitted to submit pertinent facts to the Patent Office for its consideration.[272] The thought behind this recommendation was that overlooked references might then be brought to light and considered by the Patent Office in the same way as other references. It finds analogy in the protest which any person can now file under Patent Office Rule 291.[273] There are no reported data as

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[266] See e. g., Science Advisory Board, Report of the Committee on the Relation of the Patent System to the Stimulation of New Industries, 18 J. P. O. S. 94 (1936); The American Patent System, Report of the National Patent Planning Commission, 25 J. P. O. S. 455 (1943).

[267] See Federico, Opposition and Revocation Proceedings in Patent Cases. Subcommittee study No. 4. And see the testimony of Lawrence Langner at pt. 3, T. N. E. C. hearings, p. 1016.

[268] "The value of this right of opposition is very limited. The benefit of any doubt must be given to the applicant for a patent or patentee: for an unsuccessful opponent has another chance to make out his case, in proceedings before the High Court after grant, whilst the unsuccessful applicant has no second chance. Thus it is very unusual for refusal of grant (or revocation) to result, and the usual effect is that the patent opposed is strengthened by amendment of the specification to meet the attacks made by the opponent. Even the insertion of a specific reference, normally regarded as a defeat for the applicant, is a defeat only in relation to prestige; such references tend to strengthen and not weaken the patent in whose specification they occur. * * *" White, Patents for Inventions (London, 1955), p. 173.

[269] See Federico, op. cit. footnote 267, supra.

[270] The Patent Office rules have long provided for the institution of public use proceedings by petition making a prime facie showing that a pending application is barred by public use or the product of the invention being on sale. These proceedings are quite rare and, when instituted, are conducted on the same procedural basis as interferences. See Patent Office Rules of Practice, rule 292.

[271] Examples of obstructive tactics are found within the confines of the cases under the present law. Thus in *Precision Instrument Mfg. Co.* v. *Automotive Maintenance Machinery Co.*, 324 U. S. 806 (1945), the facts showed that one Larson filed a patent application to the invention of another and executed a preliminary statement in an interference with false dates designed to antedate those of the application of the real inventor. Hunt patent 2,300,157, directed to a feather-picking apparatus for chickens, issued after several interferences instituted as the result of patent applications filed by persons who saw the Hunt machine in use. See *Mueller* v. *Campbell*, 68 F. Supp. 464, 472–3, in which the findings of fact touch on this subject. One finding states that "At the trial of this case Campbell testified that the dates given in the preliminary statements were false and were known by him to be false at the time he executed the affidavits" and that "Campbell's purpose in giving the false dates in the preliminary statement was to antedate the Hunt machine which he had seen at Marion, Ohio, and to attempt to obtain in his patent the Hunt inventions embodied in that machine."

[272] Footnote 266, supra. See also, Bush, Proposals for Improving the Patent System, subcommittee study No. 1.

[273] "* * * Protests to the grant of a patent are ordinarily merely acknowledged, and filed after being referred to the examiner having charge of the subject matter involved for his information." Patent Office Rules of Practice, rule 292.

Cf. *Helene Curtis Industries* v. *Sales Affiliates, Inc.*, 233 F. 2d 148, 160–163 (2d Cir. 1956) (damage claim filed by patentee on ground that protest in Patent Office obstructed issuance of the patent).

to the number of protests filed or their outcome. However, they are generally considered ineffective because the applicant usually has an opportunity to reframe claims to distinguish the additional reference and the examiners are thought to give little attention to references obtained in this fashion.[274]

Whether the mechanical difficulties associated with any arrangement along the lines suggested by the Science Advisory Board are too great for the benefits obtained is difficult to predict. Thorough study must necessarily precede further consideration of such procedure, including a consideration of the workload the procedure would place on the Patent Office, the mechanical problem of making patent specifications available while at the same time permitting some form of revision, and the like. Clearly the matter deserves exploration—but it may well turn out that no feasible arrangement can be devised.

3. Delayed patent issuance

From its inception the American patent system has been based on a patent term measured from the date of patent issuance. The consequence is that the period between the date the patent application is filed and the date the patent issues—if unduly prolonged—can result in a patent grant out of step with the progress of the art to which it relates. In such instance the patent—when finally issued—may come too late to stimulate the thoughts of others, there is an unduly long time period when an innocent infringer may be unexpectedly faced with a patent covering current manufacture,[275] and expiration of the patent is unreasonably delayed. All of these are important considerations working against the basic objective of the patent system in stimulating research and product competition.

The problem of delayed patent issuance has long been the subject of attention by both the Congress and the Patent Office. Changes in the time period allowed for response to Patent Office action illustrate the trend. From 1836 to 1870 the statutes fixed no definite period, in 1870 the period was set at 2 years, in 1897 it was reduced to 1 year, and since 1927 the time allowance has been 6 months.[276] Moreover, in 1939 the statute was amended to permit the Patent Office to set a special period of as short as 30 days in appropriate cases.[277] Under the present practice even this short time is eliminated in some instances by an "examiner's amendment" effective to change an application without action of the applicant.[278]

The net effect of these and similar changes has been to squeeze the delays out of ex parte practice so far as action by the applicant is concerned. The remaining opportunity to speed up ex parte proceedings lies largely in more prompt Patent Office action. Here the recently increased Patent Office appropriation offers a bright prospect of eventually bringing the Office to reasonably current status.

This hopeful conclusion is not justified with respect to interference practice. Cases continue to arise where—by reason of one or more interferences and related court proceedings—a patent issues long after its filing date and even after the patent would have expired if issued in normal course. The Jorgensen automatic choke patent is

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[274] See Willits, Proposed Patent Legislation, pt. 2, TNEC hearings, pp. 714, 718.
[275] See testimony of Harry R. Mayers, general patent counsel, General Electric Co., hearings, October 10–12, 1955, pursuant to S. Res. 92, pp. 150–152. And see pt. 2, TNEC hearings, pp. 371, 701–713, and 720.
[276] See: Patent Act of 1870, 16 Stat. 198; Patent Act of 1897, 29 Stat. 692; Patent Act of 1927, 44 Stat. 1335.
[277] 53 Stat. 1264.
[278] Manual of Patent Examining Procedure, sec. 1302.04.

a well known current example.[279] The patent there issued in 1955 on an application filed in 1932, a spread of some 23 years. To be sure, the great bulk of the delay that occurred in this instance is a legacy of the past that would not recur under present Patent Office practice—and the number of patents issued after interferences and unduly delaying court proceedings is infinitesimally small in relation to the total number of grants.[280] Nevertheless, there are instances—based on current Patent Office practice—where patents have issued a decade after the filing date, and even a small number of such cases calls for a thorough review of the interference practice with the objective of precluding like cases in the future.[281]

The interference practice has evolved from a long history of Patent Office experience with the manifold problems that arise in carrying out the statutory command of determining "priority of invention." [282] The proceedings are unique to the American patent system, for virtually all other patent systems award the patent to the first applicant.[283] Interference practice stands as by far the most intricate phase of Patent Office procedure, and is probably as complicated and difficult as any field of litigation. The issue of priority is itself complicated by issues of what constitutes "diligence," whether there is testing sufficient for a "reduction to practice," and the like; the problems of proof, with the requisite "corroboration," are great; strategy in bringing motions to add counts, shift the burden of proof, and the like, can spell the difference between victory and defeat; and the Patent Office is quite rigid in demanding literal compliance with the rules of practice.

Yet there is much to recommend the Patent Office interference practice. The Office long ago learned that no decision on priority of invention has meaning without a reasonably precise statement of what the invention in controversy is. Hence the requirement that both parties "make" the same claims; the procedural steps by which the examiner can bring about this result without conferring unjust advantage; and the provision of a motion period within which the parties can seek a better definition of the interference issue.[284] To be sure, these activities take time, but to cut them short or to abolish them would make the whole determination chaotic. Similarly, it was learned long ago that the vast majority of interferences can be terminated without testimony and final hearing. Hence the opportunity of the motion period to challenge the right to make claims, to dissolve on the ground of nonpatentability, or in other respects terminate the proceeding forthwith.[285] In like measure the Office long ago

[279] Patent 2,705,484, Hearings, October 10–12, 1955, pursuant to S. Res. 92, pp. 287–291.
[280] Hearings, October 10–12, 1955, pursuant to S. Res. 92, pp. 290–291.
[281] Two examples of cases where extensive delays would be likely to take place under current conditions are Etten patent 2,755,653 and Kronmiller patent 2,475,430. In the Etten case the patent issued on July 24, 1956, on an application filed on September 3, 1935. The proceedings leading to the issuance of this patent are too complicated to be discussed here. See *Etten* v. *Jantz*, 142 F. 2d 680 (C. C. P. A. 1944); *Etten* v. *Lovell Mfg. Co.*, 83 F. Supp. 178 (W. D. Pa., 1949), 184 F. 2d 737 (3d Cir. 1950), 121 F. Supp. 291 (W. D. Pa. 1954), 225 F. 2d 884 (3d Cir. 1955), cert. den. February 27, 1956 (No. 593–4, October term, 1955). To the extent the Etten case represents events likely to recur, the delay was essentially all involved in the protracted court proceedings that ultimately resulted in a decision overruling the Patent Office determination.
The Kronmiller patent issued on July 5, 1949, on an application filed on June 27, 1936. The proceedings in this instance involved bill in equity filed to review the Patent Office award of priority against Kronmiller. The district court overruled the Patent Office (*Minneapolis Honeywell Regulator Co.* v. *Milwaukee Gas Speciality Co.*, 78 F. Supp. 569 (E. D. Wis., 1948)), and the court of appeals affirmed the district court (id. at 174 F. 2d 203 (7th Cir. 1949)).
[282] 35 U. S. C. 135.
[283] The "conflict proceedings" under the Canadian patent law are the closest approach to the interference practice under United States law. The Patent Act, 1935 (Canada), sec. 44 (ch. 32, 25–26 Geo. V, 1935); Canadian Patent Rules, 1948, rules 76–84.
[284] Patent Office Rules of Practice, rules 202–203, 233.
[285] Id., rules 231–238.

recognized that steps must be taken to assure against perjured testimony, false dates, and obstructive tactics. These considerations have given rise to the requirement that preliminary statements be filed before either party learns the important priority dates of the other.[286] Again we have procedure that takes time and introduces complexities—but has an important function in the over-all determination. While it is easy to point a finger of doubt at these and many other aspects of the Patent Office interference practice, the fact is that in each instance there is a history of substantial experience dictating the procedure being followed. Moreover, the delay that takes place in the Patent Office—with the current policy of restraint in declaring interferences and insistence upon the expeditious conduct of interferences when declared—is not great in relation to the nature of the issues and to the delays that can occur in subsequent court review. It follows that alteration of the Patent Office interference practice as such is not the solution to the problem.

A number of proposals have been made to alleviate the interference problem. One is to limit by statute the earliest date of invention that can be shown. The preliminary draft of the patent codification bill contained such a provision, fixing the earliest possible date of invention at 2 years prior to the filing date.[287] Whatever merit this plan may have in generally simplifying interference proceedings, it does not go to the heart of the protracted proceedings that occasionally take place and is accordingly unlikely to solve the delay problem.[288]

A more promising proposal is to issue all the applications in interference before final interference decision. Several situations arise under current practice where one application issues prior to such decision. A substantial proportion of all interferences are between issued patents and pending applications, in which event one patent has necessarily issued before declaration of the interference.[289] Another case where one patent issues prior to final interference decision is that occurring when review of the Patent Office interference decision is sought by bill in equity.[290] In this instance the Patent Office follows the policy of issuing the patent to the party adjudged by the Office to have priority, thus avoiding the delay otherwise associated with court proceedings that affirm the Office decision.[291] The proposal of issuing all patents prior to final interference decision differs from these existing practices in that all rather than just one patent so issues.

Little can be accomplished by issuing only the application deemed most likely to prevail in the interference. The instances of unduly delayed patent issuance under present Patent Office practice are cases where the Patent Office interference decision has been reversed on

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[286] Id., rules 215–227.

[287] Proposed Revision and Amendment of the Patent Laws, Preliminary Draft with Notes, January 10, 1950, Committee on the Judiciary, House of Representatives, par. 25.

[288] In the case of the Jorgensen and Etten patents, footnotes 279 and 281, supra, the interference proceedings involved proofs of dates approximately 2 years prior to the various filing dates.

[289] Under 35 U. S. C. 135, a patent applicant may copy the claim of an issued patent for interference purposes, provided that this is done within 1 year after the patent issues. See Patent Office Rules of Practice, rules 204–206. If the application "supports" the claim thus made and other conditions are met, the Patent Office declares an interference and proceeds in essentially the same manner as in other interferences.

[290] 35 U. S. C. 146.

[291] Par. 1109 of the Manual of Patent Examining Procedure reads in part:

"* * * the Commissioner may at once issue a patent to the applicant who is adjudged by the Board of Patent Interferences to be the prior inventor, without waiting for appeal by any loser. However, in ordinary cases it is the policy of the Office not to issue a patent to the winning party during the period within which appeal may be taken to the Court of Customs and Patent Appeals, or during the pendency of such appeal. * * *"

Par. 1109.01 reads in part:

"The winning party may be sent to issue despite the filing of a suit under 35 U. S. C. 146 by his opponent."

A patent was issued during the pendency of action to review Patent Office interference decision by bill in equity in *Etten* v. *Lovell Mfg. Co.*, footnote 281, supra.

review by bill in equity.[292] Any scheme of issuing only the patent application most likely to prevail upon final review falls short of meeting this contingency and offers little prospect of overcoming the difficulties that have arisen under current practice.[293]

If all patent applications in interference are to be issued, there is no need to await a first decision on priority before issuance takes place. Accordingly any one of a number of dates may be used as the date of issuance. One possible date is the date interference is declared; another is the date of decision on interference motions; still another is the date of some preliminary award of priority based on modest documentary proofs; and finally the date of the Patent Office interference decision can be used. Of these, issuance immediately after decision on interference motions has much to recommend it. The purpose of the motion period is to clear away all issues other than priority and to dispose of the interference without testimony and final hearing if that be possible. Experience shows that many interferences end at this time, so that the number of conflicting patents issued would be considerably reduced by awaiting the motion decision. Moreover, in virtually all cases the only issue left for determination after the motion decision is that of priority,[294] so that there should be no further need for changes in the claims or any doubt as to the form and content of the patent if issued after favorable final decision on priority. Finally, with the Patent Office reasonably current in its work the time period between declarations of interference and the motion decision should be well under 6 months so that awaiting the motion decision will not entail any significant delay.

Another promising way to reduce interference delay is by streamlining court review of Patent Office interference decisions. Currently, the parties to an interference may obtain review of the Patent Office decision by way of appeal to the Court of Customs and Patent Appeals or, in the alternative, by bill in equity in the appropriate district court.[295] The latter carries with it the full right of appeal to the cognizant court of appeals and possible grant of certiorari by the Supreme Court.[296] Review by bill in equity also provides for a full trial with opportunity to supplement the record as made before the Patent Office. Such trials and the attendant appeals account for a substantial part of the delay in the current cases of unduly delayed patent issuance. A great deal of this delay could be eliminated by substituting for the bill in equity procedure a review by the appropriate court of appeals on the record made in the Patent Office. Such procedure would be consistent with the review now provided for orders of the National Labor Relations Board, the Federal Trade Commission, and other administrative agencies.

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[292] See footnote 281, supra.

[293] A number of proposals have been made to streamline interference proceedings by eliminating the present interference practice and having the Patent Office make some sort of preliminary decision based on simple documentary proofs, followed by issuance of the patent to the party then adjudged first inventor. The preliminary Patent Office decision would then be subject to review in court. See, e. g., Edmonds, Further Development of Patent Legislation and Administration, 25 J. P. O. S. 501, 504–505 (1943); pt. 2, T. N. E. C. Hearings, pp. 714, 718, 721, 732–733; hearings before the Committee on Patents, House of Representatives, 67th Cong., 2d sess. on H. R. 3264, February 24, 1944. Since the problem of interference delay under present conditions appears to be primarily a matter of handling the cases where the Patent Office interference decision is reversed, these proposals would appear to accent rather than resolve the problem as it exists today. Two alternatives to the proposal here made justify consideration. One is to issue the patent to the senior party and, if the junior party ultimately prevails, issue that patent only for a shortened term coterminous with the term of the patent to the senior party. Another alternative is to couple this procedure with a right on the part of the last issued patentee to recover damages running from the date of issue of the earlier patent.

[294] Certain matters "ancillary to priority" can be considered on final hearing in interference proceedings. See Patent Office Rules of Practice, rule 258. Usually the decision is narrowly confined to the specific question of the dates of invention as shown by the respective proofs of the parties.

[295] 35 U. S. C. 141 and 146.

[296] See e. g., *Sanford* v. *Kepner*, 344 U. S. 13 (1952).

This is not the place to attempt a full exploration of all the possible ways to overcome the delays presently possible in interference cases. It is enough to note that many alternatives have promise and that some definite steps should be taken to accelerate patent issuance in interference cases. In so doing, however, precipitate action and superficial conclusions should be carefully avoided. The interference practice has a long history of step-by-step progress based on experience. Proposals must be carefully weighed in the light of that experience. It may well be that some—or even all—the above possibilities have limitations that preclude their use, or that some other change is more suitable. The basic point at this time is that the matter demands attention—and not that one course or another is the solution.

A "20-year bill" becomes equitable when the problem of interference delay is overcome. Such statute provides for a maximum patent term of 17 years after issuance, but in no event longer than a term of 20 years (plus delays not chargeable to the applicant) as measured from the filing date.[297] It has a long history in proposals extending back at least to 1897.[298] There should be little objection to such a statute so long as the interference problem is disposed of. However, it should not be looked upon as a cure-all—or as alone solving the problem of delayed patent issuance—for the heart of the problem today lies in interference proceedings, and not in the ex parte practice.

Finally, in considering the work of the Patent Office one thought demands reiteration—an adequately financed Patent Office is the best single assurance that administration of the patent law will conform to the public interest. Here, all hands agree on the over-all need, for it is beyond argument that the accelerated current pace of technical advance must be reflected in a commensurate increase in the Patent Office budget. There is an additional opportunity in an increased Patent Office budget. Over the years the Office has itself been a major source of improvement in patent practice, and has by administrative action done a great deal to make the patent system more effective. Once the Office is free of the handicap of inadequate funds, insufficient personnel, and an overhanging problem of excessive backlog, it should be possible for it to turn increased attention to these other matters. Happily, it now appears that the need for funds is being fulfilled by the Congress and that the necessary funds will continue to be available.

In the opinion of the writer there is a definite need for legislative action in the case of defensive patent applications and the problem of eliminating undue delay in interference proceedings. These and similar Patent Office problems are complicated, they bear upon many difference factual situations, and demand careful study before final decisions are made. The above discussion does no more than outline some of the problems and the possibilities—and is not intended to do more. The need is not for immediate action but rather for careful study and constructive thought by all concerned with the patent system.

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[297] See, e. g., S. 3745, 84th Cong., 2d sess.
[298] See Report of the Commissioner of Patents, 1897. And see, H. R. 15,989, 63d Cong., 2d sess.

C. SOME FUNDAMENTAL ASPECTS OF PATENT LITIGATION

Much has been said of the problems incident to patent litigation. It has been said that such litigation has been used by monopolistic interests for the purpose of throttling potential competition by dubious charges of patent infringement. On the other hand it has been said that the cost of patent litigation is so great that even a highly meritorious patent owned by an individual cannot be enforced because of the cost and the opportunity of a well-financed infringer to obstruct justice. And cutting across these criticisms we face the problems of coping effectively with the highly technical character of some patent litigation, and of minimizing undue deviations in judicial attitude toward the patent system as a whole.

A measure of the extent of oppressive patent litigation is found in the decade of experience with the attorney fees statute.[299] Under this statute the courts are given express power to allow attorney fees to prevailing parties in patent causes "in exceptional cases." Even after giving due regard to the reluctance of a court to grant what amounts to a punitive award under this statute, one would suppose that if overreaching tactics by patent litigants were common a considerable record of such awards would have accumulated by now. Just the opposite has occurred—for there have been few awards and the sums involved have been moderate.

Additional considerations confine the patent owner who might seek to oppress an alleged infringer. Perhaps the most important of these is the declaratory judgments statute.[300] At one time it was possible for a patent owner repeatedly to threaten infringement suit—or even bring such suit and then seek voluntary dismissal—without at any time giving the accused the right to an adjudication of the controversy. The declaratory judgment statute has entirely changed this picture. It is now settled that almost any action amounting to a charge of patent infringement defines the "case or controversy" necessary to support a declaratory judgment suit.[301] And it is not even necessary that the recipient of such charge be in actual manufacture of an infringing product, so long as there is a bona fide investment in contemplation of the accused manufacture.[302] Finally, an important substantive change in the 1952 Patent Code makes the owners of United States patents residing in foreign countries subject to declaratory judgment action.[303]

The effects of the attorney fees statute and the declaratory judgments statute are supplemented by two additional developments. One is section 1404 (a) of the 1948 Judicial Code, giving the courts an opportunity to transfer cases to a more convenient forum and thereby minimizing the opportunity for oppressive forum shopping.[304] The other is the rule, being adopted by an increasing number of courts, requiring a party seeking to take deposition in a remote location to advance the expense of the same to the opponent.[305]

The over-all effect of these statutes and rules is to give the courts ample power to protect both parties against oppression in patent

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[299] 35 U. S. C. 285. This section of the Code is based on 60 Stat. 778, August 1, 1946.
[300] 28 U. S. C. 2201.
[301] See, e. g., *Federal Telephone & Radio Corp.* v. *Associated Telephone and Telegraph Co.*, 169 F. 2d 1012 (3d Cir. 1948) cert. den. 335 U. S. 859.
[302] *General Electric Co.* v. *Refrigeration Patents Corp.*, 65 F. Supp. 75 (W. D. N. Y. 1946), cf. 35 U. S. C. 252, second paragraph.
[303] 35 U. S. C. 293.
[304] 28 U. S. C. 1404 (a). See, e. g., *Clayton* v. *Warlick*, 232 F. 2d 699 (4th Cir. 1956).
[305] See, e. g., Local Civil Rule 4, United States District Court for the Northern District of Illinois.

matters. The patentee has the opportunity to go to court for redress through conventional patent infringement action, while the accused infringer can do likewise by filing declaratory judgment proceedings. Once action is filed by either party the courts can penalize the misuse of discovery proceedings by monetary awards, can discourage forum shopping by appropriate transfer, can penalize general obstructive tactics by awarding attorney fees, and can maintain a close general supervision of the action by the use of pretrial conferences and similar procedures.

To be sure, these controls are not absolute. Rather—like the Federal Rules of Civil Procedure—they are based on the premise that the best control is flexible control and that the judgment of the court as applied to the facts of a specific case is more effective than any categorical rules that might be laid down. It should be added that—as in litigation generally—a judiciary free of undue workload and an undue case backlog is essential to the effective conduct of proceedings.

An additional matter of perspective requires emphasis. Certain difficulties attend all litigation. No matter what is done there will be unsuccessful litigants who point to the judicial and patent systems as the source of their woes. Frequently they can make persuasive cases of apparent unfairness. The same may be said of the expense of litigation—patent or otherwise. Lengthy trials occur in virtually all fields.[306] From the standpoint of the litigants any trial is too long and too expensive. These are facts of the judicial process that extend through all types of litigation. Of course they do not mean that we should not search for ways to make patent litigation—and all litigation—less expensive and less provocative of criticism. But they do indicate that the resolution of the problem—as in all litigation—lies most fundamentally in the control exercised by the trial judge over trial and pretrial proceedings. In short, in patent cases—as in other litigation—judicial control over discovery proceedings, summary judgment techniques, and the opportunity for prompt trial under the direct supervision of a judge not burdened with overload constitute the basic weapons to prevent overreaching and obstructive tactics.

There remains the problem of the patent owner with insufficient finances to bring a meritorious patent infringement suit regardless of the tactics of the defendant. This is not a problem unique to the patent law. It occurs every day in the personal injury field. And in the area of antitrust litigation the small-business man injured by a violator often is unable to finance the expense of litigation. Any legitimate case, however, if sufficiently meritorious, will interest counsel on some contingent basis. With respect to those persons with allegedly meritorious inventions who have not succeeded in obtaining relief, it can only be said that others do not view their claims so favorably.[307]

Patent litigation necessarily involves a problem of handling the technical issues that often arise in patent proceedings. A judiciary chosen solely for reasons other than interest and experience in technical matters can hardly deal comfortably with problems such as the com-

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[306] For examples of lengthy nonpatent civil cases see *Rank* v. *United States*, 142 F. Supp. 1–198 (S. D. Cal. 1956); *Standard Oil Company* v. *The Standard Oil Company*, 141 F. Supp. 876 (D. Wyoming, 1956). And see Report of the Judicial Conference of the United States on Procedure in Antitrust and Other Protracted Cases, dated September 26, 1951, 13 F. R. D. 62.

[307] Cf. testimony of Mrs. Nellie O. Fletcher at pp. 63–64, hearings, October 10–12, 1955, pursuant to S. Res. 92 and *Fletcher* v. *Atomic Energy Commission*, 192 F. 2d 29 (App. D. C. 1951).

plexities of electromagnetic radiation from V-type antennae,[308] the properties of double-tuned coupled resonant circuits,[309] or the presence or absence of a "sync transforming means" in a television receiver or a patent disclosure.[310] Mr. Justice Frankfurter once protested:

> It is an old observation that the training of Anglo-American judges ill fits them to discharge the duties cast upon them by patent legislation. The scientific attainments of a Lord Moulton are perhaps unique in the annals of the English-speaking judiciary. However, so long as the Congress, for the purposes of patentability, makes the determination of originality a judicial function, judges must overcome their scientific incompetence as best they can. * * *[311]

Neither partisan nor court appointed experts solve this problem. The partisan expert has been much criticized—and with reason. A "battle of experts" is far from an expeditious way to resolve technical controversy. Court-appointed experts have been used sparingly, and experience with such experts to date has not stimulated any movement to promote their more general employment.[312]

Special trial or appellate courts with jurisdiction confined to patent cases are not the answer to this problem. To be sure they offer some advantages, particularly the opportunity to staff them with judges of demonstrated experience and interest in technical and patent matters. And the use of such judges within the framework of some special trial or appellate court would prevent what is now possible—a case passing through both the trial and appellate courts to ultimate disposition without the participation of any judge with interest and facility in the subject matter involved.

Any specialized court proposal, however, introduces its own difficulty. Such court, whether trial or appellate, would tend to channelize the patent law into its own peculiar lines divorced from the development of the law as a whole.[313] In many respects the patent law already suffers from an excess of specialization, which would only be exaggerated by a special court or courts. Closely coupled with this difficulty is the fact that patent cases frequently involve questions of confidential disclosure, unfair competition, trademark infringement, antitrust law, and contracts.[314] To channel all of these questions—often involving issues of local law—to a specialized patent court is of doubtful soundness. On the other hand, their separation at the appellate level seems clearly impractical if they are joined (as they must be) at the trial level.

Possibly some modified arrangement might assure the participation of judges of technical competence in patent cases and at the same time preserve the benefits of decision making by a judiciary having continuing general experience. One such arrangement might consist

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[308] *Mackay Radio and Telegraph Co.* v. *Radio Corp. of America*, 306 U. S. 86 (1939).
[309] *Marconi Wireless Telegraph Co. of America* v. *United States*, 320 U. S. 1 (1943).
[310] *Hazeltine Research Inc.* v. *Avco Mfg. Corp.*, 227 F. 2d 137 (7th Cir. 1955).
[311] Dissenting in *Marconi Wireless Telegraph Co. of America* v. *United States*, 320 U. S. 1, 60 (1943). And see the comment of Judge Learned Hand in *Parke-Davis & Co.* v. *H. K. Mulford Co.*, 189 Fed. 95, 115 (S. D. N. Y., 1911). See testimony of Judge Learned Hand at pp. 132, 133, hearings October 10–12, 1955, pursuant to S. Res. 92.
[312] See testimony of Judge Learned Hand, footnote 311, supra.
[313] "I think it might be desirable to have one court of patent appeals provided, with this proviso, and I for myself would regard it as absolutely critical, that is, that it should be a rotating court. I do not want to have a court of specialists, because we all get in love with ourselves." Judge Learned Hand at p. 132, hearings, footnote 311, supra.
[314] See, e. g., *Colgate-Palmolive Company* v. *Carter Products, Inc.*, 230 F. 2d 855 (4th Cir. 1956) (confidential disclosure issue in patent case); *Kobe, Inc.* v. *Dempsey Pump Co.*, 198 F. 2d 416 (10th Cir. 1952) (monopolization under the Sherman Act involved in patent case).

of a single court of patent appeals which would sit as a separate court only in appeals from Patent Office ex parte and interference decisions. As to all other appeals involving patent questions, the members of such court could disperse and sit individually with two regular court of appeals judges in the respective circuits. An arrangement along this line would assure the participation of a technically trained judge at the appellate level in every patent case and yet would give such judge only a minority voice in the decision-making process. Moreover, the judges of the court of patent appeals would bring to bear on Patent Office appeals a continuing experience in patent infringement and related questions. The principal disadvantage of such a scheme—in addition to the mechanical problems it necessarily entails—lies in the risk that the "patent member" of a court of appeals panel would tend to dominate patent decisions.

Still another variation is found in the possibility of having district judges in each circuit of technical competence and experience for special assignment to technically complex patent cases.[315] This can be done in considerable measure within the confines of existing legislation. Indeed, the fact that the proposal has not been tried more frequently—or a movement started to assure the specific appointment and assignment of such judges—indicates that the courts and the bar do not consider the problem of technical knowledge as acute as the above discussion suggests.[316]

Of two things we can be positive. First, all suggestions to bring to patent litigation both judges of technical experience and competence and judges of continuing general experience necessarily impose their own mechanical and other problems. Second, a detailed and thorough investigation should precede the consideration of any legislation, for it is by no means certain that the matter really warrants legislative treatment and it may well turn out upon full inquiry that the present jurisdiction of the courts is superior to the alternatives.

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From its inception, the United States patent system has been based on enforcement of patent rights by the Federal courts of general jurisdiction. For over a century and a quarter the number of patent cases by the Supreme Court itself was comparatively large—and it is in these decisions that we find virtually all of the present doctrines relating to patent infringement, much of the law on the invention question, and most of the equitable doctrines applicable to patent cases. Experienced patent advocates are virtually unanimous in the belief that the patent system has been strengthened by the participation of a judiciary of general jurisdiction in the decision making process.

Moreover, serious patent litigation problems of the past have now receded into history. At one stage the Supreme Court backlog reached a hopeless figure—with the consequent opportunity for excessive delay at the Supreme Court level in patent controversies—but this problem has been largely eliminated by more general discretionary jurisdiction. The abuses incident to trial by deposition under the old equity rules have been largely eliminated by the Federal rules of civil procedure. The opportunity of the patent owner to make infringement threats—and even file suit—without giving the accused

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[315] See, e. g., hearings, October 10–12, 1955, pursuant to S. Res. 92, p. 131.
[311] See, e. g., hearings, op. cit., footnote 315, supra, at p. 133.

infringer the right to an adjudication has been eliminated by the declaratory judgment statute.

Today we have a modern crop of problems. On the one hand patent plaintiffs are said to receive too little justice too late. We hear also that patent defendants are subjected to excessive expense and difficulty in defending themselves. The very presence of these somewhat inconsistent complaints indicates that the solution does not lie in additional statutes, but rather must rest on court discretion. Where litigants—be they plaintiffs or defendants—transgress the bounds of reasonableness in discovery technique, trial conduct, and the like, the courts have ample power to penalize the conduct involved. Moreover, there is no reason to believe that courts with this power, a disposition and ability to use pretrial conferences, summary judgment, and other procedures to oversee both the discovery and trial stage of patent litigation, and not burdened with overly crowded dockets, will fall short of effectively policing the activity of patent litigants and arresting activity of the kind that unnecessarily prolongs patent litigation or adds to the expense. In short, the resolution of these current problems lies in close judicial supervision under the authority now available—not in attempt to define by legislation what is fundamentally a matter turning on specific fact situations.

Proposals for a single court of patent appeals or other specialized patent infringement courts staffed by a segregated group of judges present apparently insuperable jurisdictional problems of accommodating the related nonpatent questions arising in patent litigation. In addition they run counter to the virtually unanimous belief that patent controversies are best handled by a nonspecialized judiciary. While there is some possibility that an arrangement might be devised to assure the participation of technically trained judges in patent cases in conjunction with judges without such training, any consideration of proposals of this kind must be undertaken with full recognition of the possibility that after all the alternatives are considered the present arrangement will emerge and be found most satisfactory.

CONCLUSION—A DECADE OF THE PAST, AND A DECADE OF THE FUTURE

In 1945 Dr. Vannevar Bush, Director of OSRD, reported to the President on a program for postwar scientific research.[317] He there stated:

> Research is also affected by the patent laws. They stimulate new invention and they make it possible for new industries to be built around new devices or new processes. These industries generate new jobs and new products, all of which contribute to the welfare and the strength of the country.
>
> Yet, uncertainties in the operation of the patent laws have impaired the ability of small industries to translate new ideas into processes and products of value to the nation. These uncertainties are, in part, attributable to the difficulties and expense incident to the operation of the patent system as it presently exists. These uncertainties are also attributable to the existence of certain abuses, which should be corrected. They have led to extravagantly critical attacks which tend to discredit a basically sound system.[318]

The years since this report have seen vigorous enforcement of the antitrust laws that has gone far to eliminate the abuses referred to by Dr. Bush. Anti-competitive patent licensing practices, cartel agreements, coercive package licensing, and other activities have been prohibited. Indeed, virtually every one of the examples of abusive patent practices of current interest at the time of Dr. Bush's report has since been the subject of a consent decree, a litigated decree, or has turned out to be unsupported on the facts.

Concurrently with this development a new competition has become dominant. No longer can the businessman make the same old thing the same old way. Rather, he must compete in research and development as well as in price, production, and service. The patent system has stimulated this trend. First, it imposes an ever-present risk of sudden obsolescence by reason of a technology developed by an actual or potential competitor, coupled with the chance that the competitor may refuse to grant patent licenses. Second, the patent system encourages competitive effort of a kind that would not otherwise take place. The television industry, for example, was for all practical purposes nonexistent a decade ago—now it dwarfs the radio industry from whence it came. Yet the industry is characterized by huge research expenditures in advance of any monetary return—over $65 million in color television already and the return is yet to come. These expenditures have been made in anticipation of monetary return through patent license royalties. The antibiotics industry, limited to penicillin a decade ago, is now the scene of the most intense competi-

[317] Science, the Endless Frontier.
[318] Id. at p. 16.

tion revolving around the development and marketing of new products. Today the industry is engrossed in a new competitive race to develop improved tranquilizers.

It is particularly significant that the new competition is not confined to the huge industrial giants that first appreciated the potentialities of research. Rather—through the operation of the patent system—the small company and the newcomer has been able to gain a foothold without being subject to appropriation of developments by the larger entrenched firms. Polaroid, Thiokol, Mallory, and many others, represent small and modest sized businesses which have launched new products against the competition of an existing industry. Such activity creates both a new commercial product or process and a new competitive entity. The examples may be multiplied endlessly.

This competitive order should be a matter of pride, but not complacency. The decade ahead should be devoted to its improvement.

A particularly crucial area is found in the Patent Office budget. The tempo of the Patent Office should match the pace of technical development. No amount of effort by a dedicated corps of examining personnel can maintain both quality and quantity when flooded with an overwhelming volume of work. This is a matter of first importance. Steps have been taken in the right direction, for a more adequate budget has been put into effect and a long-term plan of action is being executed. For the benefit of the public, manufacturers, and patent applicants, the Congress should give its sympathetic and sustained aid to the Patent Office in overcoming the backlog.

An increased level of Patent Office operations will doubtless reduce the patent mortality in the courts. Only time can tell us the extent of the improvement. In the meantime attention should be directed to other matters, such as relieving the load of defensive patent applications, equitably overcoming the problem of delayed patent issuance, and the like. And, over-all, there should be a continuing effort to devise simplified procedures for obtaining and enforcing patents.

Finally, we need a reorientation in concepts. It ought not to be necessary endlessly to defend the patent system against the stigma of "monopoly," when it is in fact a source of competition. It should not be assumed that every time an excuse is found to invalidate a patent, competition somehow necessarily benefits. It ought not to be necessary to indulge in endless argument over whether the patent laws or the antitrust laws ought to prevail when both serve the same end of maintaining competition and we should be looking for ways to make both more effective. This is the real opportunity of the times. If the patent system can be made to do more effectively what it is already doing, patent issues are treated in their proper perspective, and the antitrust laws continue to be enforced, we can look forward to a future of technical progress within the framework of a competitive order.

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