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1963 Federal Tax Proposals Affecting Research and Industrial Property Rights

JOHN F. CREED*

THE ADMINISTRATION HAS RECOMMENDED that a substantial revision of the federal tax structure be accomplished in the current year. This report will outline and comment upon those proposals relating to research activities and the disposition of patents and other industrial property rights.

As of the date of this writing, the various tax recommendations made by the Administration have not yet been formalized in a legislative bill for presentation to Congress; rather, they are to be found in merely descriptive form in the President's Tax Message of January 24, 1963, as amplified by Secretary Dillon's Statement before the Ways and Means Committee on February 6, 1963 and by Technical Implementation submitted to the Committee on that date.

RESEARCH AND DEVELOPMENT

Under Section 174 of the Internal Revenue Code, the taxpayer may elect to deduct research and experimental expenditures in the year incurred.[1] Amounts expended for depreciable property and equipment used for research, however, do not qualify for such election. The 1963 proposals would make such outlays eligible for current expensing, subject to the conditions discussed below.

More specifically, this liberalized treatment would extend to equipment used in "research and development." In this connection, the Technical Implementation provides:

> "Research and development would include basic and applied research in the sciences and engineering and activities designed to develop new products and processes or substantial innovating improvements in present products or processes. Research and development would not include, however, the design and development of prototypes, pilot plants, and processes which are intended to be, or are, sold or put into use for the production of a product to be sold or marketed. Research and development would also exclude quality control, routine product testing, market

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[1] Alternately, the section permits the amortization of such costs over a period of at least 60 months.

research, sales promotion, legal services, and similar nontechnological activities."[2]

The general rules governing the new deduction would be the following:

(*1*) The equipment must be used directly and exclusively in research and development.

(*2*) The equipment must be special research equipment; assets for general purpose use or supporting assets would not qualify. Illustrative of such nonqualifying assets would be general office equipment and furniture of a type used elsewhere in the business; transportation and communications equipment of a type used elsewhere in the business; and depreciable property attached to a building and necessary for the operation of machinery or the comfort, safety, or health of personnel, if of a type used elsewhere in the business.

(*3*) To qualify for deduction, buildings and equipment must be eligible for the investment credit.[3]

(*4*) No deduction would be allowed for equipment used in performance of a federal contract.

Certain mitigating exceptions to these rules would obtain with respect to companies with small R&D budgets. For such companies, expenditures for equipment used directly in research and development could be expensed subject to the following conditions:

(*1*) The deduction would be limited to 4 percent of total research and development expenditures and in no case could exceed $20,000.

(*2*) General purpose equipment, buildings and improvements would not qualify for deduction.

(*3*) If equipment is used less than 100 percent but at least 50 percent for research and development purposes, 50 percent of its cost would be deductible.

(*4*) So long as research and development equipment is not used exclusively in performing a federal contract, it would qualify for deduction.

Comment

The proposal to allow current expensing of research and development equipment would seem clearly in the public interest. It would

[2] Ways and Means Committee Print, p. 96 (1963).

[3] For a discussion of the investment credit, see Robert B. Bangs, "Effect of Federal Tax Legislation on Owners of Patents and Related Property, *PTC J. Res. & Ed.*, Vol. 6, No. 3 (Fall 1962), pp. 368-371.

appear, however, that the general rules are entirely too restrictive in requiring:

(*1*) That the equipment be used exclusively in research and development; and

(*2*) That the equipment cannot be used to any degree in performing federal contracts.

A liberalization of these requirements would appear advisable if the measure is to have the desired impact upon research and the economy.

SALE OF A PATENT

Subject to various conditions, Section 1235 of the Internal Revenue Code entitles both the amateur and professional inventor to capital gains on the sale of a patent (or an undivided interest therein). This treatment is also available under the section to individuals who invest in the invention prior to its actual reduction to practice.[4] Certain patent sales not qualifying under Section 1235 may possibly be eligible for capital gains under the general capital gains provisions of the Code.

The new proposal would deny capital gains to an inventor whose personal efforts created the patent that is sold. It would do so by repealing that portion of Section 1235 that applies to the inventor, and by amending Sections 1221 and 1231 so as to make the patent in the inventor's hands a non-capital asset.

Comment

A principal motive of Congress in enacting Section 1235 in 1954 was "to provide an incentive to inventors to contribute to the welfare of the Nation."[5] It would seem that it is today more important to maintain this incentive than ever before. Certainly it is paradoxical for the Administration to seek the removal of this incentive while at the same time attempting to stimulate research activity through a liberalization of Section 174.

Actually, the proposal would do more than eliminate the special preference bestowed upon inventors by Section 1235, for the amendments to Section 1221 and 1231 would operate to deny inventors the benefits to which they are entitled under the general capital gains provisions, without reference to Section 1235.[6] Thus, in a very real

[4] For a detailed analysis of Section 1235, see John F. Creed and Robert B. Bangs, "Federal Taxation of the Inventor," *PTC J. Res. & Ed.*, Vol. 2, No. 4 (Dec. 1958), p. 505.

[5] S. Rep. No. 1622, 83rd Cong., 2d Sess., p. 439 (1954).

[6] A patent qualifies as a capital asset in the inventor's hands if it is *not* held primarily for sale to customers in the normal course of his trade or business.

sense, the enactment of the measure would work an actual discrimination against inventors in terms of capital gains eligibility.

It should be noted that individuals investing in inventions and patents would be unaffected by the proposed legislation. They would continue to qualify for capital gains on the sale of such property, either under Section 1235 or otherwise under the general capital gains law.

INCOME AVERAGING

Section 1302 of the Code permits the inventor under certain restricted circumstances to spread over several taxable years the ordinary income concentrated in one taxable year.[7] It is now proposed that this section, and the various other income averaging provisions of special application set forth in Sections 1301-1317 of the Code, be replaced by a single income averaging formula that would apply generally to all taxpayers with widely fluctuating income.

A taxpayer would be eligible to use the averaging provisions if:

(*1*) His taxable income for the current year exceeds 133⅓ percent of his average annual taxable income for the prior four years; and

(*2*) Such "excess amount" exceeds $3,000.

If these conditions are met, the taxpayer could elect to pay a tax on such "excess amount" that would approximate the tax due had that amount been spread over the five year period comprised of the current year and the prior four years.

Comment

The proposed income averaging provisions could prove of material benefit to inventors, as well as to authors, actors, athletes, attorneys and other groups whose income from year to year is susceptible to wide variation. These provisions would appear to represent a substantial improvement over the melange of narrow and complex rules of special application presently found in Sections 1301-1317 of the Code.[8]

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[7] It is required: *1*) that the work on the invention cover at least 24 calendar months; and 2) that the gross income in the taxable year constitute at least 80 percent of the aggregate of the gross income received in the taxable year, all prior years, and the year following the taxable year. If these conditions are met, the total income from the invention may be allocated ratably over the period from the beginning of the work to the end of the taxable year, such period not to exceed 60 months.

[8] It should be noted that enactment of the proposal would likely mean the repeal of Section 1304 of the Code, which for purposes of computing tax permits the allocation of compensatory damages back over the period in which the patent infringement occurred.

CONTINGENT FUTURE PAYMENTS

Current law permits capital gains on the sale of capital assets in circumstances in which the seller receives continuing payments that are contingent on the productivity, use or disposition of the transferred property. Perhaps most illustrative of this arrangement is the sale of patent rights in consideration of periodic payments measured by the transferee's sale of the patented product over the life of the patent.[9] It is now proposed that payments on the sale of a capital asset be taxed as ordinary income if deferred over a period of more than five years and if contingent on the productivity, sales, profitability, use or disposition of the transferred asset.[10]

In situations in which a capital asset is sold for fixed *and* contingent payments, ordinary income treatment would apply only to the latter. In this regard, the amount of minimum annual payments required under a continuing royalty sale of a patent or like property would be construed as a fixed payment, and hence would be entitled to capital gains treatment.[11]

Comment

The proposed legislation, if enacted, would likely have its principal application to the sale of patents, trademarks, know-how and like property. This would appear to be a harsh result, since the very nature of these assets frequently dictates that their sale be in consideration of contingent periodic payments. In enacting Section 1235, Congress expressly recognized this fact in observing that "due to inherent difficulties, a royalty type of arrangement is the reasonable way . . . to sell a patent."[12]

The theory underlying the proposal to deny capital gains is that, in transferring an asset in consideration of future payments contingent on sales, disposition, or use, the transferor "is able to continue to enjoy the principal right of ownership—participation in the income produced by the asset."[13] This is but a revisitation of the argument in which the Commissioner persisted for nearly ten years with respect to royalty sales

[9] See, e.g., Edward R. Meyers, 6 T.C. 258 (1946).

[10] The seller would be entitled to recover his basis in the property before becoming subject to tax.

[11] It is also proposed that if a contract for the sale of any asset fails to designate as interest any part of payments that are deferred for more than one year, or if the designated interest is unrealistically low, the contract would be construed as designating a reasonable amount of interest.

[12] S. Rept. 1622, 83rd Cong., 2d Sess., (1954), p. 439.

[13] Ways and Means Committee Print, p. 149, (1963).

of patents,[14] notwithstanding his consistent defeat in the courts.[15] It is the same argument that Congress repudiated in enacting Section 1235.

CONCLUSION

Enactment of the 1963 federal tax proposals could have a fairly significant impact upon research and invention. Certain of the implications are favorable. The suggested extension of Section 174 to cover current expensing of research and development equipment is especially to be commended. And passage of the income-averaging provisions could prove a source of real encouragement and advantage to inventors.

In the area of capital gains, however, the proposals would seem to be of questionable merit. To deny the inventor capital gains on the sale of a patent would be not merely to eliminate the special incentive to invention created by Section 1235, but to discriminate against inventors in terms of the general law of capital gains. The proposed ordinary income taxation of long-term contingent payments received in selling patents and similar assets rests on an argument the validity of which has already been rejected by both the courts and the Congress. It is difficult to understand how these two proposals can form a part of any equitable tax reform; and it is virtually impossible to reconcile them with the objective of promoting research and invention which underlies the proposed revision of Section 174.

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[14] See Mimeo. 6490, 1950-1 C.B. 9, which took the position that such transfers effected not a sale but a mere licensing of the patent.

[15] See, e.g., Leonard Coplan, 28 T.C. 1189 (1957).

Access To The European Patent

D. A. WAS*

IT IS QUITE UNDERSTANDABLE that the initiative to create a European patent has aroused a considerable interest, not only within the countries adhering to the Rome Treaty which took that initiative, but also outside that area. For a European it is particularly gratifying to notice how much sincere attention is being given to the subject in the U.S.A. leading to profound discussions on the merits of the proposed Convention elaborated by the so-called Haertel Committee. Since almost every interested organization in Europe is at present studying this proposal with a view to commenting thereon, such European organizations will undoubtedly benefit by, and consider in their reports, the results of the analysis undertaken in the U.S.A.

Apart from the host of technical problems involved in the creation of a supranational patent system which will set the pattern for European patent protection for a very long time to come, and which therefore needs the incorporation of the most modern concepts, there are a number of subjects which have a definite political flavour. Of those, the problem of the accessibility of the European patent, viz. the question who will be entitled to seek and obtain a European patent, springs to the fore, and it seems certain that it is this problem which has a fascinating appeal for the American inventor and American industry.

The fall issue of 1962 of this *Journal* contains an article by Gerard J. Weiser on this subject, which in all its concision essentially analyzes this particular problem. There seems room, however, for some additional remarks on the subject which may be useful in clarifying some points and may thus be of some use in further discussions on the subject in the U.S.A. The aim of the present contribution is to make such additional points, as seen from the European side.

It seems that the question of accessibility presents two main problems:

1. What is the use of restricting such accessibility?
2. Is such restriction compatible with the obligations under Article 2 of the Union Convention of Paris?

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However illogical it may seem, it is probably more useful to start with the second question.

I. ARTICLE 2 OF THE UNION CONVENTION OF PARIS

The article by Mr. Weiser already contains an extensive bibliography on this subject, but it can be said that none of the contributions listed has treated the subject exhaustively. Since then, and very recently, two more contributions have been made, which are to be found in the March issue of *La Propriété Industrielle*. In that issue two conflicting opinions are presented: one by Professor Eugen Ulmer of Munich University, who supports the opinion now often heard in the U.S.A., that restricting access to the European patent to nationals of the contracting states would violate Article 2 of the Paris Convention, and the other by Mr. Albert Colas, a well-known patent agent in Paris, who expresses the opinion that Article 2 has no bearing on supranational legislation.

It is by no means the present writer's intention to take sides in this controversy, but some remarks of a certain pertinency may be made here.

The classic example of a treaty which restricts accessibility is the Madrid Arrangement for the International Registration of Trade Marks, which however does not involve the question of assimilation to nationals as only the latter's national registration can be used as the basis for subsequent international registration. A better example therefore is the Hague Arrangement for the protection of designs and industrial models. However, as Professor Ulmer points out, this Arrangement does not institute substantive rights which are different from those obtainable through national registrations. Therefore the restriction of accessibility does not withhold from the nationals of non-member states any substantive right which could not be acquired by following the route of national registration. Consequently, following Professor Ulmer's approach, restricted accessibility to the European patent would only be permissible if nationals of non-contracting states would be able to obtain the same patent rights by filing national applications as the nationals of the contracting states would by filing European patents. Comparing the draft treaty with the existing national legislations in the contracting states will soon show that this is not so.

However, in the exchange of views at present taking place in the U.S.A., perhaps too little attention has been given to the efforts to harmonize the national patent legislations in accordance with the

same principles expressed in the draft treaty for the European patent. A draft treaty has been worked out by the Committee of Experts of the Council of Europe, aiming at harmonization of the conditions for patentability and of the scope of the protection to be afforded by national patents. The stipulations of that draft treaty are in essence identical with those contained in the draft for the European patent system. As it can be foreseen that the said Convention of the Council of Europe, the so-called Strasbourg Convention, will be ratified well before the treaty on the European patent, it may well be that reliance upon Article 2 of the Paris Convention may turn out to be a rather blunt weapon in the hands of those who want to protest against any restricted accessibility to the European patent.

Of course, if the views expressed by Mr. Colas were to be accepted, there would be no argument at all against such restricted accessibility. One must say, however, that his approach invites the consideration of a further problem, viz. whether in the various countries international treaties, and in particular those instituting supranational legislation, are assimilated to national legislation or not.

II. THE RESTRICTION OF ACCESSIBILITY

Obviously the emotional aspect of the restriction of accessibility to the European patent may look quite different when viewed from the angle of nationals of the contracting states and from that of anybody who is outside. The more so as the Convention instituting the European patent constitutes perhaps the most important development in the realm of patent protection since the creation of the Paris Union.

The Drafting Committee have considered both restricted and unrestricted accessibility and have not expressed their opinion on which course ought to be taken. This is quite understandable, as the draft convention has a hybrid character in that, although formally it is open to adherence by any other state, its substantive content is such that such adherence can hardly be anticipated. In this connection reference may be made to the stipulations regarding the free flow of goods as found in Article 20a (1) and 29 (2) and the regime foreseen for compulsory licensing, where the criterion of satisfying the markets of the combined territory of the contracting states has been introduced.

It goes without saying that a real Common Market patent should in due course of time take the place of the existing national patents, and therefore such Common Market patent should be accessible in the same measure as holds for the national systems. However, for industry a Common Market patent is to be considered less attractive than a

European patent which extends to more countries than are at present co-operating under the Treaty of Rome. It is in the interest of industry to obtain uniform protection in a maximum number of countries by a single instrument. Moreover the added efficiency of a Common Market patent over the present national protection in the six member states of the Common Market is hardly existent, now that the Netherlands is introducing the "examen différé" into its national legislation, the enactment of which is at present well under way.

However that may be, attention should be given to three reasons for restricting accessibility, the validity of which should be considered. These three reasons are of a technical, financial and political nature respectively, and some remarks on each of those aspects will now be made.

A. *Technical Reasons*

The problems involved in the creation of a new supra national administration for dealing with the examination and grant of European patents and the jurisdiction pertaining thereto should not be underrated. On the other hand, quite obviously a start should be made as soon as possible, and it is in this context that restricted accessibility will greatly relieve the new administration at the outset of their task. The draft agreement anticipates that the new system will come into operation stepwise, that is to say, by successively declaring admissible certain domains of technology. Here we are confronted with another kind of discrimination as between one type of industry and another. It is therefore understandable that this particular prescription has not been given a very enthusiastic reception.

B. *Financial*

Unlike the U.S. system, those prevailing in Europe are almost completely financed by the payment of annuities for granted patents, and this is especially the case in the so-called examination countries, as the filing fee is only a fraction of examination costs. It must be anticipated that until the day, which may be 20 years off, that sufficient European patents have been granted, the contracting states will have to finance the considerable deficit of the new administration. It therefore seems a valid consideration to reserve the benefits of the new system to the nationals of those states which are willing to contribute financially to the new arrangement.

C. *Political*

In the event that, as is hoped by European industry, the new European patent will extend over considerably more countries than

the six of the Common Market, an incentive to adhere should be given to those other countries, which might be in a position to join the scheme. However, if the nationals of such other states could have access already as foreseen by the first alternative of Article 5, it must be anticipated that such countries would show considerable hesitation in doing so. Restricted accessibility would therefore serve to give such an incentive.

III. FINAL REMARKS

As Mr. Weiser has very pertinently pointed out, restricted accessibility will entail an obligation on the part of the contracting states to maintain their own national legislation in force. It can be said, however, that at present no one would like to speculate on an early abandonment of such national systems for protection; first sufficient experience should be gained with the European system before such measures could be contemplated. In this connection it should be appreciated that whereas American industry developed in one extensive market, the reverse is true with respect to most of the European industries. Here industry has grown within national markets of far more restricted scope, and more often than not behind protective tariff barriers, and is now confronted with the creation of a supersize market. Obviously it needs a transitional period to adapt itself to that new environment and before this necessary adaptation has occurred, it would not be very prudent to contemplate the abolition of national protection.

One very important point should be made clear. If in Europe a considerable exchange of views is taking place on the subject of restricted accessibility—and very often the point of view is sympathetic towards such restriction—it is always understood that ultimately accessibility should not be made subject to any restrictions. The whole discussion centers about the problems arising from accessibility as they will exist from the outset of the application of the new scheme and for a number of years thereafter. There is no question that ultimately the European patent should be obtainable for everybody who so desires.

There is one more important aspect of the problem of accessibility. Article 212 of the draft treaty introduces the concept of adhesion to the treaty as distinct from adherence. It might very well be that countries which for sundry but valid reasons could not become full members of the treaty, but which understood the philosophies underlying a restricted accessibility, would wish to associate themselves with the European convention so as to obtain access for their nationals. One of the conditions which could be anticipated in such event would probably be financial assistance towards the costs of the new adminis-

tration. As such association would have to be arranged through an agreement between the contracting states and the prospective associating state, the former would probably take the standpoint that they could only accept as associated states those which they felt could not be expected to become full members, e.g., because they were too far removed from the European scene, or had economies which could neither be integrated nor associated with the Common Market. On the other hand, if such a country could be considered as fulfilling the conditions for becoming a full member instead of an associate, it might then well be that the contracting states would not be willing to enter into an association agreement with that particular state. It seems that the U.S.A. would be a major representative of the first group. Therefore the above considerations are here presented because not only has the problem of accessibility more aspects than have hitherto found full consideration in American literature[1], but the draft treaty seems to hold possibilities which could usefully be further explored by our friends on the other side of the Atlantic.

[1]See, however, Michael N. Meller, "Toward a Multinational Patent System," *Journal of the Patent Office Society,* Vol. 44, No. 4 (April 1962), pp. 227-273.

Introduction to the Japanese Patent System

KOTARO OTANI*

THE PROTECTION OF INVENTIONS IN JAPAN began in 1871 and a modern patent law was established in 1885. This law, which was enacted 78 years ago, may be said to be the basis of the current Japanese Patent Law. A trademark law was enacted in 1884, a design law in 1889 and a utility model law in 1905. The above four laws constitute the Japanese industrial property laws. Thereafter, these laws were revised several times and the 1921 laws were in force until March 31, 1960. On April 1, 1960 the present laws took effect, with some major changes over the prior laws.

Since I have examined patent and utility model applications in the Japanese Patent Office, I would like to discuss some of the features of our Patent Law and Utility Model Law, with special emphasis on the Patent Law.

First I would like to mention the major distinctions of our Patent Law as compared to the United States Patent Law.

PRINCIPLE OF FIRST APPLICATION

In current patent systems in the world, generally one of two principles governs the cases where two or more patent applications are submitted for the same invention. One is a principle of first invention and the other is a principle of first application. Our system has adopted the principle of first application. On this point our Patent Law says the following:

> (First application)
>
> ARTICLE 39. 1. In case two or more patent applications for the same invention are filed on different dates, only the earliest applicant may obtain a patent for the invention.
>
> 2. In case two or more applications for the same invention are filed on the same date, only one applicant agreed upon by these applicants may obtain a patent for the invention. In case no agreement is reached or a consultation between the applicants concerned cannot be arranged, neither of them may obtain a patent for the invention.

In the case of above paragraph 2, the Director-General of the Patent

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Office orders the applicants to arrange a consultation (paragraph 7 of Article 39). Such cases are actually rare. However, the following case occurs sometimes. That is to say, an applicant files two or more patent applications on the same date, thinking that the inventions in the applications are slightly different, but on examination an examiner recognizes the inventions to be substantially the same. In this case, the above paragraph 2 may be applied to give the applicant an opportunity to select only one application.

PUBLIC ANNOUNCEMENT OF APPLICATION AND OPPOSITION SYSTEM

We have a strict examining system quite similar to that of the United States. Under our examining procedure applications are opened for public inspection after the examination is conducted favorably to the applicant, with a two-month opposition period. The opposition period begins on the date of the public announcement of the application. As for the procedure, Article 51 and Article 55 say the following.

> (Public announcement of application)
> ARTICLE 51. 1. The examiner shall, in case he does not find any reason for rejecting a patent application, render a ruling to the effect that a public announcement of the application shall be made.

A public announcement is made in the *Patent Gazette* as a patent application publication.

> (Filing of opposition)
> ARTICLE 55. Within two months from the date of the public announcement of the publication, any person may file an opposition thereto with the Director-General of the Patent Office.

In cases where an opposition is filed, the basis for the opposition usually is examined by the same examiner who examined the application and decided to have it published. The number of oppositions per one hundred patent publications averaged eighteen in 1962 and the number of patent applications rejected as a result of opposition was about six per one hundred patent publications.

UTILITY MODEL SYSTEM

Japan is among the few countries of the world that have a utility model system. The Japanese system differs from that of West Germany in that an examining procedure for the utility model applications similar to the one for patent applications has been adopted in Japan but not in West Germany.

A utility model, similar to a patent, is concerned with the creation of technical ideas and differs completely from a design which is con-

cerned with the esthetic feeling through the sense of sight. The difference between a patent and a utility model depends on how highly the creation of technical ideas is advanced. A utility model may be considered, so to speak, as a small invention, whereas a patent may be said to be granted for a larger invention. For a small invention which will be protected by a utility model, we use the term "device" in our Utility Model Law, distinguishing from an "invention" protected by a patent. However, as a matter of fact, the border line between an invention and a device is, of course, very difficult to explain in abstract terms. It would become clearer if many actual examples of patents and utility models registered in the past were available to you.

One more thing I have to mention is that a utility model will be registered only for a device, namely, an improvement of an article relating to its shape, structure, or a combination thereof. Therefore, an improvement relating to method, process, chemical composition, a material, etc. cannot be registered as a utility model. This is also one of the points distinguishing a utility model from a patent. The procedure for prosecuting utility model applications, including oppositions, is nearly identical to the one for patent applications with only a few exceptions.

In Japan the utility model system is very popular and utility models exceed patents in terms of both applications and registrations. However, applications from foreign countries are nearly all for patents and only a few of them are later changed into utility model applications. (Such a change is permitted according to Article 8 of the Utility Model Law.)

I mentioned above some of the main characteristics of our patent system. Now, I would like to explain several additional points, particularly stressing those differing from the United States Patent Law.

A. *Requirements for Patentability*

Article 29 describes the main requirements for patentability of an invention as follows:

> (Requirements for patentability of an invention)
> ARTICLE 29. 1. Anyone who has made an invention which can be utilized in industry may obtain a patent therefore, except such inventions as mentioned below:
> (*1*) An invention which was publicly known in Japan prior to the patent application.
> (*2*) An invention which was publicly worked in Japan prior to the patent application.
> (*3*) An invention which was described in a publication distributed in Japan or in a foreign country prior to the patent application.

> 2. As to an invention which could have been easily made, prior to the patent application, by a person who has an ordinary knowledge in the technical field to which the invention belongs on the basis of the inventions mentioned in any item of the preceding paragraph, a patent shall not be granted for such invention, notwithstanding the provisions of the same paragraph.

As our system has adopted the principle of first application as I mentioned before, the judgment of novelty of an invention is based upon the filing date of the invention.

In our old law prior art was limited to publications and public knowledge existing in Japan, but, in our current law, it has been expanded to include publications existing in other countries as well. This provision was possible because modern transportation and communication in the world have been greatly developed.

Paragraph 2 concerns the inventive step, corresponding to section 103 in the United States Patent Law.

B. *Unpatentable Inventions*

Even though inventions may fulfill the requirements prescribed in Article 29, those prescribed in Article 32 are not granted patents by reason of public benefits or industrial policy in Japan.

> (Unpatentable inventions)
> ARTICLE 32. The inventions as mentioned below shall not be patented, irrespective of the provision of Article 29.
> (*1*) Inventions of foods, drinks or fancy edibles.
> (*2*) Inventions of medicines (viz. things used for diagnosis, cure, medical treatment or prevention of disease of human beings: hereafter referred to as "a medicine or medicines") or of the process to manufacture a medicine by mixing two or more medicines.
> (*3*) Invention of a substance to be manufactured by a chemical process.
> (*4*) Invention of a substance to be manufactured by the process of atomic transformation.
> (*5*) Invention which is liable to injure public order, good morals or public health.

As for the provisions of unpatentable inventions our system bears a strong resemblance to that of the German system. At this point our system is much different from the United States system in which medicines or substances manufactured by a chemical process may be the subject of a patent grant.

Of course, a method or process for manufacturing foods or drinks, medicines and chemical materials is patentable except for the process stated in the above paragraph (*2*).

As for plants, we have not yet granted patents, because it is our understanding that an invention should be capable of being repeated.

However, with respect to plants, it is still considered to be difficult to cultivate the same species repeatedly and successfully.

C. *Patent of Addition*

Like many countries, such as the United Kingdom, West Germany and France, we have a system of patent of addition. I hear that the United States also had this system until about one hundred years ago.

A patent of addition may be granted to the patentee, instead of an independent patent, for an improvement of the principal patent. As a patent of addition will accompany the principal patent, it exists, as a rule, for the duration of the principal patent. In the case that a principal patent has been invalidated the patent of addition becomes an independent patent.

The requirements for patentability of an invention of addition are described in Article 31 and are just the same as those for patentability of plural inventions in one application, which I am going to discuss in the following category.

D. *Claims*

In our old law only one claim was, as a rule, written in one application. (Strictly speaking, there was an exception to this, but it was rarely utilized because of its very strict application.)

In our current law we keep the principle of one application for one invention, but exceptions will be permitted in certain cases. These exceptions have become very popular now. They are based upon the concept that plural inventions which are closely related may be filed (claimed) in one application. But these relations are specifically regulated and differ from those in other countries such as the United States. The relations are described in Article 38.

> (One application for one invention)
> ARTICLE 38. One patent application shall be made for each invention. However, any inventions having any one of the following relations to one invention stated in the claim of a patent application (hereinafter referred to as "specified invention") may be filed in the same application with the specified invention.
>
> (*1*) An invention in which the substantial part of the matter indispensable for its construction is the whole or the substantial part of the matter indispensable for the construction of the specified invention and which serves the same purpose as that of the specified invention.
>
> (*2*) In the case where the specified invention is an invention of an object, an invention of a process of manufacturing the object, or an invention of a machine, instrument, equipment or other things for manufacturing the object.
>
> (*3*) In the case where the specified invention is an invention of a process, an invention of a machine, instrument, equipment or other things used directly for the working of the invention of the process.

The above-mentioned provisions of plural inventions may be considered as one of the outstanding features of our current law, but are probably so difficult to understand that I would like to show some examples below.

Examples under paragraph (*1*)

Example I

Claim 1. A welding rod comprising a core rod of special steel containing less than x% of A, less than y% of B and more than z% of C.

Claim 2. A welding rod comprising a core rod of special steel containing less than a% of A, less than b% of B, less than c% of C and more than d% of D.

Example II.

Claim 1. An ingot comprising element A and element B.

Claim 2. An ingot comprising element A and element B and having a shape of C.

Example III.

Claim 1. A method of manufacturing P comprising the process of reacting A with an acid.

Claim 2. A method manufacturing P comprising the process of reacting A with a salt.

Example under paragraph (*2*)

Claim 1. Metallic alloy R consisting of materials A and B as basic materials and less than 1% of C.

Claim 2. A method of manufacturing metallic alloy R comprising the steps of adding less than 1% of C to materials A and B, mixed melting and sudden cooling of the melt.

Example under paragraph (*3*)

Claim 1. A method of fluidized reaction comprising process step A and process step B.

Claim 2. An apparatus for practicing a fluidized reaction comprising the structure to operate the process step A and the structure to operate the process step B.

One application having plural claims may be filed only for a patent and not for a utility model registration. A utility model application can be made only for one device (Article 6 of the Utility Model Law).

E. *Applicant*

In the United States the applicant, as a rule, is the inventor. However, in Japan not only the inventor but also an assignee of the invention from the inventor may file a patent application.

F. *Duration of Patent Right and Renewal Fees*

The period of duration of the patent right is 15 years from the date of the public announcement of the application. However, it may in no case exceed 20 years from the date of filing. As for a utility model right, the period of duration is 10 years from the date of the public announcement of the application, not exceeding 15 years from the date of filing.

The patent fees from the first to the third year must be paid in a lump sum after a notification of the decision granting the patent is received by the applicant. The fee for the fourth year and thereafter must be paid in the previous year or prior thereto.

G. *Invalidation of a Patent*

In the United States a patent can only be invalidated in the law court. However, in our country it can be done only by a trial procedure at the Patent Office and not in the law court.

Those who are dissatisfied with trial decisions may appeal to the Tokyo High Court and then to the Supreme Court.

H. *Obligation of Working a Patented Invention*

In the United States Patent Law there is no provision on obligation of working a patented invention, but our Patent Law has such a provision, as many other countries have. In this connection our law says the following:

> ARTICLE 83. In case a patented invention has not been adequately worked continuously for three years or more in Japan, anyone who intends to work the patented invention may, with the permission of the Director-General of the Patent Office, request the patentee or the exclusive licensee to hold consultation on the grant of a non-exclusive license thereon.

I explained above some main points of the Japanese Patent Law, particularly emphasizing its differences from the United States Patent Law. Finally, I will mention very briefly the organizational structure of our Patent Office and some data from a recent statistical report of the Office.

THE ORGANIZATION STRUCTURE OF THE JAPANESE PATENT OFFICE

Our Office belongs to the Ministry of International Trade and Industry, which corresponds to the Department of Commerce in this country. We have six divisions, a Library and a Training School. The divisions are the General Administration Division, the 1st-4th Examination Divisions and the Trial Division.

STATISTICAL DATA

TABLE 1

NUMBER OF PATENT, UTILITY MODEL, DESIGN AND TRADEMARK APPLICATIONS

Year	Patents	Utility Models	Designs	Trade-marks	Total
1958	(7,896)	(1,145)	(176)	(2,016)	(11,233)
	38,519	70,719	17,124	37,858	174,219
1959	(9,613)	(997)	(329)	(2,008)	(12,947)
	41,537	68,102	26,368	38,230	174,237
1960	(11,587)	(1,069)	(440)	(2,712)	(15,808)
	43,484	63,077	24,536	39,089	170,186
1961	(13,659)	(1,383)	(347)	(3,138)	(18,527)
	48,417	65,685	23,462	37,458	175,022
1962	(16,101)	(1,264)	(309)	(3,642)	(21,316)
	60,127	81,858	28,283	43,985	214,253

Note: The figures in parentheses indicate the number of applications by foreigners.

TABLE 2

NUMBER OF PATENTS, UTILITY MODELS, DESIGNS AND TRADEMARKS REGISTERED

Year	Patents	Utility Models	Designs	Trade-marks	Total
1958	(3,358)	(519)	(120)	(1,825)	(5,822)
	9,972	16,479	13,890	23,768	64,109
1959	(3,346)	(659)	(87)	(1,245)	(5,337)
	10,278	18,208	14,109	18,156	60,751
1960	(3,576)	(708)	(223)	(1,282)	(5,789)
	11,252	22,102	15,883	20,516	69,753
1961	(7,376)	(864)	(175)	(1,415)	(9,830)
	20,946	34,234	11,931	20,119	87,230
1962	(5,070)	(652)	(183)	(2,005)	(7,910)
	15,703	29,016	17,346	23,763	85,828

TABLE 3

PERCENTAGE OF PUBLICATIONS OF APPLICATIONS

Year	Patents			Utility Models			Total of Patents and Utility Models
	Japanese	Foreigners	Total	Japanese	Foreigners	Total	
1958	0.37	0.68	0.44	0.41	0.71	0.41	0.42
1959	0.40	0.70	0.46	0.43	0.66	0.43	0.44
1960	0.45	0.73	0.51	0.49	0.70	0.49	0.50
1961	0.47	0.70	0.53	0.49	0.68	0.49	0.51
1962	0.51	0.83	0.56	0.49	0.64	0.50	0.53

Note: The percent of publications of applications is the number of public announcements decided divided by the number of public announcements decided plus the number of rejections decided.

TABLE 4

NUMBER OF PATENT APPLICATIONS AND REGISTRATIONS BY FOREIGNERS

Name of Country	Number of Applications					Number of Registrations					Rights in Force at the End of 1962
	1958	1959	1960	1961	1962	1958	1959	1960	1961	1962	
Canada	67	73	81	104	120	20	25	21	68	32	239
Denmark	32	31	39	56	56	20	11	6	25	39	154
France	367	393	458	578	613	99	116	167	331	253	1,317
Italy	151	152	193	286	327	30	48	47	88	86	371
Netherlands	359	460	586	605	681	131	147	152	394	277	1,453
Rep. of China	10	34	25	24	27	1	—	1	2	6	19
Sweden	136	175	193	211	258	69	71	55	142	86	666
Switzerland	576	725	804	853	899	192	227	223	540	350	2,316
U. K.	819	861	1,022	1,146	1,239	207	251	313	643	358	2,531
U. S.	3,508	4,470	5,437	6,519	7,782	1,621	1,582	1,738	3,426	2,441	15,338
West Germany	1,629	1,926	2,287	2,509	2,932	885	831	775	1,504	929	6,631
Others	242	313	466	768	1,167	83	37	78	213	213	892
Total	7,896	9,613	11,591	13,659	16,101	3,358	3,346	3,576	7,376	5,070	31,927
Percent	20.5	23.1	26.7	28.2	26.7	33.7	32.6	31.8	35.2	32.3	32.5
Grand Total	38,518	41,537	43,484	48,417	60,127	9,972	10,278	11,252	20,946	15,703	98,270

Note: Percent is against the grand total.

The 1st Examination Division consists of five sections and handles applications, registration, classification and examination of designs and trademark applications. The 2nd, 3rd and 4th Divisions consist of 17 sections which examine patent and utility model registration applications. The Trial Division handles appeals from adverse decisions by the examiners (in this point the Division corresponds to the Board of Appeals of the United States Patent Office), trials on invalidation of patents and other trials, such as trials on correction of patent specifications.

The number of employees of the Office was a total of 1164 in 1962. Among them are 497 examiners and 88 trial examiners.

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FOURTH PUBLIC LECTURE AND DISCUSSION*

APRIL 18, 1963

8:00 P. M.

Current Developments in Antitrust and Trade Practice Laws and Policy in Japan and the Relation Thereto of Industrial Property Rights

GUEST LECTURER

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WASHINGTON, D. C.

* PUBLIC LECTURE AND DISCUSSION SERIES. "Current International Industrial Property Developments and the Relation Thereto of Antitrust and Trade Practice Laws and Policies" is the theme of a public lecture and discussion series presented under the auspices of the Foundation. The object of this series is to provide an opportunity to exchange views with officials and other foreign experts who are in a decision-making or recommending capacity with respect to new international developments and who, being located abroad, would not ordinarily be available to people in this country. This program is made possible as a result of support from the Alfred P. Sloan Foundation and an industrial firm. Held on the campus of The George Washington University, the meetings are so organized as to encourage participation from the audience. They are free of charge and open to the public. The first three lectures concerning Great Britain and the Common Market were published as Vol. 6, No. 4 of this *Journal.*

Current Developments in Antitrust and Trade Practice Laws and Policy in Japan and the Relation Thereto of Industrial Property Rights

PROCEEDINGS

PROVOST COLCLOUGH: Eight o'clock is only a figurative time of day—it depends on where you have been for dinner and perhaps a few other aspects—but I think, while there will be others here, that perhaps we should start.

First, I pay my respects to our guest from Japan, about whom I will speak in a moment, and I welcome all of you to this fourth lecture on industrial property on the international level.

For those who plan industrial property transactions or investments in Japan, in view of the steadily expanding trade between Japan and the United States—and may I parenthetically give an example, in 1961 Japan-United States trade amounted to more than $2.8 billion. Japan's rapidly rising gross national product augers well for the future.

Against that background, I submit, it is vital that we become better acquainted with the opportunities that are available with respect to this important member of the free world community. For example, Japan—a close trading partner of the United States—is one of the best markets we have for such products as data processing and computer equipment. On the other hand, some of the most dramatic technological advances, particularly in the electronics field, have been under the patent system of Japan and we have proved to be one of the best markets of Japan in this field.

In considering investment or trade with Japan, whose economy is subject to a high degree of planning, it is important to understand the type of legal and economic controls that are in effect.

The Fair Trade Commission of Japan is a striking example in the field of trade practice of the attitude of the Japanese toward governmental administrative control and supervision. Mr. Toru Onuma, the eminent Secretary General of that Commission, whom we are honored to welcome tonight on behalf of the University and its Foundation, will shed light on the current developments in antitrust and trade practice law and policy in Japan. The Secretary General will also discuss the relation thereto of industrial property rights, including

some consideration of patent and trademark licensing. Finally, he will refer to pertinent fiscal and trade controls.

So, to begin the program for the evening it is my pleasure to introduce the moderator for this evening, Mr. Hajime William Tanaka, Special Counsel, U. S.-Japan Trade Council. He attended the University of Los Angeles where he received a Bachelor of Arts degree. He has received the Bachelor of Law and Master of Law degrees from The George Washington University. And I am very proud to say he received his Bachelor of Law degree when I was Dean of the Law School and that is where we became good friends. He has been in private practice in this city for the last nine years and includes most of the significant imports from Japan in the organizations he represents. He is General Counsel for the Electronics Industries Association of Japan, Counsel of the Stainless Steel Flatware Manufacturers, the Sheet Glass Association, the Japanese Potteries Manufacturers, the Japanese Bicycle Exporters, the Japanese Tile Manufacturers, the Japanese Machinery Exporters, and the Tuna Packers Association.

Before presenting the moderator, may I request that our guests write their names and addresses on the cards which were given to you with the program, the purpose of which is to indicate those who would like to be on our mailing list; that is, those who are genuinely interested in The Patent, Trademark, and Copyright Foundation research and educational programs.

And now it is my privilege; Mr. Tanaka.

MR. TANAKA: Thank you very much, Director Colclough, for those kind words.

First, I wish to acknowledge the untiring efforts of Director Colclough and our Executive Director, Dr. Harris, in making possible this unique series of lectures to bring to you experts from various countries to shed light upon the laws, regulations and policies of foreign countries bearing on antitrust enforcement and its relation to industrial property rights.

Tonight our distinguished speaker is Mr. Toru Onuma, Secretary General of the Fair Trade Commission of Japan. Mr. Onuma received his Bachelor of Law degree from Tokyo University and entered into a long, distinguished career with the government. He has served with the Ministry of Foreign Affairs and with the Special Procurement Board. In 1954 he became Chief of the General Affairs Section of the Fair Trade Commission of Japan. In 1957 he moved up as Chief of the Economic Division and, in 1962, he assumed the Secretary Generalship of the Commission, which is the highest career post in the agency.

We are also fortunate and privileged to have with us tonight Mr. Tetsuro Ohata, who is Commercial Counselor of the Embassy of Japan. Mr. Ohata is on his second tour of duty here and in the interim he was deeply involved in foreign trade problems as Chief of Commercial Policy Planning with the Ministry of International Trade and Industry. We look forward to his participation tonight with great interest and know that he will make a substantial contribution to the success of this lecture.

Now I take great pleasure in introducing to you our guest speaker for tonight, Mr. Onuma.

(Applause.)

MR. ONUMA: Mr. Chairman, distinguished guests, Ladies and Gentlemen: It is my pleasure to be invited by The Patent, Trademark, and Copyright Foundation of The George Washington University to participate in the international policy lecture series and to speak to this distinguished audience on the current developments in antitrust and trade practice laws and policy in Japan and the relation thereto of industrial property rights.

However, as I am with the Fair Trade Commission in the capacity as Secretary General of the staff office, I will limit my lecture to four major points, namely, first the outline of the Antimonopoly Law; second, current developments in the enforcement of the Antimonopoly Law; third, relations of industrial property rights to the Antimonopoly Law; fourth, international contracts or licensing agreements approved under law concerning foreign investment and their treatment.

The law relating to prohibition of private monopoly and methods of preserving fair trade, commonly known as the Antimonopoly Law, was enacted in 1947 modeled on the Sherman Act, the Clayton Act and the Federal Trade Commission Act of your country and was extremely stringent and thoroughgoing, but it was twice relaxed in 1949 and in 1953. The first revision was made chiefly to moderate the strict restrictions on stockholding and interlocking directorates with a view to facilitating foreign investments and also to simplify the procedure for filing reports on international contracts or agreements and corporate mergers.

In the second amendment the step was taken to outlaw only cartels that might substantially restrain competition in any particular line of commerce by mitigating the severe cartel prohibition and at the same time, to permit exceptionally the formation of cartels for specific cases by incorporating special provisions in the Antimonopoly Law itself.

In addition to these amendments, the provisions governing stockholding and interlocking directorates were further eased.

These are the permutations which the Antimonopoly Law has undergone since 1947.

I shall now briefly discuss the present Antimonopoly Law. It goes without saying that the Antimonopoly Law aims to promote free and fair competition, and also to protect the interest of the general consumers as well as to bring about the sound development of the national economy. For the purpose of attaining these objectives the Law specifies three prohibitions, that is, first, the prohibition against private monopolization, second, the prohibition against unreasonable restraint of trade and, third, the prohibition against unfair business practices. These are so-called three principles in our Antimonopoly Law.

Private monopolization is to substantially restrain competition in any particular line of commerce by excluding or controlling business activities of other enterprisers contrary to the public interest. The Law does not condemn monopoly itself or bigness itself brought on naturally and in consequence of free competition, but prohibits monopolization resulting from the control and exclusion of other enterprisers. Here the term "substantial restraint of competition" means, in short, such condition as to arbitrarily control quantity and price of products or to have market control power. It is difficult to determine under what conditions an enterprise will reach the point when it begins to exert substantial restraint. After all it is a matter that should be determined on a case-by-case basis.

Next, the term "unreasonable restraint of trade" generally addresses itself to cartel activities, and means to substantially restrain competition in any particular line of commerce, contrary to public interest, through fixing, in conspiracy with other enterprisers, the quantity, price or restricting access to technology, products, facilities of restraining another party.

Lastly, the term "unfair business practices" embraces boycott, price discrimination, unreasonable induction of customers, unfair price fixing, unreasonable tying agreements, abuse of dominant position and interference with trade of competitors.

Besides the above-mentioned three prohibitions, the following supplemental prohibitions and restrictions are provided for in this Law in order to properly achieve the objectives of the Antimonopoly Law, that is to say:

(*1*) International agreements or international contracts which con-

tain clauses for unreasonable restraint of trade and unfair business are prohibited;

(*2*) Trade associations are prohibited from substantially restraining competition in any particular line of commerce; concluding illegal international contracts; restricting membership; restricting functions or activities of members; and coercing members to engage in unfair business practices;

(*3*) Japanese companies or foreign companies are prohibited from acting as a holding company whose principal business is to control business activities of companies in Japan through stock ownership;

(*4*) No officer or employee of a company is permitted to hold at the same time a position as an officer in another company in Japan where the effect in each case may be to substantially restrain competition;

(*5*) With certain exceptions, any financial institution generally is prohibited from owning stock of a company in Japan in excess of 10 percent;

(*6*) Corporate mergers and acquisition of business are forbidden, where in any particular line of commerce the effect of such merger or acquisition may result in substantial restraint of competition or where effected by resort to unfair business practices.

With respect to substantial restraint of competition, I have already stated its relation to private monopolization, but in view of the fact that there has always been a question in the case of merger proposals, I shall again explain it here.

In case where the market share is increased in proportion to the increase in production capacity or quantity as a result of mergers, it is difficult to clearly define the line beyond which such market share may become illegal. According to current policy there is no question if such combined share is less than 30 percent in any competitive market area. But it cannot be said that a market share exceeding 30 percent is per se illegal. However, such cases would be subjected to careful examination under the Antimonopoly Law because there might be a danger of causing substantial restraint of competition. The question as to when and how a market is controlled is considered to be a relative problem and cannot be resolved uniformly without taking into consideration all the relevant economic circumstances involved.

Therefore, an answer to this question cannot be obtained merely from the quantitative share of the market supply (or demand) involved in a proposed merger. For example, there have been a few instances of mergers aggregating a market share exceeding 30 percent

which were permitted on the ground that such share would not bring about substantial restraint of competition.

As stated hereinbefore, several regulations against cartels and trusts are set forth in the Antimonopoly Law in order to promote and maintain full competition, but on the other hand, the exemptions and immunities from the application of the Law co-exist as exceptions thereto. These exemptions and immunities are provided for where the very nature of the business does not lend itself to free competition and where a political judgment is made that public welfare considerations require curbing of free competition and where business survival is threatened by excessive competition.

Basically, there are two cases where such exemptions and immunities are provided, that is, the one is in the Antimonopoly Law itself and the other is in separate laws. Then with regard to this subject, I shall illustrate some instances.

(*1*) Otherwise lawful business such as railway, electric, gas or any other business deemed to be natural monopolies are exempt from the application of the Antimonopoly Law;

(*2*) Exercise of rights under the Copyright Law, the Patent Law, the Utility Model Law, the Design Law or the Trademark Law are exempt from the Antimonopoly Law;

(*3*) Associations, for instance, cooperative associations established for the purpose of promoting mutual aid among small scale enterprisers or consumers and which satisfy the provisions of special laws are immune from the application of the Antimonopoly Law;

(*4*) Resale price maintenance contracts for such commodities as designated by the Commission, which are put into force after satisfying certain procedural requirements are considered lawful;

(*5*) Depression cartel or rationalization cartel as prescribed in the Antimonopoly Law itself may be formed subject to Commission approval. A depression cartel may be permitted when a situation arises where the supply and demand imbalance in a specific commodity is such that the price of such commodity falls below the average production cost and there exists the probability that a majority of such enterprisers may not survive and where enterprise rationalization is deemed inadequate to resolve the difficulty. Under this type of cartel a limitation of production volume or sales volume or restriction of production facilities are permitted. However, despite the above-mentioned steps, where it is impossible not only to improve such a situation, but also to achieve the limitation of production because of technical reasons, then the cartel may fix prices.

As to rationalization cartels, if it is particularly necessary in order

to raise the technical level, improve quality, reduce production cost, increase efficiency or take other rationalization measures, a limitation on technology or kind of products, or use of common facilities for the storage of raw materials or products or for delivery may be authorized upon obtaining Commission approval. It should be noted that Commission approval cannot be obtained if the cartel in question unreasonably injures the interest of customers, general consumers or related enterprisers;

(*6*) There are several concerted activities that can be effected with approval of the competent minister under the Export and Import Trading Law, the Medium and Small Enterprise Organization Law and other laws. In these laws certain requirements by which the respective activity may be executed, are set forth. In any case it is a rule that the competent minister must give his approval after he has consulted with the Commission.

So far as I have reviewed the substantive provisions of the Antimonopoly Law we administer and other laws we have to deal with. Now, I shall say a word regarding procedure under our Law.

The Commission, like the Federal Trade Commission, conducts investigations into possible violations and renders its decision after holding hearings. However, if the respondent is dissatisfied with the decision, he may institute a suit for vacation or modification of the decision to the Tokyo High Court. On the other hand, when the Commission has reason to believe that there exists an offense against the Antimonopoly Law, it must file an accusation with the Attorney General.

MR. TANAKA: Mr. Secretary General, if I may interrupt at this point, I would like to ask a question. You have made reference to many provisions proscribing unreasonable restraint of competition. However, you go on to cite numerous exceptions. Under the circumstances, it appears to me that the exceptions may have become the general rule. Now, in your opinion, what are the reasons for the creation of these exceptions under Japanese law?

MR. ONUMA (Through Mr. Tanaka's translation): That is a good question. Unlike the situation which exists in the United States, excessive competition is an economic fact of life in Japan notwithstanding the tradition of cartelism. For this reason, price stabilization and measures to shield small business from the full impact of free competition have been authorized as exceptions to the Antimonopoly Law which permit these smaller business firms to form associations for the purpose of stabilizing prices and allocating market shares.

In the field of export trade, we have the Export-Import Trading

Law which authorizes the formation of export associations subject to approval by the Ministry of International Trade and Industry in consultation with the Fair Trade Commission. These export associations are formed to achieve stabilized prices and to prevent dumping, among other things. These are some of the economic circumstances in Japan which compelled the revision of the Antimonopoly Law.

MR. TANAKA: If there are any questions from the floor I would be delighted to receive them and interpret for Mr. Onuma.

If you are recognized, for the record please give your name and affiliation.

Yes?

MR. TUKPONG: My name is Ignatius Tukpong and I am a student in the Department of Economics at Howard.

MR. TANAKA: And your question?

MR. TUKPONG: My question is this: Now this law came up, I think, during the occupation period, I mean what we call SCAP—Supreme Commander of Allied Forces in the Pacific. So after the return of power to Japan in 1952, we understand the biggest organization—probably you call Zaibatsu—

MR. TANAKA: Zaibatsu.

MR. TUKPONG: Right. Now there was a return of that after it had been disorganized during the occupation of Japan. May I put it to you now that these exemptions in this Antimonopoly Law are made just in a way to say that you are still probably honoring in one way or another the enforcement pledge by the occupation authorities on this trading—holding companies and so on. So that instead of presenting to the world that you have actually done away with monopoly you just go undercover, still maintaining monopoly?

PROVOST COLCLOUGH: Do I understand correctly that your question has to do with the political influences as against the economic?

MR. TUKPONG: I think it's more or less a complex tie-up, both political influences and economic influences, but I would mostly say it is political.

MR. TANAKA: Let me interpret very briefly for Mr. Onuma.

MR. ONUMA (Through Mr. Tanaka's translation): In direct response to your question I would reply emphatically that political considerations did not play any part in the successive relaxations of the Antimonopoly Law following the restoration of sovereignty to Japan. I would say that economic considerations were the primary and principal considerations and that they reflect an effort directed at modification of the antitrust policy to conform with the economic realities of Japan.

MR. TANAKA: Are there any other questions?

MR. MUNZ: I have one. My name is Otto John Munz. I am a patent lawyer here in Washington.

You state here that the formation of the holding company may be a threat to free and fair competition. Does it mean a holding company created in Japan or outside of Japan or both?

MR. ONUMA (Through Mr. Tanaka's translation): Yes, this provision relates only to holding companies doing business in Japan. Obviously, if a holding company has its sites in Japan and is incorporated under the laws of Japan, it would be subject to the proscription contained in this provision but it would not apply to any holding company acting outside or located outside of Japan.

MR. MUNZ: Now if American companies would form holding companies in Japan, would that be against the provisions of the Japanese antitrust—if American corporations would form holding companies in Japan?

PROVOST COLCLOUGH: Incorporated in Japan?

MR. MUNZ: Yes. Would that apply?

MR. ONUMA (Through Mr. Tanaka's translation): Yes, it would apply.

MR. MUNZ: Now what are the reasons or what are the premises, why does the Japanese Government think that a holding company would be a threat to the fair trade practice?

MR. ONUMA (Through Mr. Tanaka's translation): This animus against holding companies has its historical basis in the period in which there existed a profusion of holding companies engaged solely in the activity of controlling and holding other companies. The Excessive Economic Power Deconcentration Law was subsequently passed to do away with these holding companies.

MR. MUNZ: Would it include the holding of patent rights?

MR. TANAKA: Would you repeat that question, sir?

MR. MUNZ: Would this prohibition include formation of a holding corporation which would specialize in holding patent rights only?

MR. ONUMA (Through Mr. Tanaka's translation): This provision does not contemplate a situation wherein a company acquires an aggregate of patents and holds them. It applies where a company purchases and holds the stock of other companies.

MR. MUNZ: I see. Thank you.

PROVOST COLCLOUGH: One gentleman there has a question.

MR. SHARMA: My name is J. M. Sharma. I am a graduate student at Howard.

I have a question that, for example, the Antimonopoly Law—Section A of the second part—I come to the conclusion that the private enterprise is being given a new type of a shape. For example, if all of the countries—say in the case of India, we are just trying to develop those industries which are not developed. Similarly here, the Antimonopoly Law is trying to encourage those industries which are not so competitive, which are not developed. Is the private enterprise in Japan being given a new shape for the public, like in all of the underdeveloped countries, particularly in India, where Mr. Nehru recently came and proposed, said there shouldn't be any private enterprise, there should be public enterprise and public works?

MR. TANAKA: Now—if I might restate your question. Is your question whether or not the Antimonopoly Law in Japan has as its objective the creation of government dominated companies as against private companies?

MR. SHARMA: No, is the encouragement to the small industries which are not developed—are the developed industries being deprived from multiplying and being asked to share the profits as is happening in all of the countries? So is it that private enterprise is being given a new form?

MR. ONUMA (Through Mr. Tanaka's translation): No, the purpose and objective of the law is to promote free and fair competition. If as a result of the interplay of free and fair competition monopolies are formed, this is perfectly all right. It is not designed to promote underdeveloped industries, it is designed to promote free and fair competition.

MR. TANAKA: Mr. Secretary General, would you proceed?

MR. ONUMA: As the second part of my talk I will discuss current developments in the enforcement of the Antimonopoly Law.

Despite the fact that the Japanese economy in 1961 and 1962 was in a recession because of the adoption of a tight money policy, prices of goods, especially consumers' prices, continuously registered an upward trend. To combat this, the Government established strong counter-measures to hold down prices. One of them was the vigorous enforcement of the Antimonopoly Law for the purpose of eliminating illegal price fixing agreements.

Accordingly, the Commission made strenuous efforts to eliminate illegal output limitations, sale restrictions, minimum price restrictions and so forth. As a result, during the calendar year 1962 the Commission issued 13 new complaints on various violations such as price fixing and other restrictions, and also disposed seven cases by render-

ing decisions ordering the elimination of unreasonable restraint and to cease and desist from unfair business practices.

On the other hand, another of the Commission's activities is to give cartels approval under the provisions of the Antimonopoly Law as follows:

Iron and steel manufacturers have formed a depression cartel involving the curtailment of production and sale restrictions for medium bar stock, after obtaining approval from the Commission. Nevertheless, prices of steel have not yet sufficiently recovered. Regarding enterprise rationalization cartels, there are at present seven cartels, in the bearing industry, the synthetic dyestuff industry and other manufacturing industries.

Cases relating to cartels referred to the Commission for consultation by the competent minister in accordance with the Medium and Small Enterprise Organization Law and other laws during the year have reached a considerable number.

Turning to mergers, the number of mergers are gradually increasing in an effort to enlarge the scale of operation and to rationalize production following the rapid progress in trade liberalization. For instance, in the calendar year of 1962 there were 884 cases as compared with 752 cases in the preceding year. Although a great number of mergers occurred, there was no case where serious problems of scale were raised in the light of the Antimonopoly Law. But, there are indications that large scale mergers will be proposed.

Besides the Antimonopoly Law, the Commission administers two more laws, that is, the law concerning Prevention of Delay in Payment to Subcontractors and the Unreasonable Premiums and Misleading Indications Prevention Law. The former aims to prevent delay of payment to subcontractors, and to cause enterprisers to conduct fair transactions with their subcontractors. Under this law the Commission took many corrective actions against enterprisers who utilized their dominant position at the time of our recession. The latter is a newly enacted law, which aims to regulate unreasonable or extraordinary premiums and lotteries, misleading labeling and exaggerated advertising arising from the rigors of competition. Since coming into force of this law last August, the Commission has already accomplished remarkable results.

For the third part of my talk I will discuss relation of industrial property rights to the Antimonopoly Law.

Generally, industrial property rights include patent rights, utility model rights, design rights and trademark rights, but I shall speak

about patent rights here. Patent rights are especially protected by our law in order to encourage inventions and development of industries. A patentee holds an exclusive right. That is to say, as to the invention of an article, he monopolizes the right to manufacture, use and sell the invention; as to the invention of a process, he monopolizes the use of such process and the use as well as sale of the thing manufactured by such process.

Furthermore, a patentee not only has an exclusive right to work the patented invention as a business, but also may grant an exclusive or non-exclusive license.

Therefore, the exercise of a patent right is exempt from the application of the Anttimonopoly Law. Article 23 of the Antimonopoly Law prescribes, "The provision of this Law shall not apply to such acts as recognized to be within the execution of rights under the Copyright Law, the Patent Law, the Utility Model Law, the Design Law, and the Trademark Law." However, when any act under a patent right is deemed to fall without the proper exercise of such right and to constitute private monopolization, unreasonable restraint of trade or unfair business practices, it will be in violation of the Antimonopoly Law.

Besides, the Antimonopoly Law contains a provision under which a patent right may be revoked. That is, in the case where an act under a patent right violates the Antimonopoly Law, the court may render condemnation and at the same time, declare the revocation of the patent right. In such case the revocation can be declared insofar as the patent right belongs to such offender. But, to date, there has been no instance wherein this provision has been invoked.

MR. TANAKA: Mr. Secretary General, may I interrupt here? You state that the Antimonopoly Law contains a provision under which a patent right may be revoked. Now as I understand our practice here in the United States, this would raise some basic constitutional questions and it occurs to me to ask whether or not the same problems might arise in Japan in connection with this particular provision?

MR. ONUMA (Through Mr. Tanaka's translation): Yes, there may be some constitutional questions involved but, as I stated previously, to date, this provision has never been invoked and no one has thus far seen fit to challenge its constitutionality. Certainly, if someone does, I think this would present an interesting legal question.

MR. MUNZ: Could it be invoked against a United States corporation?

MR. ONUMA (Through Mr. Tanaka's translation): Well, where the American corporation in question is located in the United States, unlike the American antitrust laws which have been construed to have

extraterritorial application, the Japanese Antimonopoly Law is generally construed and enforced in such a manner as to have no extraterritorial application so that unless the American corporation is located in Japan these provisions would not apply.

MR. MUNZ: One point missing. A United States corporation may be located in the United States and have a plant in Japan.

MR. TANAKA: In that case if the patent is worked or the patent registered in the name of a subsidiary corporation in Japan, obviously that corporation will be dealt with as a Japanese corporation.

MR. MUNZ: Thank you.

MR. ONUMA: Now, I will give some illustrations as to whether the exercise of a patent right becomes questionable from the point of view of the Antimonopoly Law.

(*1*) Establishment of output limitation and sale price restriction are considered, in principle, to be within the patentee's power.

(*2*) Resale price restriction is different from direct sale price retriction as mentioned in (*1*) above and does not, in principle, belong to the purview of a patent right. To establish a resale price restriction one is required to take such procedure as specified in the Antimonopoly Law. It is provided in the Law that commodities subject to resale price restrictions are only such commodities as are designated by the Commission and literary works. The commodities so far designated are cosmetic, hair-dye, toothpaste or powder, home use soap, liquor, packed caramel, medicine, camera and ready-made T-shirts.

(*3*) Concerning restriction of a sale area, market restriction within the Japanese territory is, in principle, the patentee's power. However, it cannot be denied that territorial restrictions in the export markets may constitute a violation of the Antimonopoly Law. In this connection, I would like to call your attention to the fact that recently, our Government stated its view at the time of the enforcement of the Law concerning foreign investment. Such view is that, and I quote, "It is undesirable to enter into licensing agreements on foreign patent rights including clauses that restrict export markets," unquote. Accordingly, we consider that it is better to delete such clauses from the licensing agreements.

(*4*) Restriction on dealing with competitive commodities may in some cases constitute unfair business practice as an exclusive trading so long as there is no justifiable reason.

(*5*) To limit the exercise of a patent right in certain fields of operation is, as a rule, recognized to be a proper exercise of the right.

(*6*) So-called tie-in clauses fall, in principle, under unfair business practices. But if the object under a tie-in clause is deemed indis-

pensable to ensure the exact working of the patent right, it may not be illegal.

(7) When a patentee fixes royalty in lump sum payment on several patent rights that he holds by concluding collectively a licensing agreement for his several patent rights, there is, in principle, no question irrespective of whether these patent rights are all used or not. What we term a sleeping charge, on the contrary, may constitute a possible violation.

I have given some examples above, but it may be pointed out that it is very difficult to determine simply and abstractly whether the exercise of a patent right may come under the violation of the Antimonopoly Law. Consequently, we must judge the exercise of a patent right on a case-by-case basis. We have so far 22 antimonopoly violation cases in connection with international agreements containing patent rights in technological assistance contracts. These are old cases prior to 1951, and their violations are restrictions of products, price, technology, markets and so forth. The Commission rendered its decision declaring that such agreements would fall under the violations of old Article 4, or unreasonable restraint of trade, or unfair business practices. Because old Article 4 stipulated that no enterpriser should in conspiracy enhance prices, restrict production volume, sales volume, technology, products, markets, customers and so forth, an agreement itself was deemed illegal even though it would not cause substantial restraint. Therefore, many international contracts would come under this Article and constitute a violation. Article 4 was deleted in the 1953 amendment.

Finally, I will discuss international contracts or licensing agreements approved under law concerning foreign investment and their treatment.

With regard to induction of foreign capital, it is considered that there are various patterns of foreign investments such as technological assistance contracts, acquisition of stock or proprietary interest, acquisition of debentures or claimable assets arising from loans and others. In order to enable smooth induction, the Law concerning Foreign Investment was enacted in 1950. The purpose of this law is:

> "To create a sound basis for foreign investment in Japan, by limiting the induction of foreign investment to those which will contribute to the self-supported and sound development of the Japanese economy and to the improvement of our international balance of payments, by providing for adequate protection for such investments."

For this purpose a majority of technological assistance contracts involving the induction of foreign patents must, according to the pro-

visions of this law, obtain validation from our Government, and therefore, the law specifies the following positive and negative requirements as standards for validation.

Positive requirements in the case of validation are the direct or indirect contribution to the development of essential industries or public enterprises; the necessity for continuation of existing technological assistance contracts concerning essential industries or public enterprises or for the alteration of the articles of the contracts concerned such as renewal.

Negative requirements in the case of refusal of validation are as follows:

In case clauses in the contract are unfair or violate any laws or orders; in case conclusion or renewal of a contract or modification of clauses in the contract is deemed to have been made by a fraud, coercion or unreasonable pressure; in case it is deemed to have an adverse effect on the rehabilitation of the Japanese economy.

MR. TANAKA: Mr. Secretary General, may I interrupt? I think there is a question from the floor.

MR. MUNZ: If I understood, sir, does the Fair Trade Commission of Japan have to validate a contract between a United States corporation which owns a patent and licenses it to a Japanese corporation?

MR. ONUMA (Through Mr. Tanaka's translation) : Any technological licensing agreement is subject to validation by both the Finance Ministry and the Ministry of International Trade and Industry by virtue of the Foreign Capital Investment Law.

MR. MUNZ: Foreign control exchange.

MR. TANAKA: Yes, also the Foreign Exchange Control Law.

MR. MUNZ: And what about vice versa, if a Japanese corporation gives a license to a United States corporation of a United States patent? Would it be subject also to validation?

MR. TANAKA: Yes, I understand your question.

MR. MUNZ: Shall I repeat it?

MR. TANAKA: No, I understand. Perhaps this question should be addressed to Counselor Ohata.

MR. OHATA: Yes, I think so. When a Japanese company wants to give a license to the foreign companies they have to get the government's approval under the foreign exchange control.

MR. MUNZ: Not under the Fair Trade Commission?

MR. OHATA: No.

MR. TANAKA: Are there any other questions?

MR. TUKPONG: Yes, sir.

Well you mentioned balance of payments causing trouble when you were talking about the contracts, technological contracts. You want to improve, attempt to improve the balance of payments situation, that's why probably you are making this law. I am a student of economics about the foreign policy of Japan. In reading through the years I found since 1945 Japan has been having a deficit in trade terms and also deficits in international balance of payment. Then the chief cause has been deficit in current account items of the balance of payment balance sheets.

MR. TANAKA: Yes, what is your question?

MR. TUKPONG: My question now is don't you think that the exporters having to obtain permission most of the time from the Ministry of International Trade and Industry are in trouble, they are not given enough incentives to export more than they are exporting now, so that if that current account had been balanced there would not be this balance of payments crisis which, for example, occurred in 1953 and in 1957 and 1961?

MR. TANAKA: Yes, I think this question should be fielded by Mr. Ohata.

MR. OHATA: As you told me, the Japanese economy is suffering from the international balance of payments sometimes, and it is a very important job for us how to increase our exports. But when we export some thing we have to get money from the foreign countries. So if Japanese exporters try to export, if they ship out their products, because of the flight of capital, it is difficult problem for the Japanese Government. So when the Japanese exporters export something to the foreign countries, the government has to check whether their receipt of money is guaranteed or certain. Furthermore, if the Japanese exporters ship something to the foreign countries on the very long term—whether three years or four years—the government has to ask them to get money more quickly. Therefore, in that sense the government has to check the exports and give the approval to exporters. That is one reason. Another reason is this: Sometimes the Japanese exporters do a very excessive competition in exports and sometimes they sell their products at too low a price and as a result of it the foreign domestic manufacturers complain about it and they request their governments to raise the tariff or something like that. Therefore, in such a case or there is such a threat, the Japanese Government has to check the export and sometimes the Japanese Government has to limit the exports. This is a very unhappy situation for the government and for the industry. But to avoid such an unfortunate situation

in the foreign markets sometimes the Japanese Government has to check the exports and give the licenses.

But as a rule, or as a principle, our export is completely free. But sometimes when there is a problem, getting the reasonable price for the export or when it is necessary to prevent the excessive competition, and in such a case the government has to check the exports and give the approval to the exporter.

MR. TUKPONG: Supposing—

MR. TANAKA: I wonder if we can hold further questioning until Mr. Onuma has completed his talk.

MR. ONUMA: For granting validation for contracts under the Law concerning Foreign Investment, the Foreign Investment Council is established in the Ministry of Finance to take charge of investigating and deliberating contracts. This Law prescribes, however, that even if the validation of our Government is obtained, such administrative measure shall not waive the declaration of illegality under the Antimonopoly Law. Inasmuch as the legal certainty of the patent right contract validated could be conspicuously injured if this provision is invoked, the Staff Office of the Commission sends an official in charge to the pre-investigation meeting composed of ministerial officials concerned to have him express the opinion of the Commission for the purpose of policy coordination.

The Antimonopoly Law provides in Article 6 that no enterpriser shall enter into international agreements or international contracts which include such matters as coming under unreasonable restraint of trade or unfair business practices, and that when an enterpriser has concluded an international agreement or international contract, he shall file a report with the Commission within thirty days as from the day of the conclusion of such agreement or contract.

Therefore, if the agreement or contract so filed contains any clause in violation of the Antimonopoly Law, the Commission shall immediately take necessary steps to eliminate such clause. Fortunately, as I have said before, we have evidenced no violation in international agreements or international contracts since 1952. One of the reasons is, we think, that prior clearance procedure is taken in the pre-investigation meeting.

In conclusion, we think that according to our records on international agreements or international contracts we will see a gradual increase in number, they will undoubtedly increase further as our trade and foreign exchange liberalization progresses.

I thank the Foundation for giving me this splendid opportunity to speak and also thank you for listening.

(Applause.)

MR. TANAKA: Thank you very much, Mr. Secretary General, for a wonderful talk and a very illuminating one.

Now I would like to open this conference to any questions from the floor. In order to save time I think it might be best to limit your questions insofar as possible to the frame of reference of this particular lecture series.

MR. WILLIAMS: Williams, Koppers Company in Pittsburgh—

MR. TANAKA: Sir, will you please state your name and affiliation for the record?

MR. WILLIAMS: Williams, Koppers Company in Pittsburgh.

MR. TANAKA: I take that back.

MR. WILLIAMS: I hope I also didn't miss the Secretary General's point on this. He kindly cited many examples where the exception of patent rights from the Antimonopoly Law might not apply. I think of one that should be very practical and I think has occurred and I wonder what he feels about a cross-licensing situation, one between two Japanese companies, or two companies having acquired the rights, or a cross-licensing situation between a Japanese company and a foreign company that effects consequently a monopoly.

The situation is this: Two patents when owned by one company and one by the other, combining those does he in effect create a monopoly of the product? Individually they have the right of monopoly.

MR. TANAKA: Good question.

MR. ONUMA (Through Mr. Tanaka's translation): The answer is—

(Laughter.)

PROVOST COLCLOUGH: That is very good.

MR. ONUMA (Through Mr. Tanaka's translation):—is No, and let's break it down into two parts. The cross-licensing in and of itself would not be illegal per se.

PROVOST COLCLOUGH: Do you say No?

MR. ONUMA (Through Mr. Tanaka's translation): No, the cross-licensing in and of itself would not be illegal per se.

Now the second issue appears to be whether or not the fact that this cross-licensing creates a monopoly in a product which is the subject of the patents involved raises any question of illegality. Here again the answer is that the monopoly created is not illegal per se. However, if the monopoly position resulting from the cross-licensing is abused

by unreasonably restricting production of the article involved, or unreasonable raising prices of the article involved, then antitrust implications would arise.

PROVOST COLCLOUGH: I think the gentleman from Pittsburgh understands that quite clearly. He has heard something like that before, haven't you?

MR. WILLIAMS: I believe we have.

(Laughter.)

MR. SPENCER: I would like to draw your attention to a piece in the *Nihon Keizai Shimbun* this past week which is entitled "Sweeping revisions scheduled for Japan's antimonopoly laws." Now this is the international edition that comes in—it's a very reputable paper—and there is quite an account here of proposed revisions which would make the Antimonopoly Law even more loose, even more flexible, some of the terms used in here.

My question is this: If, Mr. Moderator, as you indicated at the beginning, the exceptions to the law seem to be the general rule rather than the law itself, how loose can you get if the Japanese want to go even further?

PROVOST COLCLOUGH: For the record, will you give your name and affiliation?

MR SPENCER: I'm sorry. My name is Spencer. I am from Howard University.

PROVOST COLCLOUGH: So nice to see you.

MR. ONUMA (Through Mr. Tanaka's translation): Well, in answering your question I might go back to 1958 when a bill envisaging virtual emasculation of the Antimonopoly Law had been introduced in the Diet under sponsorship of the major industries in Japan. However, because small business, in particular, and organized consumer interests fought the bill, it was never acted upon by the Diet. Now it is true that today there is another push being made to lend greater flexibility to the Antimonopoly Law. However, it is my personal feeling that the forces in favor of such an amendment will have rough sledding in the Diet.

(Laughter.)

MR. TANAKA: Any other questions?

(No response.)

PROVOST COLCLOUGH: Ladies and Gentlemen, I again say we appreciate your being here. I trust you have all found this, not only interesting, but exciting, if I may use that word. For, in the free world today we are presented with tremendous challenges. They can be

viewed or labeled, if I may use that word, political, economic, sociological or by other disciplinary terms. It is the purpose of a lecture series such as this, however, to give us the opportunity of exchanging views on broad areas of economic and political importance with respect to the well-being of a particular nation and relating that to the well-being of other nations represented here tonight. I am particularly pleased that there are as many represented here. So, I hope we will take away with us the realization that nothing in the world today is absolute except objectives.

Now at the end of our lecture I call upon the Executive Director of the Foundation, for the benefit of those who are here this evening. And may I again ask those of you who are interested in being on our mailing list to turn in the cards. Put your names and addresses on them.

May I call upon the Executive Director, Mr. L. James Harris, to give us a word about our fifth lecture into the month of May.

EXECUTIVE DIRECTOR HARRIS: This is only going to be a very brief word. I was very happy to hear the many questions and the informative responses. The purpose of this series is to exchange ideas with foreign experts who, being located abroad, are ordinarily not available to you. You are invited to come to the next lecture on May 23rd, and to bring your friends.

We are planning to have distinguished guests from Mexico, Brazil and Argentina, the three leading industrial nations of Latin America. These experts are either in a government decision-making or recommending capacity—that is, in a governmental capacity, or in a recommending capacity to government. They will talk about their own countries and also about other countries in Latin America that have looked to them as bellwethers. This is on May 23, next month.

Of course, Latin America isn't a single entity. It is made up of many nations. Consequently we chose the three leading industrial nations to represent them. It is important that we have people here who have questions to ask so that we can shed more light on the effect on United States interests of recent events in Latin America. Therefore, I again bring to your attention that the next meeting is on May 23.

I want to thank you all for being here. I want particularly to thank Mr. Onuma, Mr. Ohata, and Mr. Tanaka.

Provost Colclough, may I call on you to close the meeting.

PROVOST COLCLOUGH: The meeting is adjourned.

(Thereupon, at 9:30 p.m., the lecture, question and answer period was concluded.)

The Upgrading Of Patented Inventions and Their Use Here and Abroad

BARKEV S. SANDERS *

SUMMARY

MOST COUNTRIES, UNLIKE THE UNITED STATES AND CANADA, require annual payment of renewal fees to keep patents in force within the maximum period allowed by law. Analysis of these statistics adds new insights regarding the economic role of patented inventions.

The rates with which patents are allowed to lapse are surprisingly uniform for different countries despite the wide variation in the renewal fees charged. This indifference in the rate of abandonment of patents to the markedly different amounts of renewal fees imposed by different countries suggests strongly that if not all, the overwhelming majority of patented inventions kept in force through the fifth year by payment of one or more renewal fees are revenue producing inventions.

To the extent that this inference is correct, the percentage of patents remaining in force through the fifth year, should be qualitatively roughly comparable with the proportion of the United States patents reported in current or past use, and those licensed, even though not reported in commercial use.

Such a cross-comparison not only strengthens our confidence in the findings of the number of patented inventions utilized commercially in the United States, but also tends to corroborate other evidence that the utilization rate derived from the Patent Utilization Study probably errs on the side of being conservative.

These cross analyses strengthen our confidence in the findings regarding the economic importance of patented inventions for all industrial nations.

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*Dr. Sanders is a member of the Foundation's Research Staff. Computations were made by Mr. Jae Hong Kim under the guidance of Dr. Sanders.

Through parallel reasoning one might infer, and therefore, look for corroborating evidence of relationships revealed by these foreign patent statistics regarding parallel relationships in the United States patents where such information cannot be obtained directly. The most important relationship of this sort found is the progressive upgrading of inventions that are patented throughout this century.

From our cross analyses we are led to conclude that:

1. In the United States the revenue producing patented inventions at this time probably exceed 60 percent.
2. That the percentage of such patents might be almost as high and possibly higher in Germany, and not much lower for Sweden and Great Britain.
3. That the level of this percentage depends in part on the initial selectivity of patentable inventions prescribed by patent laws of different countries.
4. That there has been in most countries, including the United States, a progressive upgrading of the quality of inventions that are patented. This trend is characteristic of patented inventions at least during the 20th century.
5. That despite the apparent acceleration of new inventions many inventions put to commercial use remain in use for many decades, and some indefinitely.

This interim report also brings together for wider use all the available patent statistics on the survival rate of patented inventions and interrelationships between annual number of inventions patented and their survival rate through the payment of annual renewal fees.

SOME HYPOTHESES

ONE WAY THAT STUDENTS OF INVENTION have used foreign patent statistics has been to try to compare inventiveness in different countries.[1] However, a consideration of the widely varied requirements of different countries regarding inventions that are patentable should indicate the futility of these attempts. Only recently Federico has pointed out additional inter-country differences in patenting which make any attempt to equate the number of patents issued by

[1]Gilfillan, S. C., "Inventiveness by Nation, A Note on Statistical Treatment," *The Geographic Review*, Vol. XX, No. 2 (April 1930), pp. 301-304.

each with inventiveness an idle statistical diversion.[2]

This lack of comparability does not mean, however, that valuable insights cannot be gained regarding the economic significance of patented inventions from certain types of analysis of available foreign patent statistics, and that certain types of international comparisons cannot be attempted through inferences that seem supported by fragmentary evidence. Thus, Federico[3] pioneered the use of foreign patent statistics as a clue to the proportion of patented inventions of different countries that prove economically significant to their owners. Most foreign patent systems, unlike ours, require periodic annual payment of renewal fees to keep a patent in force. Federico's reasoning was as follows:

> "While a complete study of the successes and failures of patented inventions is at least theoretically possible, the labor involved would be enormous. Statistical methods of approach along various lines, with a correlation of the results, are possible, but do not appear to have been undertaken. The systems of taxation of patents in force in most countries can be used as one element in such a study since from them *some measure of patents which are successful, in the sense of producing revenue to their holders, can be obtained.*"[4]

The present author fully agrees with the above reasoning, and believes the approach sufficiently important to warrant an empirical study of appropriate samples of foreign patents for selected countries to determine the adjustments required for patents of each country to enable one to derive from renewal statistics reliable estimates of the number and proportion of patented inventions that are revenue producing.

A priori consideration leads this writer to surmise that normally almost all the patented inventions that are kept in force for five years or longer, on which at least one or more renewal fees are paid are, "producing revenue for their holders." Therefore, such patents represent the approximate proportion of patents in each country and for a given time that are in commercial use and perhaps those licensed.

The Patent Utilization Study indicates that in the United States, about 60 percent of the patented inventions issued to resident inven-

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[2]Federico, P. J., "Comparative International Patenting Statistics," *PTC J. Res. & Ed.*, Vol. 6, Conference Number, 1962, pp. 37-42, 154-156.

[3]Federico, P. J., "Taxation and Survival of Patents," *Journal of the Patent Office Society*, Vol. XIX, No. 9 (September 1937), pp. 671-691.

[4]*Ibid.*, p. 672. Emphasis added.

tors produce some revenue actually or constructively.[5] This percentage for the United States compares reasonably well with the percentage of foreign patents surviving at least five years, having been kept in force by one or more payment of annual renewal fees.[6]

The percentage of all patented inventions for selected countries for which data are readily available, which have survived five years or longer with one or more annual payment of renewal fees to keep them in force are shown in Table 1. The Table also shows the percentage surviving from fifth to the sixth year, and an index of abandonment of patents between the fifth and the sixth year after the time of filing or the year of issue as the case might be.

The Table shows marked variation in the percentage of patents surviving through the fifth and the sixth year. This is understandable, since the criteria for issuing a patent differ markedly in the different countries. In addition, the proportion of foreign inventions patented in the different countries in relation to domestic patents varies markedly for each. And it is believed that this proportion is also associated with the patent survival rate.[7] It is also probable that the proportion of company owned patents, in relation to individually owned, might also contribute to differential survival rates for the different countries. On the basis of the Patent Utilization Study we would infer that other things

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[5]In this total we include in addition to patents reported commercially used, those that were licensed. The Patent Utilization Study defined commercially used patents, those inventions that were reported sold, produced for sale, or used in the manufacture of articles for sale. A patent which failed to meet at least one of these conditions was not considered used, even if it were licensed. The 60 percent includes licensed patents.

[6]For most European countries an invention which has been put to commercial use in the country of origin may not be patentable any more. There are other countries, such as Great Britain, where commercial use in that country, but not otherwise, invalidates the invention for a patent. In those countries, therefore, commercial use prior to patent application is not permitted. In the light of what we found in the United States, namely, an extremely high propensity for patented inventions to be put to use as quickly as possible, it would seem reasonable that similar propensity must prevail in other countries. Consequently, patented inventions for which applications were filed five years ago, and on which at least one or more renewal payments are made are likely to represent inventions which are licensed or are in commercial use. See Sanders, B. S., "Speedy Entry of Patented Inventions into Use," *PTC J. Res. & Ed.*, Vol. 6, No. 1 (Spring 1962), pp. 87-116. In the United States, where no renewal fees are required, about 80 percent of the patented inventions are ever used commercially. The initiation of such use precedes the sixth anniversary of the patent application date—and in nearly half of these the date of initial use precedes the date of filing patent application.

[7]The percentages of foreign patent applications in each of the countries in

being equal the increased proportion of foreign patents over domestic would tend to increase the survival rate. Similarly, other things being equal, it is believed that the higher the proportion of corporate owned patents the higher the survival rate. It is also possible that the survival rate is affected by type of industry in the different countries and a host of other differential factors including the size of the market and the nature of patent protection actually available from the courts and other enforcement agencies. These differentials in themselves make an international patent utilization study promising in casting new light on the economic contribution of patented inventions within diverse institutional settings.

It is believed, however, that one of the most important differential factors influencing patent survival as shown in Table 1 is the original selectivity, i.e., the criteria used by the different countries in issuing a patent. The highest percentage of survival is observed for the patents issued in Germany,[8] followed by Sweden, and Great Britain, in that order. This is also the order of relative stringency of requirements in granting patents by these respective countries. The lowest survival percentages are for Denmark, Netherlands, and France. Of these, in France there are no exclusion requirements whatsoever, therefore, the low survival rate is understandable. But in Denmark applications are examined and published for opposition—so it is not clear how to account for its low survival rate except in terms of its size. In Netherlands, where patent applications are subjected to rigorous examination with searches through prior domestic and foreign patents and also to opposition, the comparatively low survival rate might be attributable to several factors. One of these is the longer exposure. In Netherlands the time starts running after the patent is actually issued. Therefore compared with German, or British patents, the average Netherlands patent might be two or three years older in terms of its possible commercial exploita-

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Table 1 for the years 1950-57 inclusive supplied by a recent publication are:

Great Britain	40.7 (55)	France	44.8
Germany	25.4 (35)	Netherlands	72.3
Switzerland	56.5	Austria	56.0
Sweden	52.7	Denmark	61.6

Ministere de L'Industrie, Institut National de la Propriété Industrielle, *La Protection des Inventions en France et a L'Etranger;* Etudes Statisques Tableaux Numeriques Diagrammes (Paris, 1960), pp. 25-32. The percentage given for Great Britain is in terms of initial and completed applications. In terms of completed applications the percentage would be 55. For Germany 35 would be a more representative average.

[8]Federico, P. J., *op. cit., supra,* note 2. See also *Renewal Fees and Other Patent Fees in Foreign Countries,* Study of the Subcommittee of the Committee on the Judiciary, United States Senate, 85th Congress, 2nd Session, pursuant to S. Res. 236, Study No. 17, Washington, 1958, 40 pp. Prepared by Federico.

TABLE 1

MEAN PERCENTAGE OF PATENTS OF SELECTED COUNTRIES IN SPECIFIED YEARS WHICH SURVIVE THROUGH THE FIFTH AND SIXTH YEAR AFTER FILING OR AFTER ISSUE BY THE NUMBER OF RENEWAL FEE PAYMENTS AND THE INDEX[1] OF ABANDONMENT OF PATENTS FROM THE FIFTH TO THE SIXTH YEAR.

Country	Years of Payments	Percent Surviving 5th yr.	Percent Surviving 6th yr.	Number of Renewal Fees Paid[2] 5th yr.	Number of Renewal Fees Paid[2] 6th yr.	Proportionate Decline in Survivals from 5th to 6th yr.[1]
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Great Britain[3]	1930-39	59.9	46.7	1	2	20.0
Germany[3]	1930-39	73.3	56.2	4	5	23.3
Switzerland[3]	1930-39	44.8	35.8	4	5	18.8
Sweden[3]	1930-39	62.1	25.6	2	3	20.4
France[3 4]	1930-39	36.8	30.0	4	5	18.5
Austria[5 6]	1925-34	39.2	31.6	4	5	19.4
Denmark[5]	1921-30	29.3	22.8	4	5	22.2
Netherlands[3 7]	1930-39	35.3	28.7	5	6	18.7
Netherlands[3 7 8]	1930-39	41.8	33.8	4	5	19.1

[1]The index is obtained by subtracting column (4) from column (3), dividing the remainder by the figure in column (3) and multiplying the quotient by 100 to get rid of the fraction.
[2]The years shown here are the statutory requirements but the actual number of renewal payments is not known, but would be generally less since payments are differed as long as the patent has not been granted.
[3]Taken from: *Renewal Fees and Other Patent Fees in Foreign Countries;* Study of the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, United States Senate, 85th Congress, 2nd Session, Pursuant to S. Res. 236, Study No. 17, 1958, prepared by P. J. Federico, pp. 27-30.
[4]Spot estimate, extended to the entire period.
[5]Derived from official sources by the present author.
[6]For Austria, the time starts running after publication, while in most others unless specified the time starts with the filing of a patent application. This could account for the lower survival rate.
[7]For the Netherlands, the time starts running from the date of issue. This could account, at least in part, for the relatively low survival.
[8]Limited to patents on which the first fee was paid.

tion. Aside from this we are led to believe that the size of the market might be another important differential factor affecting survival rates.[9]

It is to be observed that the percentage of patents surviving through the fifth year for Great Britain is almost the same as our estimate of revenue producing patents for the United States. The percentage shown for Sweden exceeds that for the United States and that for Germany is much higher than our estimate for the United States with respect to patents "producing revenue to their holders."

Since we have no reason to assume that the criteria of patentability are any less stringent in the United States than they are in any other

[9]The hypothesis would be that in countries with small internal markets, foreign patentees do not always deem essential to continue patent protection in order to retain control of the market. These are inferences which can be confirmed only through a properly designed empirical study.

country, including Germany, one would expect, other things being equal, that the proportion of patents that are "revenue producing," should be about as high in the United States in comparison to other countries if our hypothesis was correct that selectivity is perhaps the most important factor contributing to the differential. The fact that the United States rate of exploitation is below that inferred for Germany and Sweden would indicate that other things were not equal.

Inventions by Non-Residents

One known difference, which is apt to show higher foreign percentages in comparison to those for the United States patents is that the estimate of 60 percent was limited to patents issued to residents of the United States. The percentages in Table 1 have no such limitation, they include all patents of a given country, whether issued to residents or non-residents. In the Patent Utilization Study we found that inventions which had been patented both in the United States and abroad had a higher commercial utilization rate than those with only a domestic patent.[10] Our latest information bearing on this differential, based on assignee replies, shows that for inventions patented both here and abroad the percentage reported commercially used is 59.2, and an additional 7.4 percent not used but licensed.[11] The corresponding percentage of inventions used is 39.6 for those patented in the United States only, and an additional 10 percent reported licensed but not reported as used. It would seem reasonable to assume that there would be, as a rule, a similar differential in the patents of these countries between their foreign and domestic patents[12] and this, in some measure, might account for the comparatively higher proportion of Swedish and German patents surviving through the fifth year.[13]

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[10]Sanders, B. S., "American Inventiveness v. Foreign Inventiveness," *PTC J. Res. & Ed.*, Vol. 5, No. 2 (Summer 1961), p. 126, Table III.

[11]We can not be sure what proportion of these licensed patents might be in commercial use by the licensee. In some instances the licensor might be a corporation engaged exclusively in research and the question of commercial use might be regarded as proprietary to their licenses as some assignees have advised us.

[12]Footnote 7 indicates wide differences in the proportion of foreign to domestic patent applications for the different countries represented in Table 1. The source cited in footnote 7, gives the percentage of United States patent applications filed by non-residents in the years 1950-57 as 17. The sample of the United States patents for Patent Utilization Study showed the percentage of patents issued to non-residents as 12.5, 7.9 and 10.2 for 1938, 48 and 52, respectively. See *PTC J. Res. & Ed.*, Vol. 3, No. 3 (Fall 1959), p. 231, Table 4.

[13]One of those reviewing this report prior to publication observes that his com-

Possible Underreporting of Revenue Producing Patented Inventions

It is conceivable that the proportion of commercially used patented inventions and those licensed in the United States, issued to residents could be appreciably higher than 60 percent, the estimate based on the Patent Utilization Study. For instance, we found that the patent utilization rate was much higher for the smaller companies.[14] In our interim report already published it was shown that corporations with 75 or more United States patents issued to them between 1939-1955 and or having assets of $100 million or more in 1954 that were represented in the sample for the Patent Utilization Study accounted for 64 percent of all assigned patents. But for the group of patents for which a completed questionnaire was returned, these larger companies accounted for 72 percent of the total. Thus indicating a marked underrepresentation of what we might call the smaller companies (i.e., those with assets of less than $100 million an fewer than 75 patents issued to them). The smaller companies, which in the original probability sample contributed 36 percent of the assigned patents, accounted for only 28 percent of the completed questionnaires received. Thus showing an underrepresentation of the smaller companies in the working sample (completed questionnaires) on which the estimate of 60 percent is based. For the larger companies, which were overrepresented, the percentage of patents reported used in the past or in current use was only 42, the corresponding percentage for the underrepresented smaller companies was 69.[15]

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pany's chief problem in determining whether to maintain or abandon a foreign patent is the paucity of information. This individual believes, therefore, that if available information concerning use prospects of patented inventions of his company in foreign countries were as good as that with respect to domestic patents, the proportion of foreign patents kept in force would be materially reduced. If this is a general characteristic for non-domestic patents this could contribute to the differential in utilization of patents of foreign countries in comparison to the United States. This would be a differential separate and distinct from the selectivity factor already discussed.

[14]Sanders, B. S., Rossman, Joseph, and Harris, L. James, "Patent Acquisition by Corporations," *PTC J. Res. & Ed.*, Vol. 3, No. 3 (Fall 1959), p. 234, Table 5.

[15]*Ibid.*, p. 248, Table 9. This marked negative association between company size and the percentage of patents reported used commercially has been studied more intensively since the publication of the interim report in 1959 to which reference has been made. In these later studies we have ranked corporations according to their net sales, net earnings and gross assets. For each of these we find the same sort of marked negative association between the corporation size and the proportion of patents reported in commercial use as we found in the earlier analysis already published in 1959. These findings will be incorporated in a forthcoming interim report.

It is also probable that failure to return a completed questionnaire was more likely for a patented invention in our sample that was used in comparison to one that was not put to commercial use. We had suspected this possibility but had no clear cut evidence in support of it, we now have some evidence which tends to confirm our hunch.

Especially in view of the incomplete returns of the sample of patents used in the Patent Utilization Study this writer has felt strongly the need for a validation study following three lines of approach. First, taking a subsample of inventors and possibly the few assignees that could not be reached for the lack of a current address, to find them, if possible, and obtain completed questionnaires to determine to what extent, the patents held by them differed from the other patents in our sample for which questionnaires were received. Second, to take a subsample of inventors and assignees who failed to return a questionnaire and interview them to obtain the information that we sought with our questionnaires, to determine the extent and nature of the bias introduced by patents for which no questionnaire was returned, even though we were in communication with inventor and assignee. Third, to take a subsample from all those patents for which a completed questionnaire has been obtained at any time, whether by interview or mail, and interview the inventor and assignee, and examine such records and other objective information available to ascertain the accuracy and completness of the information supplied in completing the questionnaire.

However, the resources of the Foundation have not made it possible to carry out this sort of a validation study.[16]

In 1962, therefore, the Foundation undertook a much more modest attempt to check at least on the reliability of the information supplied by assignees with respect to a few key questions. To achieve this we sent a postal card questionnaire to those assignees who had returned to us completed questionnaires.[17] From the returns we observed that the returns for patented inventions that were reported used in the past came in with much greater delay. This we attribute

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[16]In 1961, The Patent, Trademark and Copyright Foundation of The George Washington University applied to the National Science Foundation for a modest research grant to finance the validation study outlined, but the application was not productive.

[17]Questions: 1. Was sampled patented invention ever put to commercial use? Yes ____, No ____. 2. If yes: (*a*) Please indicate date such use began; (*b*) Is patented invention still in use? Yes ____, No ____; (*c*) If not in use, when did use

to the fact that for older patents which have not been in use for some time the records may not be as readily available and it requires more time and effort to go through them and extract the information desired. It is quite possible that in some instances for these obsolete patents the files might even be inaccessible or actually destroyed.[18]

With patented inventions that were never in commercial use the situation would be somewhat different. In some instances the respondent or someone to whom the respondent can consult would know that the invention was never used and there is no need to go to the records, since there is no information to extract from the records. Where such a person is not available then the records have to be consulted, but once it is clear that the patent was never used then no further effort would be required in returning the questionnaire.
With respect to patents in current use the records are readily available, and if the questionnaire is a short one, little effort would be required to complete it—so one would expect early return and generally correct entry as to utilization status. But the situation could be much more different if the questionnaire is a long one, such as the questionnaires used initially for the Patent Utilization Study.[19]

The time lapse for the return of postal card questionnaires bears out at least some of our expectations. This is shown in Table 2.

It is seen that lapsed time between the mailing and receipt of the questionnaire is longest of all for patents used in the past, followed by never used patents, and shortest for patents reported in current use.[20] The differences between the mean for currently used patents and that for the other two groups are statistically significant, but not between the means for patents reported in past use and those never used. The

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terminate? Year _____, Month _____, Day _____; (*d*) Has use been profitable? Yes _____, No _____. 3. Was patent ever licensed? Yes _____, No _____. 4. If yes, is it licensed now? Yes _____, No _____. 5. Was this invention also patented outside the United States? Yes _____, No _____. 6. If yes, in how many foreign countries? _____.

[18]Interest might also play a role. The inventor or the assignee would have little interest in an obsolete patent to invest any time in searching the files to obtain information so they are more apt not to respond to the questionnaire or merely to report it not used or unknown. Many letters reflect this attitude, the assignee saying that the sampled patent was an old patent no longer of any value.

[19]Sanders, B. S., Rossman, Joseph, and Harris, L. James, "The Patent Utilization Study," *PTC J. Res. & Ed.*, Vol. 1, No. 1 (June 1957), pp. 109-111.

[20]This would tend to confirm our hypothesis of lagging interest in undertaking work with respect to obsolete patented inventions, touched upon in footnote 18. Converse to the lack of interest in obsolete patents, inventors and assignees are actively interested in patented inventions which are still in current use.

variability in time, shown in column 4, also appears suggestive. It is generally lower for patents used in the past and it is lowest for those patents for which utilization status remained the same on both questionnaires. This suggests possible copying from the previously completed questionnaire by some assignees. Such a practice would result in early return, but it would nullify the objective of this experiment. Whether this occurred or not and on what scale we do not know.

TABLE 2

STATISTICS OF TIME LAPSE IN RETURNING POSTAL CARD QUESTIONNAIRES BY ASSIGNEES IN RELATION TO UTILIZATION STATUS REPORTED ON THE INITIAL AND SUBSEQUENT QUESTIONNAIRES.

PRELIMINARY

Utilization Status Reported	Return Time in Weeks			Number
	Mean	S.D.	C.V.	
(1)	(2)	(3)	(4)	(5)
All Cases[1]	3.26	3.09	94.8	436
In Current Use				
Reported Both Times	2.75	2.63	95.6	100
Subsequently[2]	2.86	3.03	105.9	128
Initially[3]	2.76	2.66	96.4	142
Past Use				
Reported Both Times	3.96	2.87	72.5	39
Subsequently[2]	3.67	3.14	85.6	79
Initially[3]	3.77	3.21	85.1	85
Never Used				
Reported Both Times	3.47	2.81	81.0	149
Subsequently[2]	3.35	3.09	92.2	226
Initially[3]	3.41	2.77	81.2	171

[1]Postal card questionnaires were mailed to assignees who had returned questionnaires. These represented 588 assigned patents. Of these 392 were responded to. After about 7 months follow-up letters were sent to many assignees who had not returned the postal card questionnaire. In response to these, to date (12-1-62) we have received 44 additional returns, making a total of 436 returns out of 588 mailed. The time lapse for follow-up cases is from the time that follow-up letters were sent.

[2]"Subsequently" refers to the utilization status reported for the sampled patent on the postal card questionnaire. It should be noted that of the 436 returns, only in 281 the use indicated was the same as that indicated on the first return. In others the use reported on the postal card differed from that reported in the initial return. On some of these the change indicated no inconsistency—such as when a patent had been reported in current use before and now in past use. In others (about 17 percent) the difference indicated a discrepancy. We have not tried to differentiate these in Table 2.

[3]Utilization status as reported in the initial questionnaire.

The most important effect of long delays in response is apt to result in a lower return of patents for which more work is required (more time)—and this would be true particularly for patents used in the

past.[21] This expectation is born out by the return patterns of our postal card questionnaires, as shown in Table 3. Column 2 shows the frequency of patents according to utilization status as reported by assignees in the initial questionnaire. Column 3 shows the number of these patents for which a postal card questionnaire was returned prior to the recent follow-up letter, grouped according to the utilization status reported initially. Column 4 shows the proportion return from the first mailing of the postal card questionnaire. The overall ratio, regardless of utilization status, is 67 percent, but the percentage for patents used in the past is materially lower, less than 61. Column 5 shows all the returns of postal card questionnaires to date (12-1-62). The overall percentage of return shown in column 6 is about 74, the corresponding percentage for patents reported used in the past (on initial questionnaire) is about the same—lower than for patents in current use and those reported in future use.[22]

We are led to infer, therefore, that our initial returns were even more seriously deficient with respect to the proportion of patents used found in the probability sample of assigned patents of which assignees returned less than 60 percent. There is reason to believe the relative deficit of patents for inventions used in the past was more marked in the returns of initial questionnaires than that suggested by Table 3.[23]

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[21]Nearly all of us can recollect circumstances when we set aside a task that requires considerable time with every intention to attend to it "soon," but as time passes our resolve to tackle it is gradually worn down, and the task remains undone. This is probably what happened in many instances for used patents where the inventor and assignee had to consult the records to be able to complete the the questionnaire. And this could have also happened to a lesser extent for patented inventions in current use since much supplementary information regarding the consequences of commercial use had to be found and answered for the initial questionnaire. It is probable, therefore, that despite the greater interest in patented inventions in current use more of these remained unresponded in comparison to those that had never been used.

[22]It must be remembered that for all of these patents, records had been obtained to answer the initial questionnaire, thus circumstances were materially different from the selective factors operating with respect to replies to initial questionnaires in 1955-57.

[23]Like others, our first inclination was to assume that patents for which questionnaires were returned were more apt to be for successful inventions. But in this assumption we had overlooked the differential effort involved in completing a questionnaire. For never used patents the respondent had very little to do in answering our original inventor or assignee questionnaire; but for a patented invention in use, or used in the past he was required to dig up much information, such as the date when use began, the date when use terminated, the effect of the

In Table 3 we are dealing with patented invention for which a file or some record was available in view of the return of the initial questionnaire; in the initial sample it is probable that records for patents which had become obsolete may not have been available in many instances or not easily accessible, this being a further obstacle in the path of completing and returning a questionnaire. In some of these, if the respondent had a hunch, sometime erroneous, that the invention was not used, he could have returned the questionnaire indicating non-use without consulting any files. Apparently in a few instances this might have occurred, but this could not occur with respect to patents put to commercial use where such use was indicated currently or in the past.

TABLE 3

NUMBER AND PERCENTAGE OF ASSIGNED PATENTS WITH INITIAL QUESTIONNAIRE FOR WHICH POSTAL CARD QUESTIONNAIRES HAVE BEEN RETURNED IN RESPONSE TO THE FIRST OR SECOND REQUEST, DIVIDED ACCORDING TO UTILIZATION STATUS AS REPORTED INITIALLY BY ASSIGNEES.[1]

PRELIMINARY

Utilization Status as Reported in Initial Questionnaire	Initial Questionnaires	Returns from First Mailing[2]		All Returns to Date[3]	
		No	(3) as % of (2)	No	(5) as % of (2)
(1)	(2)	(3)	(4)	(5)	(6)
Current Use	180	122	67.8	142	78.9
Used in Past	113	68	60.7	85	75.2
Future Use	45	32	69.6	36	80.0
Never Used	250	170	68.0	173	69.2
Total	588	392	66.7	436	74.1

[1]The initial questionnaires were mailed in different waves late 1955 and early 1956 and most of the returns came in 1956.
[2]First mailing of the postal card questionnaire was done late in 1961 and at the beginning of 1962.
[3]The follow-up letters to some of the assignees who had not returned a postal card questionnaire were sent out early in September, 1962. No returns have come in December, 1962 and since.

Another differential which must not be overlooked is the size and complexity of the file from which the information must be culled. It would be reasonable to assume that for currently used patents the file is readily available and some salient information might be kept up to date by some corporations. But this would not be universal, moreover, it is improbable that information would have been readily available on all the items anywhere. Therefore, even for currently used patented inventions a search of the files was essential to answer initial ques-

use on sales and on production costs, net returns realized from the use of the invention, etc. And for patents used in the past, getting hold of the records in itself may have represented a considerable task in many instances.

tionnaires—and this would have prejudiced the completeness of return for used patents, compared with those that were never used. Some confirmation of this inference is found in the returns of postal card questionnaires.

This bias from failure to answer, or to regard the invention as never used, or to indicate the utilization status as unknown would be particularly marked for inventions used in the past. On the basis of a comparison of the utilization status for a given invention reported initially and subsequently we are led to infer that depending on the nature of the file and the thoroughness of the respondent in examining the file, conflicting answers might be supplied regarding the utilization status of the sampled patent. Thus, we find that for 15 inventions initially reported in current use now (postal card questionnaire), the response is that these inventions were never used. This could result from a failure for the subsequent respondent to have checked the record carefully, or it could possibly be because the later respondent used a more rigorous criterion as to what he regards commercial use—perhaps profitable use. We are inclined to believe, however, that in most of these, failure to search the record thoroughly accounted for the discrepancy. In 11 of these 15 the date of initial commercial use was given which the initial respondent could not have invented, though the subsequent respondent could have easily overlooked it and considered the patented invention never used.

In 29 others, which initially were reported used in the past, on the subsequent questionnaire the entry was never used. The same reasoning could apply to these.[24] Of these, in 23 the date when use began is reported in the initial reply. It is probably noteworthy that in 11 of the 25 the date when use began was in the thirties. That is the older, and the more extensive the records, the less likely becomes a return of the questionnaire, and in the event of a return there is a greater likelihood of error by reporting the sampled patent as never used. Thus, in 44 cases initially reported used the subsequent returns indicate never used.

There are nine cases initially reported never used, but the subsequent returns report these in current use. Since in seven of these

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[24]Note that the proportion of patented inventions initially reported in current use, which in response to the postal card questionnaire were reported never used, is proportionately much smaller—about 10 percent, compared with 33 percent for patents reported used in the past in the initial questionnaire. This difference is not a happenstance.

the date when first use began is specified as prior to 1955, we are inclined to conclude that in these, the initial respondent was negligent. In six of these seven, profitable exploitation of the sampled patent is reported. Therefore, the question of interpretation of what constitutes use could not account for the disagreement. In the one case, where the information on profitable use is not supplied, it is possible that the use had been so limited that at the time of initial reply there might have been some question of interpretation. There might also be some question of interpretation for another one of the nine inventions for which the date when commercial use began is not supplied. Finally one of the nine is for an invention the commercial use of which began in 1957, following the return of the initial questionnaire. It is of interest that this invention was not reported as "future use," which it should have been according to our instructions for completing the initial questionnaire.

There were twelve, formerly reported never used, but reported used in the past on the postal card questionnaire, for all of these the date when commercial use began is given. We are inclined, therefore, to accept the reclassification of these at their face value and attribute the error to the respondent of the initial questionnaire. It is perhaps significant that on most of these the commercial use began quite early. In nine of the twelve the date when use was terminated is also given, and if we accept these dates at face value, they would indicate that these inventions were in current use when the initial questionnaire was returned. These findings indicate a distinct bias favoring lower utilization level. If the respondent for some reason comes to the conclusion that the invention is not used, there is no reason for him to change his erroneous supposition. But such a mistake could not occur with an invention that is reported used, since the respondent is asked to fill out many other supplementary questions, which he can get only by a careful examination of the record; such as date when use began for all used patents. For patents used in the past, the date when use terminated is also required. There were many other specific answers required for all the commercially used patents whether used in the past or currently. Among these were, the intensity of the use, the effect of use on sales and on production costs, the net amount realized from the use, laboratory testing preceding the commercial exploitation of the invention, the costs in developing the invention for the market, etc. It is apparent, therefore, that carelessness, lack of thoroughness, and sheer inertia all would tend to reduce the returns for inventions that were put to commercial use, especially those used in the past and a

consequent exaggeration of the proportion of patented inventions reported never used in the returns. This exaggeration was produced both by a higher return rate for patented inventions in the sample that were not commercialized, and through errors in considering patented inventions that had been used commercially as not used.

We are justified, therefore, to consider patented inventions reported used initially or subsequently as a better approximation of the "true" proportion of such patents than the responses on either return by itself—disregarding the discrepancy. Therefore, if we add to the 227 patented inventions reported as used in the past or in current use by the postal card questionnaire those reported used in the initial questionnaire we would have a total of 252 used patents out of 436 for which cards were returned. On this basis the percentage of used patents would be about 58, while the percentage based on initial returns for these 436 patents was about 52.[25] It is not inconceivable at all that in the group of patents for which no questionnaires were returned initially the proportion of inventions put to commercial use would be substantially higher than even this adjusted proportion on the basis of the initial and the postal card questionnaires. There is strong indication, therefore, that our estimate of 60 percent of inventions patented by residents being used at anytime, and those licensed errs appreciably on the low side. The true figures could be appreciably higher.[26]

Administrative Differences

Finally, it is possible that in some measure the higher retention rate in Germany and perhaps in certain other countries requiring renewal fees might be a consequence of delays in granting the patent. If the life of the invention starts running from the date of application, as it does in Germany and many other countries, a significant proportion of patents could be still pending on the fifth or even the sixth anniversary of their filing date. As illustration of this phenomenon, in

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[25]Actually for identical patents there is a net diminution of used patents on the postal card questionnaire, but this net loss is partly made up by some "future used" patents that were actually put to use. As we have seen, of those reported used initially 44 were reported never used subsequently, or unknown (1 unknown) but only in 21 the initially reported never used patents are reported as used in the postal card questionnaire.

[26]The Foundation has received letters from some companies indicating that the percentage of their patented inventions used exceeds 70 to even 90 percent—but of course one can not infer how representative these companies are and, therefore, could not base any conclusion on these.

footnote 60 of this report we actually reproduce the number of patents applied for in a given year reported granted in two successive reports of the *Blatt für Patent—, Muster-und Zeichenwessen,* for 1961 and 1962, respectively. From these figures one can see that if one were to consider patents applied for in 1955 as given in the 1962 volume 100 percent, the number of such patents reported in the 1961 volume would be only about 90 percent of the 1962 total. If one were to wait for the figures in 1963 volume of patents applied for in 1955, this number would be appreciably higher than that shown in the 1962 report; perhaps by about 8 percent higher. The figures that would be given in 1964 report would be more than 10 percent higher, and so on. From the data shown in footnote 60 we infer that ultimately the number of patents granted which had been applied for in 1955 would be 20 to 25 percent higher than that given in the 1961 official report. But this final or near final figure would not be forthcoming until the annual report for 1968 or 1969 is published. These inferences are based on the figures given in footnote 60 which show marked discrepancy between the number of patents applied for in a specific year that were reported in the official publication for 1961 and 1962, respectively. It would be seen that these differences are very large at first but they diminish progressively. Thus for patents applied for in 1948 the number granted as reported in the 1961 volume is 13,456 and in the 1962 volume 13,483. If we consider the 1962 total as complete, 100 percent, the 1961 figure would represent 99.8 percent of this total.

That these long delays, in adjudicating the validity of a significant proportion of patent applications have serious consequences in the effective exploitation of the patented invention, is well recognized, was indicated by Dr. Franz Froschmaier in his Foundation sponsored public lecture, March 7, 1963.[27] Froschmaier indicated that in order to ameliorate, if not overcome this administrative difficulty, the new Common Market patent provisions are designed to issue the patent provisionally for the first five years so as to mitigate this long delay.

Apparently the delay in granting the patent may impede the effective exploitation of the invention so that many patentees whose patent is granted after the fifth or sixth year may nevertheless undertake the payment of the annual maintenance fees which have become due with the

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[27]Froschmaier, F., "Progress Toward the Proposed Conventions for a European Patent and for a European Trademark, *PTC J. Res. & Ed.,* Vol. 6, No. 4 (Winter 1962-63), pp. 477-498.

hope that once they have the patent they might be able to exploit the invention commercially—a hope which may not be always justified. To the extent that there is such a relationship, there might be an exaggerating element in regarding patents maintained through the fifth year as representing inventions that have been put to commercial use. It is also conceivable that this uncertainty would have been particularly high in the years of World War II during which a certain proportion of the patents applied for during 1930-39 were issued. As far as percentages shown in Table 1 are concerned, however, there are perhaps two mitigating considerations: (*1*) That despite the delaying influence of the war, the backlog in granting patents, as suggested by figures for Germany given in footnote 60 are probably considerably greater for postwar years than they were for patents applied for in the years 1930-39 and granted prior to 1945, when the German Patent Office closed and was not reopened until 1950. (*2*) There are always probably a certain proportion of patent applications resulting in patents that are put to commercial use, which are not kept in force through the fifth year either because the invention has become obsolete, or because the patentee finds that he can effectively exploit the invention without patent protection.[28] As the time in granting patents is protracted the less valuable patent applications would be abandoned so there would be an upgrading of inventions for which patents are eventually granted. This would be particularly true for German patents because of accumulated heavy burden of renewal payments which occur as the granting of the patent is delayed. This might account in part for the much higher survival rate of German patents.

We are led to surmise from these that were the United States to adopt the practice of renewal fees, as has been suggested at times, between three-fifths to three-fourths of the patents issued would be kept

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[28]It is also conceivable that a small proportion of patented inventions might be maintained by payment of renewal fees because the patentee has not given up the hope of eventual use. This would be analogous to patented inventions in the Patent Utilization Study which were reported in "future use." However, this is less likely to occur in European patents kept in force; while in the United States assignees reporting "future use" were merely expressing a wishful hope at no extra cost, in Europe to keep a patent in force the patentee must make progressively iincreasing payments each year to maintain the patent. In the Patent Utilization Study there were in all 45 patents, nearly 8 percent of the total on which assignees reported "future use." In our postal card inquiry we have had returns for 36 of these 45 "future use" patents. The information on utilization supplied by assignee for these 36 is commercial use for only 4. For the rest no commercial use is checked. In 7 additional patents reported in "future use" the patent is reported licensed but no actual use is reported.

in force to about the fourth or fifth year because they would represent revenue producing inventions for which patent protection would be deemed valuable.

Conversely the proportion of patents put to commercial use in the United States and those licensed, strengthens our confidence in the hypothesis that the proportion of patents kept in force to the fifth year through payment of renewal fees in European countries represent by and large revenue producing inventions.

Duration of Survival of Patents in Relation to Continued Use of the Invention

While we hypothesize that by the beginning of the fifth year most of the patented inventions which have brought no economic return would have been dropped to avoid continued payment of annual renewal fees, the converse does not follow. That is, for many inventions the commercial use may continue long after patent protection has been dropped by choice or by the termination of the maximum period of patent protection. In fact, this very situation might be used as a handle to determine through objective first hand studies the extent that the patent protection after the initial period serves as an instrument of economic monopoly about which there is vast amount of economic speculation with very little verifiable evidence one way or another.[29]

To be sure, the overwhelming majority of patents that are allowed to lapse without the payment of *any* annual renewal fees represent inventions that were not put to commercial use, including some used ones which had become obsolete by the time the first renewal fee had to be paid. This, however, does not exclude the possibility of there being a few inventions that are in commercial use but for which the patentee is sure enough of his control of the market so that he sees no need for patent protection by payment of renewal fees. For patents kept in force through the payment of renewal fees, as the life cycle of the patented invention evolves, with the arrival of each anniversary when the payment of renewal fees is required there would be a sort of reassessment of the situation, and with aging of the invention more and more patentees with commercially used patents would allow the patent to lapse because they conclude that they can control the future

[29]One frequently encounters broad charges about large corporations buying important patents and shelving them so as to prevent their use. No properly documented evidence of even a single important instance has come to the attention of this writer.

exploitation of the invention without the further protection provided by the patent. By the time a patent has been in force for five years or more it is apt to be a revenue producing patent. The progressive abandonment of these patents from then on represents some inventions which become obsolete but more and more predominantly, they represent inventions where the patentee after assessing his competitive position concludes that he no longer needs the patent protection on the particular invention for its exploitation.

It is probable that this cost balancing and abandonment of the patent protection occurs more often with inventions where the economic returns are more modest in comparison to those that are kept in force for the maximum duration allowed by law. But there could be no question that many of the inventions for which the patent protection is dropped, the dropping of such protection, per se, is no indication of obsolescence. The most important evidence in support of this is from the Patent Utilization Study. The study shows that many inventions remain in commercial use, on the basis of information supplied by assignees, for many years. Thus on the basis of the initial questionnaires from assignees 52 percent of all the patented inventions issued in 1938 which were reported in commercial use at any time were still in use in 1956 and 57, when the questionnaires were returned. The mean number of years that these inventions had been in commercial use was in excess of 19, limited—to be sure—by our period of observation.[30] We have every reason to assume that in foreign countries as well, patented inventions must remain in commercial use for long periods of time. Since the mean effective life of most patents is comparatively short—this means many inventions continue in commercial use even though patent protection is abandoned years before the terminal year allowed by law.

There are other indications that many corporations have other ways of retaining control on inventions once the patent protection has

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[30]We are planning to present this evidence supplemented by later information obtained from the postal card questionnaire to show the effective longevity of the use of many patented inventions which belies such undocumented assertions as the following: "The research and development work is essential for the maintenance of its position. It [a company] cannot allow itself to fall seriously behind in the technological race, regardless of whether inventions promise it a 17-year patent protection, *which in fact as a result of obsolescence means usually no more than a few years, or whether inventions promise it only a head start of two or three years* or only a means of catching up with the rivals." Machlup, F., "Patents and Inventiveness Efforts," The Evidence Is Insufficient to Prove or Disprove the Claim That Patent Protection Promotes Inventive Effort, (*Science,* Vol. 133, No. 3463 (May 12, 1961), pp. 1463-1466. Emphasis added).

enabled them to put the invention on the market. Such evidence is supplied by the studies undertaken by The Patent, Trademark, and Copyright Foundation of The George Washington University with respect to the consequences of selected antitrust decrees. In the *Concrete Producing Machinery* case it was found that antitrust decision did not change the competitive position of the Besser Company that was charged with the violation of the Sherman Act. Similar findings resulted from the studies of *Vehicular Parking Meter,* and the *Technicolor* cases. While the antitrust decrees may have slowed down the progress of offending corporations, they did not improve significantly the competitive position of complainants.[31].

There are in all probability a certain proportion of inventions for which the patentee would prefer continued protection much beyond the maximum period allowed under the law. This was illustrated in this country for patents issued prior to 1861 when the ordinary patent term was 14 years, but patentees were allowed an extension for seven additional years. The patentee had to pay $50 to obtain this extension. Some 7.5 percent of the patentees in the period 1865 to 1874, for which information is available, took advantage of this provision, others who would have liked this extension could not qualify.[32] Because of the costliness and diffculties of direct studies of patented inventions and the economic role that they play, as the quotation from Federico indicated,[33] it is instructive to study the survival course of foreign patents for which the patentee is required to make annual payments to keep the patent in force. Such studies take on greater significance since the findings from the Patent Utilization Study give us insights and suggest hypotheses that would not have been possible otherwise.

Thus our various hypotheses about the proportion of patented inventions being used commercially, and the long continued use of many inventions after patent protection is waived or expires find confirmatory indication through foreign patent statistics.

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[31]Frost, G. E., Oppenheim, S. C., Toomey, N. F., "Compulsory Licensing and Patent Dedication Provisions of Antitrust Decrees—a Foundation for Detailed Factual Case Studies, *PTC J. Res. & Ed.,* Vol. 1, No. 1 (June 1957), pp. 127-144; Vol. 1, Conference Supplement, 1957, pp. 20-26; Vol. 2, No. 1 (March 1958), pp. 61-134; Vol. 2, Conference Supplement, 1958, pp. 66-71; Vol. 2, No. 3 (Sept. 1958), pp. 376-417; Vol. 3, Conference Supplement, 1959, pp. 61-77; Vol. 4, No. 1 (Spring 1960), pp. 1-39; Vol. 4, No. 2 (Summer 1960), pp. 108-149; Vol. 4, Conference Number, 1960, pp. 21-22; Vol. 5, Conference Number, 1961, pp. 35-41.

[32]Federico, P. J., "Taxation and Survival of Patents," *Journal of the Patent Office Society,* Vol. XIX, No. 9 (September 1937), p. 687.

[33]See p. 47 of this report.

EVIDENCE OF SUPPORT OF OUR HYPOTHESES BY FOREIGN PATENT STATISTICS

The foreign patent renewal statistics tend to support the two hypotheses deduced in part from the Patent Utilization Study.

It is believed that the uniform ratio of abandonment of patents of different countries beginning with the fourth to sixth year after filing or after issue is one indication of the economic productivity of these inventions. In the commentary on the analysis of Dernburg and Gharrity this author demonstrated graphically the uniformity of these rates of decline in the patents kept in force in different countries.[34] This uniformity is also demonstrated by the index in Table 1 in this report. While the percentage of patents surviving through the fifth or sixth year from all those issued differ very markedly for different countries as a result of varying criteria of patentability and other differences, the proportion abandoned prior to the payment of renewal fee for the sixth anniversary in the life of the patent is almost the same for each country. This uniformity bespeaks of the comparative homogeniety of patents kept in force through the fifth year and thereafter. This does not necessarily imply uniform economic value, since such value is affected by differences in the patent laws and problems of the scale of operation, such as the size of the domestic market, etc.) but it does suggest uniformity in the sense that almost all of these inventions are revenue producing inventions.

Federico also dwells on the uniform rate of survival, he observes:

> "One remarkable feature of these curves [Percentage of Patents Surviving] is their regularity after the first 4 years, when all three [Great Britain, Germany, Switzerland] can be compared. They are all similar type and the decrease from year to year is almost exactly a geometrical decrease; that is each year being a constant fraction of the preceding year. If the portions of the curve from 5 years on were plotted on a similogarithmic graph paper, they would approximate straight lines [see Chart I], indicating that the decrease in the proportion of patents kept in force from year to year follows the simple exponential curve of decay."[35]

Indifference of Survival Rate to the Amount of Renewal Fees Required

The uniformity of decline in the survival rate of patents after the fourth or fifth year despite the wide disparity in the amount of renewal

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[34]Sanders, B. S., "Comment," *PTC J. Res. & Ed.*, Vol. 5, No. 4 (Winter 1961-62), p. 364.

[35]*Renewal Fees and Other Patent Fees in Foreign Countries,* Study of the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, United States Senate, 85th Congress, 2nd Session, Pursuant to S. Res. 236, Study No. 17, Washington, 1958, 40 pp., specifically pp. 27-29.

fees required by the patent laws of the different countries has important implications. These differences in renewal fees are marked in terms of absolute amounts charged over the entire period and in terms of the annual incidence of the charges, but neither of these seems to affect to any perceptible degree the survival rates from year to year. Both the aggregate amounts and the pattern of annual charges of renewal fees for recent years are given by Federico for many countries, including those considered specifically in this report.[36] This uniformity is illustrated by survival rate of patents for selected countries for which such data could be readily found, shown in Chart I (see Appendix).

Federico approaches this same problem, the indifference of survival rates to the payment of renewal fees, by comparing the renewal rates observed in different countries just before and after the renewal fees were increased. These observations are summarized in Table 4.

TABLE 4

PERCENTAGE OF PATENTS KEPT IN FORCE IN THE YEARS BEFORE, DURING, AND AFTER AN INCREASE IN THE ANNUAL RENEWAL FEE.

Country	Percentage Patents Kept in Force			Year and Extent of the Increase
	Before Increase	During Increase	After Increase	
(1)	(2)	(3)	(4)	(5)
Great Britain	88.2	88.0	90.0	Increase in mid 1955, affecting 7th through the 16th year renewal payments.
Switzerland	86.0	....	86.1	Increase in 1/1/57, 36 percent, affecting 8th to the 15th year.
Netherlands	91.2	91.0	91.7[2]	Increase in mid 1957, 75 percent, affecting all patents.
Germany	87.0	88.0	86.6	Increase in 1955.

[1]*Renewal Fees and Other Patent Fees in Foreign Countries,* Study of the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, United States Senate, 85th Congress, 2nd Session, Pursuant to S. Res. 236, Sudy No. 17, Washington, 1958, p. 32. Prepared by P. J. Federico.

[2]Obtained later. The percentages are based on total patents issued, including those on which the final payment was not made.

It is to be observed that there is no evidence whatsoever that an increase, even such an increase as 75 percent, in the annual renewal fee had any effect whatsoever on the proportion of patents renewed in the

[36]*Ibid.,* pp. 10-21.

year following the increase. This complete indifference of the survival rate of patents after the fourth or fifth year to increased renewal fees is a strong indication that the surviving patents are revenue producing and, these revenues are so large in comparison to the annual renewal fees that the latters influence on the specific decision to continue the patent in force or not are inconsequential.

Federico emphasizes this indifference:

> "The data available does not indicate that the increases in the amounts of the annual fees have affected the proportion of patents on which the fees are paid. The variations in the proportion paying the fees following an increase are much smaller than random variations occurring from year to year. It may be concluded that, within limits, the amount of annual fees has little or no effect on the keeping of patents in force."[37]

The insensitivity of keeping patents in force to increased renewal fees not only demonstrates that most of these inventions are revenue producing but also that most of them are nowhere near obsolescence, else the hiking of renewal fees would have influenced their termination time.

Still other phenomena support the conclusion that majority of these inventions continue in commercial use even after the patent protection is abandoned.

One such evidence is the tendency for an acceleration in the abandonment rate of patents in the terminal year or in the two terminal years. This is discernible in Chart I and can be verified by the annual survival rates which were provided initially in this report for selected countries for which such statistics could be found. This acceleration in the abandonment of patent protection in the last one or two years before expiration, results, it is believed, from a general stocktaking by patentees as to how they would be affected when the patent protection ends. In doing this some of them come to the conclusion that they could operate successfully without the patent protection and thus are led to allowing the patent to expire by non-payment of the last or the last two annual renewal fees.

Another type of evidence that many inventions are kept in use despite the abandonment of patent protection is the increase in survival rate when the patent term is extended. We find that in any country where the statutory protection period is extended, almost

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[37] *Ibid.*, p. 32. Emphasis added.

immediately many more patents are kept in force longer than previously.

The reader can ascertain this by examining the annual patent survivals for Great Britain, Germany and Switzerland, in the years immediately before and after such extensions in the maximum years during which a patent might be kept in force.[38] In all of these the maximum duration of patent protection was extended. It was observed that the percentage of patents surviving to the terminal year was not diminished. For instance, in Great Britain when the maximum period of patent protection was extended from 14 to 16 years in 1920, the survival rate of patents in their 13th and 14th year jumped immediately on the prospect of a longer life. Thus, these rates for the 13th year were 6.3 and 7.0 percent for 1904 and 1905, but they jumped to 7.3 and 7.8, respectively, for 1906 and 1907 when the maximum duration was extended to 16 years. The percentage of patents in their 14th year jumped from 5.0 and 5.4 for 1904 and 1905 to 6.2 and 7.3. Moreover, in a few years patents surviving to the 16th year were as high as the percentage which previously survived to 14th year when that was the terminal year. This pattern is repeated in other countries except in Austria.[39]

Another indication of active use is found in the occasional sharp increases in survival rates when opportunity arises to restore some patents allowed to lapse. Such anomalies frequently occurred during World War II when rigid adherence to renewal payment was abandoned for hardship cases. These irregularities are discerned particularly in the wide fluctuations of patent survival rates during the war years in Germany and to a lesser extent in Great Britain and in other European countries.

The preceding inferences and hypotheses and still others could be tested effectively by an empirical study of utilization status of patented inventions in various countries where renewal fees are charged. In the meantime a compilation and closer inspection of available statistics on survival rates would in themselves be instructive. With this end in view the present author has collected for this report renewal statistics

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[38]These tables, as well as similar tables for Austria and Denmark were prepared for this interim report. Readers may obtain these tables by writing to the Foundation.

[39]In Austria the extension occurred immediately after the partition of the Austro-Hungarian Empire, following World War I. It would be plausible to assume that the economic disruption introduced by the partition could easily have distorted the natural effect of the extension of time on the survival of patents.

for as many countries as he could get and for as long a period as such statistics are supplied.

BRITISH PATENTS

In presenting for inspection and analysis the patent survival statistics from Great Britain this writer has followed Federico's lead[40] by starting the series with 1884 patents, when a schedule of annual renewal fees was first adopted.[41]

The provisions of 1852 Act were radically recast in the Act of 1883 and our statistical series commences with the operation of that statute. In Great Britain the first renewal fee becomes due before the fifth anniversary of the complete filing of the application for a patent. Thereafter, on each anniversary of the filing the annual fees of increasing amounts are required to keep a patent in force through the maximum period allowed under the British law. The annual fees until recently were as follows (they have since been increased):

Years after Filing	Fees in Pound Sterling	Years after Filing	Fees in Pound Sterling
5	5	11	16
6	6	12	17
7	8	13	18
8	10	14	19
9	12	15	20
10	14	16	20

The total payment to keep a patent in force for the maximum period of 16 years was until recently 165£, or about $462.[42]

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[40]Federico, P. J., *supra,* note 3. The writer wishes to express his appreciation to Mr. Federico for his advice with respect to sources of foreign patent statistics, and hazards involved in their use. He is also grateful to Mrs. Lanham of the Scientific Library of the Patent Office for making these sources available to the writer. In describing the specifications of these patent systems in the course of time, this writer has depended largely on secondary and tertiary sources. Unless specifically cited, these are the two works of Federico, one 1937 the other 1958 already referred to, and another is *A Survey of the Principal National Patent Systems,* by Jan Vojáček, 1936, with inserted amendments down to fifties.

[41]Of course, historically the Statute of Monopolies, 1623, is considered the Magna Charta of the rights of inventors. Patents had been granted by English kings, but from 1601 on they were subject to court decision and were limited to a term of years. It was not, however, until 1852 when a comprehensive patent law was enacted with opposition proceedings. Vojáček, J. I., *A Survey of the Principal National Patent Systems, Prentice Hall,* New York, 1936.

[42]*Ibid., supra,* note 35, p. 15. Until 1920 the maximum period in Great Britain was 14 years, at that time it was extended to 16 years retroactively and it lengthened the life span of patents issued as early as 1906.

Prior to 1902 no investigation was made of the novelty of the patent applications. But since then a search is made of all prior British patents. In the 1907 Act patents of addition were provided for, for the first time.

Consideration of economy has led us to be sparing in the presentation of analytic statistics over time. The basic tables giving the annual number of patent applications on which patents were issued, and the year by year survival of these patents as a percent of each year's cohort were excluded to save printing costs. The discussion utilizes the information in these tables. The reader can get processed copies of these and other basic tables by writing to: The Patent, Trademark, and Copyright Foundation of The George Washington University, Washington 6, D. C.

As we shall see, for some countries no statistics are available for the period of World War II. In Great Britain this gap in patent statistics is limited to the number of patents issued after 1946 by year of application. In the commentary on the work of Dernburg and Gharrity this author was not aware of this deficiency in the basic statistics used by these authors.[43] They give no indication of such a gap in the basic information. With such a gap it becomes all the more dubious whether there is any validity in their conclusion that the trend in increased survival rate of patents in Great Britain was reversed in 1950 in comparison to 1940, incidentally, a war year. We shall revert to this matter when we examine more carefuly such data as are available bearing on this trend of survival during World War II and after.

In Great Britain filing of a patent application can begin with the filing of a provisional specification which, however, must be followed by the filing of a complete specification within 12 months. However, a preliminary filing is not essential.[44] The application, if found allowable, is advertised in the official *Journal* for opposition which may be

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[43]Dernburg, T., and Gharrity, N., "A Statistical Analysis of Patent Renewal Data for Three Countries," *PTC J. Res. & Ed.*, Vol. 5, No. 4 (Winter 1961-62), pp. 340-61. Also B. S. Sanders, "Comment," in the same issue, pp. 361-68.

[44]The total payment in obtaining a patent is (or was until recently) eight pounds. If the patentee files a provisional application, he is required to pay one pound then, and four pounds are paid later when he files complete specifications. Otherwise, the filing of complete specifications, without the preliminary, requires a fee of five pounds. The sealing fee is three pounds. See Federico, *supra,* note 35, p. 15.

filed in the next three months following the publication. Patent protection starts when the application is published but it is not enforceable except retroactively, until the patent is granted. The term of the patent starts running with the complete filing of the application.

Before the fifth anniversary of the date of complete filing the first renewal fee falls due. If any annual fee that comes due is not paid the patent ceases to be in effect. Therefore, any British patent granted remains in effect for such portion of the four years, starting with the filing of complete application that has not lapsed already when the patent is issued; the maximum duration of a British patent is 16 years from the date of filing, if all the 12 renewal fees are paid. Before a patent lapses for non-payment of a renewal fee, there is a grace period of one month. There is also a three year period within which the patentee may apply without unreasonable delay to restore a patent allowed to lapse unintentionally, if this occurs, the patent rights would be protected in the intervening period. How much these interruptions affect the survival statistics we do not know. We assume that except perhaps in periods of war their influence is comparatively small. Even though the life of the patent starts running with the filing of the complete application but the patent grant, i.e., enforcement of these rights must await the publication for opposition and the eventual payment of the sealing fee before they can be enforced. Usually appreciable time lapses between the filing and the time when the patent is issued. In some instances the granting of the patent might come four or more years after the date of complete filing. In these circumstances if the first renewal fee falls due before the patent has been granted it is allowed to be delayed as much as three months after the date on which the patent is granted. After issue, all prior renewal fees, if any, become due and payable within three months. Probably because of these time relationships between the date of filing, the date of granting, the grace periods of one month and three months in paying the renewal fees and finally the right to restore a lapsed patent within three years under certain circumstances, the number of patents from a particular year actually being in force differ in official statistics published each year. Such differences were particularly marked in the period of World War II.[45]

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[45]In fact in some years the number of patents surviving in a specific year may actually exceed the number shown to have been in force in the prior year from the same cohort (this is true for certain war years). Having become aware of

Inspection of the annual number of patent applications granted from 1884-1946 shows wide fluctuations from year to year. These fluctuations are particularly sharp during the two World Wars and in 1929. In a war period the number of patents filed for decline sharply, then there is a sharp rise after this initial fall. The lowest number of filings were reported in 1940, World War II; the next two lowest troughs were for 1915 and 1900, World War I, and the Boer War, respectively. The rebound from the sharp decline in the number of patents granted, resulting from a war, appears to have two humps, judging from the Boer War and World War I. The necessary data for judging this pattern is not available for World War II. A separate statistical series, labeled "Patents Sealed" given in Annual Reports of the Comptroller General, which is supplied for the years following World War II period, (if it could be relied upon at all for this purpose), would suggest a similar double hump after the last war.[46]

The general upward trend, in all probability, could be accounted for by increase in the population. But to us the more significant and meaningful upward trend is in the proportion of patents surviving after a specified number of annual renewal fee payments, which could not be attributed to population increase, and we believe signify in general a progressive upgrading of inventions which are patented. Stated in another way, there has been in Great Britain a qualitative improvement in the inventions that are patented—or an increase in inventive output. This general trend can be seen in Tables 5 and 6.

Closer analysis of annual figures shows that the wide year to year variation is not limited to the number of patents applied for but is also characteristic of the percentage of patents surviving from those

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these disturbances in the official statistics, in compiling these statistics we have derived the information for a specific year from the latest official publication giving the figures for the particular year. We surmise the gap between the filing of patent applications and the granting of the patents might have become so marked during World War II and since the war that the Comptroller General has deemed advisable to discontinue the publication of the number of patents issued by their date of filing in relation to patents kept in force through annual payment of renewal fees. If this is the case, then any inference based on survival rate of patents for the postwar period would be suspect.

[46]The annual number of patents sealed reported for the years 1935 through 1960 are as follows: 17,675, 17,819, 17,614, 19,314, 17,605, 11,453, 11,179, 7,969, 7,945, 7,712, 7,465, 8,971, 11,727, 15,558, 20,709, 13,509, 13,761, 21,380, 17,882, 17,985, 20,630, 19,938, 25,205, 18,531, 18,157 and 26,775. These statistics probably compound the variation of annual number of patents filed for by administrative delays and accelerations in the examination and granting of patents.

issued in a given year. The variations in the percentage of patents surviving appear to be two types. The predominant type is inversely correlated with the number of patents issued. This inverse relationship is especially common when there are sharp changes in the number of patents filed for. It appears that sharp decreases in the number of patents filed for improve markedly the prospect of survival rate of these patents. This would suggest that forces depressing markedly the number of patents applied for have a selective effect, eliminating more of the least worthwhile inventions—thus bringing about a qualitative upgrading in the inventions that are patented. The converse occurs when there is a sharp increase. Such increase in numbers downgrades the inventions that are patented, and thus lowers the survival rate. Fluctuations occurring during and after a war are dominantly of this type—they affect the quality of inventions patented and thereby their subsequent survival rate.

There are other variations in the number of patents applied for in a year that seem to be correlated positively with survival. These would suggest secular changes in legal or economic circumstances appreciating or depreciating the economic significance of patents to their owners. Such changes affect both the annual number of applications filed, for which patents are granted, and the proportion of patents kept in force. With minor exceptions, survival rates tend to be high or low consistently for patents applied for in a given year. This relationship again suggests the importance of quality of inventions underlying patents determining in considerable measure their survival pattern. The extent of variation in the survival rate of patents issued in different years tends to decrease progressively with the length of time that the patent has been in force. This suggests that cumulative effect of the impact of economic and other factors tends to confound the homogeneity of patents applied for in a particular year.

The relationships between the annual number of patents applied for and subsequent survival history of these patents are shown graphically in Appendix I, Chart I in the Conference Number of the Foundation's *Journal.* The Chart shows the annual number of granted patents applied for 1884 to 1946, the percentage of each annual cohort surviving through the fifth, seventh and ninth year after the year of application, through the payment of first, third and fifth renewal fees.[47]

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[47]*PTC J. Res. & Ed.,* Vol. 6, Conference Number, 1962, p. 147.

The most important insight gained from this analysis is the general upward trend in the survival rate of patents over the decades for which this information is available. The magnitude of this trend and its temporal relationship may be seen from the ten year weighted averages in the survival rates of British patents shown in Table 5.

Table 5 shows the mean percentage of patents granted in each ten year period by year of application from 1884 through 1943 and for the years 1944-46, surviving to the fifth and subsequent years through the payment of annual renewal fees. It also shows for each period the mean survival rate of patents on which at least the first renewal fee was paid.

There is very little change in the average survival rate of patents issued in the decade 1894-1903 compared with the preceding decade. The survival rate for 1894-1903 is slightly higher for the first three renewals, almost the same for the fourth, and lower for all subsequent renewals, but by and large the differences are relatively small. However, the survival rates are markedly higher for the decade 1904-13 throughout the entire range compared with that of the prior decade. These rates climb higher still in the decade 1914-23 and 1924-33, respectively. The ascent is sharpest of all in the decade 1934-43. But in spite of this sharp increase the survival rates for the subsequent three years, 1944-46 are appreciably higher in the fifth through the seventh year almost the same for eighth and ninth year and slightly below the highest averages for the subsequent years. Since the decade when the rates were highest of all were the years of World War II, it would be unwarranted to infer from this evidence any reversal in the underlying trend in the late forties because of this slight drop in mean survival rate beyond the ninth year. As we have said in discussing annual rates the pattern following World War II, to the extent that it is available, is the same as what happened after the Boer War and the First World War; i. e., first a rise in survival rate at the beginning of the war, then a drop following the war, and then a general upward shift. To the extent that we have comparable data following World War II it would seem this pattern is likely to have been repeated.

In Table 5 we also show the mean number of patents for each period on which the first renewal payment was made and the survival rate of these over the remaining life of the patent for each decade. Since the improvement rate in the survival of patents issued in 1894-1903 was limited to the initial period—particularly patents surviving the first renewal, when this is used as the base, the percentage of survival for subsequent years is lower for this decade in comparison to the

TABLE 5

MEAN PERCENTAGE OF PATENTS OF GREAT BRITAIN APPLIED FOR IN A GIVEN YEAR SURVIVING SPECIFIED YEARS AFTER APPLICATION AND THE PERCENTAGE OF THESE PATENTS IN WHICH THE FIRST RENEWAL FEE WAS PAID SURVIVING SPECIFIED YEARS THEREAFTER, GROUPED BY DECADES, 1884-1946.[1]

Years of Application	Percentage of Survival at Specified Years After Application												Terminal Years
	5th Year	6th Year	7th Year	8th Year	9th Year	10th Year	11th Year	12th Year	13th Year	14th Year	15th Year	16th Year	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1884-93	30.8	22.7	18.2	15.1	12.6	10.6	9.0	7.6	6.3	4.8	—	—	1897-06
1884-93	100.0	73.8	59.0	49.0	40.8	34.6	29.2	24.8	20.4	15.7	—	—	1897-06
1894-03	33.4	24.2	18.8	15.0	12.1	9.9	8.1	6.7	5.4	3.9	—	—	1907-16
1894-03	100.0	72.4	56.4	45.2	36.9	29.5	24.3	20.1	16.0	11.6	—	—	1907-16
1904-13	36.6	27.7	22.6	19.4	16.8	14.3	12.3	10.3	8.7	7.1	6.1[2]	4.5[2]	1917-28
1904-13	100.0	75.7	61.7	52.9	46.0	39.1	33.5	28.1	23.9	19.3	16.4[2]	12.1[2]	1917-28
1914-23	51.6	40.2	32.8	26.5	21.5	17.5	14.5	12.1	10.0	8.2	6.7	5.0	1929-38
1914-23	100.0	77.9	63.5	51.4	41.7	33.9	28.1	23.5	19.2	15.8	13.0	9.7	1929-38
1924-33	58.2	46.2	37.7	30.9	25.8	21.9	18.8	16.4	14.5	12.8	11.1	9.0	1939-48
1924-33	100.0	71.7	64.8	53.1	44.3	37.6	32.3	28.1	24.9	22.0	19.1	15.4	1939-48
1934-43	69.4	61.3	55.8	50.7	46.1	42.0	37.9	33.9	30.0	26.1	22.5	18.3	1949-58
1934-43	100.0	88.4	80.3	73.1	66.4	60.4	54.6	48.9	43.1	37.6	32.5	26.3	1949-58
1944-46[3]	85.3	70.0	57.8	51.0	45.5	40.2	35.7	31.4	27.5	23.6	20.4	17.0	1959-61
1944-46	100.0	82.3	67.7	59.8	53.4	47.1	41.9	36.9	32.3	27.6	23.9	20.0	1959-61

[1]Obtained from selected issues of "Patents, Designs and Trademarks," *Report of the Comptroller General of Patents, Designs and Trademarks.*
[2]For 8 years 1906-13. The maximum duration was extended in 1920 from 14 years to 16 retroactively with respect to patents still in force at the time when the law went into operation.
[3]Statistics of patents granted by year of application not published after 1946.

prior decade, 1884-1893. In the next decade, however, the survival rates of patents on which the first renewal fee was paid also show improved survival for subsequent renewal fee payments in comparison to the experience in prior decades.

In the decade 1914-23 the renewal rates are higher for the sixth and seventh year but drop below those observed for 1904-13 for eighth and subsequent years—but they are higher in general than those for prior decades. This reversal in survival must be attributed perhaps entirely to the effect of World War I.

In the decade 1924-33 the survival rates are higher than those of 1914-23 with the exception of percentage surviving through the sixth year. And the percentages surviving 13 years and beyond are highest of all when compared with corresponding rates for prior decades. The survival rates of once renewed patents are markedly higher for the decade 1934-43 throughout the entire range. They fall back, somewhat, for the 1944-46 period, but this is only in comparison with percentages for 1934-43, otherwise the percentage survivals for patents applied for in 1944-46 are highest of all. The differential in favor of patents issued in 1934-43, again, must be attributed to World War II. Thus, there is no question that there has been a general increase in the survival rate of patents at least through World War II, and as far as we can tell there is no indication that this underlying trend has been lost. The less steep rise in the rate of patents surviving through the fifth year, results from the fact that the sharpest increase has been with respect to patents on which the first renewal payment is made. This percentage was less than 31 in 1884-93, and it had risen to 85 in 1944-46.[48]

Table 5 also indicates how the average percentage of patents surviving through the 16th year equals and exceeds the survival rate through the 14th year when the latter was the terminal year. This, as we have said earlier, is a definite evidence that the eventual abandonment of a patent, per se, is no indication that the commercial use of the invention has been terminated. Instead, the abandonment of patent protection for inventions that are put to commercial use usually indicates

[48]While the survival of patents through the payment of renewal fees in the initial years signifies primarily the increased proportion of revenue producing patents, a continued increase in survival for later years may reflect largely the competitive business conditions which induce the patentee to continue patent protection or to abandon it on the belief that he could still continue the exploitation of the invention. If true, then as an index of upgrading of patents survival rates through the first or second year of renewal fee payment is much more important than that for subsequent years.

that the patentee has arrived to the conclusion that its control of the market with respect to the patented invention has become such that patent protection may be abandoned with impunity. Or, perhaps, the patentee finds that he can conclude such understanding or arrangements with his suppliers and competitors that when the patent protection comes to an end his interests would not be disasterously affected. While such stock taking might come at any time in the life of the patent it is almost sure to occur a year or two before the terminal year —whether the terminal year happens to be the 14th, the 16th or the 18th. As a result of this, we find some acceleration in the termination rate of patents in the terminal one or two years both when the maximum term was 14 years and after it was raised to 16 years. This acceleration in the termination rate is reflected in the mean termination rates shown in Table 5, as well as in Chart I, except for periods when this influence is submerged by the effect of a war or other major disturbances.

The increasing longevity of British patents may also be demonstrated in terms of mean life time of patents granted that were applied for in different years. This might be regarded another type of summary presentation. The mean survival years of British patents granted during the years 1884 through 1946 is shown in Table 6.

The Table shows the initial and terminal years of patents for each year and the average number of years that the patents remain in force within the time intervals indicated. To facilitate long term comparison of trend, the average life of a patent from application to the 14th year has been shown for the entire period 1884 to 1946 inclusive, as well as the mean duration on the basis of a maximum of 16 years over the period that this maximum duration has been in effect. Besides showing the mean life of all patents in terms of a maximum period of 14 and 16 years, respectively, we also show the mean life of those patents on which at least one renewal fee was paid, again in terms of a maximum period of 14 and 16 years, respectively. Finally, we show the mean cumulative duration for each ten year period.

The mean duration that patents remained in force during 1884-1903 was close to 5.4 years. For patents which had survived through the fifth year, that is, had the first renewal payment, this mean duration was 8.5 years. The average life of patents increased perceptibly in the decade 1904-1913. This increase is true for all patents and for those surviving through the fifth year. The trend in increase continues to the next decade but reaches its peak for patents filed for in 1913 or 1915, depending whether one considers patents surviving through the

TABLE 6

MEAN YEARS OF LIFE OF PATENTS OF GREAT BRITAIN BY THE YEAR OF APPLICATION FOR ALL PATENTS, AND FOR THOSE FOR WHICH AT LEAST ONE RENEWAL FEE WAS PAID, FOR MAXIMUM PERIODS OF 14 OR 16 YEARS, RESPECTIVELY, 1884-1946.[1]

Year of Appli.	Terminal Year	All Patents Maximum 14 Yr.	All Patents Maximum 16 Yr.	Patents Renewed At Least Once Maximum 14 Yr.	Patents Renewed At Least Once Maximum 16 Yr.
(1)	(2)	(3)	(4)	(5)	(6)
1884	1897	5.3	—	8.5	—
1885	1898	5.4	—	8.7	—
1886	1899	5.4	—	8.7	—
1887	1900	5.4	—	8.7	—
1888	1901	5.3	—	8.6	—
1889	1902	5.3	—	8.2	—
1890	1903	5.3	—	8.3	—
1891	1904	5.4	—	8.5	—
1892	1905	5.4	—	8.4	—
1893	1906	5.5	—	8.4	—
1884-1893	1897-1906	5.4	—	8.5	—
1894	1907	5.5	—	8.3	—
1895	1908	5.4	—	8.1	—
1896	1909	5.3	—	8.1	—
1897	1910	5.2	—	8.0	—
1898	1911	5.4	—	8.1	—
1899	1912	5.3	—	8.1	—
1900	1913	5.4	—	8.1	—
1901	1914	5.4	—	8.2	—
1902	1915	5.4	—	8.1	—
1903	1916	5.4	—	8.1	—
1894-1903	1907-1916	5.4	—	8.1	—
1904	1917	5.5	—	8.2	—
1905	1918	5.5	—	8.3	—
1906	1921	5.5	5.6	8.3	8.6
1907	1922	5.6	5.6	8.5	8.8
1908	1923	5.7	5.8	8.6	8.9
1909	1924	5.8	5.9	8.7	9.0
1910	1925	5.8	5.9	8.9	9.2
1911	1926	5.9	6.0	9.4	9.7
1912	1927	6.1	6.2	9.3	9.6
1913	1928	6.3	6.4	9.5	9.8
1904-1913	1917-1928	5.8	5.9	8.8	9.2
1914	1929	6.7	6.9	9.1	9.3
1915	1930	6.9	7.0	8.8	9.1
1916	1931	6.8	6.9	8.5	8.7
1917	1932	6.5	6.6	7.9	8.1
1918	1933	6.2	6.3	8.1	8.2
1919	1934	5.9	6.0	8.3	8.5
1920	1935	5.7	5.8	8.5	8.7
1921	1936	6.2	6.3	8.7	8.9
1922	1937	6.5	6.6	8.8	9.0
1923	1938	6.6	6.8	8.7	9.0
1914-1923	1929-1938	6.4	6.5	8.5	8.8
1924	1939	6.7	6.8	8.6	8.9
1925	1940	6.6	6.8	8.5	8.8
1926	1941	6.7	6.8	8.4	8.6
1927	1942	6.7	6.8	8.6	8.9
1928	1943	6.5	6.7	8.8	9.1
1929	1944	6.6	6.7	9.0	9.3
1930	1945	6.8	7.1	9.1	9.5
1931	1946	7.0	7.3	9.2	9.7
1932	1947	7.4	7.7	9.2	9.7
1933	1948	7.4	7.7	9.1	9.6
1924-1933	1939-1948	6.8	7.0	8.9	9.2
1934	1949	7.6	7.9	9.2	9.8
1935	1950	7.8	8.1	9.8	10.3
1936	1951	7.9	8.3	10.7	11.4
1937	1952	8.0	8.4	10.9	11.6
1938	1953	8.9	9.4	11.4	12.0
1939	1954	9.3	9.8	11.3	11.9
1940	1955	9.8	10.3	11.1	11.7
1941	1956	9.5	10.0	10.8	11.4
1942	1957	9.4	9.9	10.3	10.8
1943	1958	9.0	9.4	10.3	10.9
1934-1943	1949-1958	8.7	8.9	10.6	11.1
1944	1959	9.3	9.7	9.6	10.1
1945	1960	8.5	8.8	8.9	9.3
1946	1961	8.3	8.7	10.1	10.6
1944-1946	1959-1961	9.1	8.7	9.9	9.5

[1]Obtained from selected issues of "Patents, Designs and Trademarks," *Report of the Comptroller General of Patents, Designs and Trademarks.*

TABLE 7

NUMBER OF PATENTS OF GREAT BRITAIN BY YEAR OF APPLICATION SURVIVING THROUGH THE FIFTH YEAR DISTRIBUTED ACCORDING TO PERCENTAGE SURVIVING THROUGH EACH SUBSEQUENT YEAR 6TH THROUGH 16TH, 1906-1956.[1]

Year of Application	Number Surviving through the 5th year	Percentage Surviving 6th and Subsequent Years											Terminal Years
		6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1906	5778	73.0	55.7	47.7	38.1	30.9	26.9	24.3	20.7	17.9	14.8	10.3	1921
1907	5547	74.0	58.7	46.3	38.2	33.4	29.9	25.5	22.7	21.2	16.6	12.2	1922
1908	5551	75.6	57.8	45.6	39.6	35.3	30.8	28.0	27.1	21.1	15.7	11.7	1923
1909	6010	71.6	56.7	48.1	43.5	37.6	34.2	33.0	27.0	20.4	17.3	12.5	1924
1910	5987	70.1	58.9	52.1	45.8	41.0	40.3	32.9	25.7	20.3	16.1	12.3	1925
1911	5543	79.8	69.3	58.7	52.4	52.2	43.2	32.8	27.1	21.6	18.5	13.7	1926
1912	6506	81.7	68.3	60.7	58.9	49.0	37.1	28.7	24.1	19.6	16.0	11.9	1927
1913	6585	85.4	75.9	74.7	61.2	45.3	37.2	29.2	25.4	20.7	16.3	12.3	1928
1914	6386	81.5	78.4	66.2	48.6	36.9	31.1	26.5	20.5	18.1	14.9	11.9	1929
1915	5403	90.0	78.6	55.5	41.8	31.4	27.7	23.6	19.8	16.3	13.9	10.7	1930
1916	5818	87.0	62.8	45.8	38.2	32.1	26.6	22.3	19.1	16.2	13.2	8.9	1931
1917	6374	70.3	50.5	39.8	32.6	27.5	23.2	19.7	16.9	14.1	10.8	7.2	1932
1918	6377	67.1	52.4	42.7	35.7	30.0	25.5	22.0	17.9	13.7	10.7	7.5	1933
1919	7431	74.1	58.0	46.9	38.4	32.7	28.4	23.9	18.7	13.8	10.7	8.3	1934
1920	6823	74.5	58.8	48.2	41.5	36.3	30.4	23.5	18.4	15.1	11.9	9.2	1935
1921	7637	77.1	63.2	53.0	45.9	38.1	29.9	24.4	19.5	16.0	13.3	9.6	1936
1922	8223	80.0	67.7	57.3	47.6	37.5	29.4	23.7	20.2	16.6	14.3	11.0	1937
1923	8390	80.2	67.1	55.9	43.8	34.3	27.9	24.3	20.4	17.9	15.5	11.7	1938
1924	9005	81.2	66.4	51.8	40.7	33.0	27.8	23.8	20.6	18.1	15.2	10.4	1939
1925	9705	79.6	62.0	48.6	38.4	32.7	27.8	24.2	21.2	18.1	14.3	9.0	1940
1926	10422	75.0	67.4	45.5	38.3	32.4	28.3	25.0	21.3	17.0	12.4	9.4	1941
1927	10801	74.9	59.1	50.1	41.8	36.5	32.6	27.8	23.0	17.2	14.3	11.1	1942

1928	10921	75.5	63.6	52.8	45.9	40.5	34.2	27.1	21.3	18.1	14.9	12.5	1943
1929	10870	79.9	65.4	56.4	49.8	42.7	34.4	26.6	22.9	19.3	17.6	15.5	1944
1930	11355	79.3	67.1	59.0	50.7	41.5	32.2	28.7	24.7	22.7	20.9	18.7	1945
1931	10750	82.6	71.6	60.8	49.3	38.1	34.1	29.8	27.7	26.2	25.2	21.2	1946
1932	11199	83.9	71.2	51.0	43.4	39.2	34.6	32.5	31.1	30.2	27.3	22.0	1947
1933	11274	81.6	64.0	47.9	43.0	37.8	35.3	33.7	33.7	31.4	26.7	21.8	1948
1934	11895	76.6	56.7	50.9	44.9	42.6	40.5	40.8	38.3	32.9	28.9	22.3	1949
1935	11476	72.2	64.1	55.6	52.4	50.5	51.7	49.0	42.2	37.3	30.7	24.5	1950
1936	10580	85.8	74.2	69.4	66.5	67.8	63.8	55.2	49.5	41.5	34.8	28.3	1951
1937	10830	86.3	79.3	75.9	77.3	72.6	62.0	54.8	46.2	39.6	36.2	28.0	1952
1938	10895	92.6	87.7	89.8	85.6	71.8	65.0	54.8	47.5	41.8	37.2	30.2	1953
1939	8777	93.4	97.0	92.6	77.0	69.2	59.0	51.7	45.2	40.6	35.0	29.3	1954
1940	6732	101.8	100.4	84.1	75.2	65.5	54.7	47.3	42.9	37.3	32.1	26.6	1955
1941	7475	102.0	86.9	80.0	72.7	59.4	52.8	47.7	42.1	37.1	31.6	27.1	1956
1942	9109	88.7	82.6	76.5	61.4	54.6	49.1	44.0	39.1	33.7	29.7	23.7	1957
1943	9671	97.6	91.7	69.1	59.9	54.3	48.0	42.4	37.6	33.5	28.1	23.9	1958
1944	12540	93.3	68.5	59.7	53.8	47.6	42.4	37.6	33.3	27.9	23.5	20.1	1959
1945	14574	69.2	59.8	53.3	47.4	42.2	36.8	32.6	28.3	24.3	21.3	17.8	1960
1946	9910	87.7	78.3	69.6	61.6	53.9	48.5	42.1	36.7	32.3	28.2	23.0	1961
1947	10020	90.4	81.7	72.8	65.1	59.0	51.2	44.4	38.6	32.6	27.3	---	1962
1948	10786	84.8	74.6	66.9	61.5	54.2	46.7	42.4	36.8	32.1	---	---	1963
1949	12886	87.0	76.9	69.0	60.6	54.2	48.0	42.2	37.7	---	---	---	1964
1950	13968	89.8	81.9	72.1	64.5	57.2	50.3	44.8	---	---	---	---	1965
1951	15047	86.8	80.5	71.8	63.8	56.9	50.0	---	---	---	---	---	1966
1952	15341	89.8	79.4	69.9	62.7	55.6	---	---	---	---	---	---	1967
1953	17064	87.9	78.3	69.0	62.3	---	---	---	---	---	---	---	1968
1954	18550	89.5	80.0	71.4	---	---	---	---	---	---	---	---	1969
1955	18975	93.8	84.7	---	---	---	---	---	---	---	---	---	1970
1956	19575	94.4	---	---	---	---	---	---	---	---	---	---	1971

[1]Obtained from selected issues of "Patents, Designs and Trademarks," *Report of the Comptroller General of Patents, Designs and Trademarks.*

fifth year, or all the patents. This peaking at the specific period is the result of the war, but after the effect of World War I wears off, the averages do not drop to the levels prevailing before 1910. The upward trend becomes evident again after 1920 and reaches a maximum of 9.8 years within the maximum of 14 years, nearly twice the mean life of patents in years prior to 1900, when the averages were less than 5.5 years. The mean life in terms of a maximum duration of 16 years instead of 14 runs parallel for each respective series.

As noted the upward trend is more marked for all patents in comparison to those all of which survived through the fifth year. It is also to be observed that the increase in the mean survival years of patents was relatively slight for patents issued prior to World War I, but has been more marked since then. Thus the increment in mean years of survival for all patents from 1884 to 1915 was 5.3 to 6.9 years, or an average increase of .05 year per annum. Between 1915 and 1940, the peak for World War II, the increase was from 6.9 to 9.8 years, or an average of 0.116 years per annum. The corresponding increments in patents surviving through the fifth year were 0.034 and 0.079 years per annum, respectively.

Post World War II Trends

We have already indicated the dubious basis on which Dernburg and Gharrity reached the conclusion that there has been a reversal in trend in the survival rates of British patents issued prior to 1950 and those issued in 1950 and after. For all patents, for which the increment has been more pronounced in comparison to those surviving after the first renewal payment we have no observation beyond 1946. Therefore, no sound conclusion could be reached regarding the trends before 1950 and after, with respect to all patents. For patents surviving through the fifth year our observations extend beyond 1946, but the incremental trend for these is less marked. Nevertheless, in view of the assertion of these authors of a reversal in trend based on a questionable method, applied to non-available basic data, it would be of interest to examine such information as we have bearing on this question. With this end in view, Table 7 presents the survival rate of patents which have survived through the fifth year, from 1906 when the maximum duration was extended to 16 years to 1956, the last year for which any survival information for patents lasting five years is available.

Inspection of the Table shows the lowest survival rate from fifth to sixth year was 70.1 percent, observed for patents applied for in 1915,

which must be attributed to the depressive effect of the war on the number of patents issued. The lowest survival rate of all was observed for patents applied for in 1918, 67.1 percent.[49] The next peak of 102 percent is reached for patents issued in 1941, the 1940 figure is almost as high, 101.8. These unduly high figures, higher than 100 percent, we again attribute to the war—World War II in this case, and to a relaxation of the requirements in the timely payment of renewal fees that apparently must have taken place. The trough of 69.2 percent is shown for patents applied for in 1945.[50]

If we try to eliminate the war effect by eliminating from our series the patents applied for in the war years, and compare the trend of survival for the remaining years through time we would have the trend shown in Table 8.

TABLE 8

MEAN PERCENTAGE OF PATENTS IN GREAT BRITAIN GROUPED BY YEAR OF APPLICATION SURVIVING FROM THE FIFTH TO THE SIXTH ANNIVERSARY FROM THE TIME OF FILING, EXCLUDING THE WAR YEARS.

Years of Issue	Surviving from 5th to 6th Anniversary
1906-1910	72.8
1920-1924	78.8
1925-1929	76.9
1930-1934	80.7
1935-1936	78.7
1947-1951	87.8
1952-1956	91.2

It is seen from these averages that at least after World War I there has been a general increase in the proportion of patents surviving from the fifth to the sixth year. There is no indication of a reversal in the trend if we eliminate the years of World War II. Therefore, we are led to reject the conclusion of Dernburg and Gharrity that there has been a reversal of trend.

[49]The number of patents applied for in 1915 was 9074, the lowest since 1885. The number applied for in 1918 was 11,589, still comparatively low. Perhaps, these were inventions conceived during the war designed to meet war emergencies which ceased to be of importance after the war—and this might account for their low survival rate.

[50]The peak and the trough for both World Wars are so similar that they clearly indicate the causal connection. The number of patents issued in 1940 was the lowest of all for the period 1884 through 1946, 8,155. For 1945, when the survival rate from the first to the second renewal payment (fifth to sixth year of filing) reached the trough, the number of patents filed for was 16,041.

EDITOR'S NOTE: *This report on "The Upgrading of Patented Inventions and Their Use Here and Abroad" will be concluded in Volume 7, Number 2.*

FORUM

Although the primary purpose of this *Journal* is to communicate the research work of the Foundation, it also serves as a vehicle for educational activities designed to exchange informed opinion and stimulate additional study. This section provides a medium for the presentation of papers and notes which do not necessarily rest as yet on a firm basis of empirical research. It is hoped that the material published in this section will stimulate researchers to undertake factual study of the issues.

The Case Against Drug Patent Complusory Licensing

GEORGE E. FROST*

RECENT LEGISLATIVE PROPOSALS would subject prescription drug product patents to compulsory licensing.[1] The proposals would give competitors access to the patented products at fixed maximum royalty. They aim to produce additional manufacturing competition and to reduce the prices of new patented drugs. The prices of some old and unpatented "generic name" drugs have been cited as indicative of possible price reductions.[2]

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[1]S. 1552 and H.R. 6245, 87th Cong., April 12, 1961. Subsequent to the preparation of this article, Senator Kefauver introduced S. 1297. This bill follows the text of the proposal he made on the Senate floor by way of amendment to S. 1552. See note 3, *infra.*

[2]Generic name drugs are sold as chemical entities without significant trademarks or tradenames. Such drugs may be unpatented or widely-licensed patented drugs. Vendors of such drugs gain little by product promotion efforts, they engage in little activity of this kind, and their prices are relatively close to bare production costs.

Nongeneric drugs include (*a*) unpatented drugs sold with emphasis upon trademark or tradename significance and (*b*) unique drugs, usually patented, sold with emphasis upon their chemical character. In the first instance, the trademark or tradename is stressed as an indicia of product quality in relation to other drugs that may be chemically identical. Because of the promotion costs, the prices of such drugs usually far exeed bare production costs.

In the case of the unique drugs, vendors engage in promotional activities in a way not possible with other drugs. Such activities, for example, include efforts having a decided educational value in connection with the proper use of the drugs. See note 46, *infra.* These product promotion activities are one reason why the prices of these drugs usually far exceed bare production costs.

As to the significance of generic names prices as indicating possible price reductions with compulsory licensing, see note 45, *infra.*

The proposals are intended to—and most certainly would—sharply curtail the value of patent rights to important new drugs. The pharmaceutical industry has a rich record of new product creation and marketing. This activity has served the public well. The pace of progress can only be maintained by a continued flow of new drugs. The compulsory licensing proposals thus pose a basic question specific to the industry, namely, whether any possible price benefits will be outweighed by decreased availability of important new drugs.

Other questions arise. The proposals single out prescription drug product patents for specialized, highly restrictive, compulsory licensing. But what economic or other considerations dictate one rule as to drug patents and a different rule as to other patents? Conversely, if the proposed compulsory licensing is sound as to drug patents—where an unusually strong case can be made for continued new product development and marketing—why should it not apply to patents generally?

The proposals also have a broad aspect requiring consideration. In varying degrees, the bills would apply to drug patents, regardless of the business practices of the patent owner.[3] The maximum royalty would be a fixed percentage of sales price, regardless of the importance of the invention. In these and other respects the proposals raise questions as to the validity of long-standing concepts that market forces and the worth of the invention should dictate the monetary reward.[4]

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[3]When S. 1552 reached the floor of the Senate, the compulsory licensing provisions had been deleted. Senator Kefauver then sought to reintroduce the compulsory licensing provisions in modified form. The proposed compulsory licensing was then conditioned upon a Federal Trade Commission finding "that the price charged . . . to druggists by the patentee is more than 500 percentum of the cost of production . . ." *Congressional Record,* August 23, 1962, p. 16343. This proposal is now embodied in S. 1297, introduced on April 9, 1963.

The amendment made on the Senate floor, and S. 1297, embody an element of selectivity not present in S. 1552. However, the calculated "cost of production"—while it is defined to include an allowance for research—omits the very important matter of distribution costs. And "production cost" used as the base for calculations may vary in ways having little or no relation to product sales price.

[4]This principle has most frequently been applied in striking down tying practices by which the return from one copyright or patent is determined by the value of another. Thus, in U. S. v. Paramount Pictures, 334 U. S. 131, 158 (1948), the Court stated:

> ". . . the reward does not serve its public purpose if it is not related to the quality of the copyright. Where a high quality film greatly desired is licensed only if an inferior one is taken, the latter borrows quality from the former and strengthens its monopoly by drawing on the other. The practice tends to equalize rather than differentiate the reward for the individual copyrights. Even where all the films included in the package are of equal quality, the requirement that all be taken if one is desired increases the market for some. Each

Consideration of these questions requires more than analysis of the prescription drug industry, important as such analysis is. They reach to the fundamentals of the patent system generally and require assessment from this broader viewpoint. It is accordingly necessary to turn first to a consideration of the competitive policy associated with the patent law and some of the lessons of history in relation to that policy. We will then consider the extent drug patents have achieved this competitive policy. Finally, we will consider the case for departure in the drug industry from the usual competition engendered by patent rights.

A brief historical survey will bring out the competitive policy of the patent law. We can begin with conditions of 1912. Some twenty years earlier, the Congress had passed the Sherman Antitrust Act in response to the business trust movement.[5] But Senator Sherman himself had said that "A limited monopoly secured by a patent right is an admitted exception, for this is the only way an inventor can be paid for his invention."[6] By 1912, experience showed that Senator Sherman's "admitted exception" was in fact a substantial loophole. One court had squarely held that the Sherman Act did not apply to patented articles.[7] The *Paper Bag* case[8] was widely regarded as supporting an absolute right to suppress patented inventions. Rank tying practices based on patents had received Supreme Court sanction.[9] This sanction, coupled with language in resale price maintenance cases distinguishing patent rights and the rights associated with copyrights and secret processes,[10] indicated that the Court was prepared to endorse price maintenance through the medium of restrictive patent license notices. The situation clearly called for a reassessment of patent policy.

It was in this setting that the House Committee on Patents (the Oldfield Committee) studied the patent situation in depth. After some 27 hearings devoted to the problems and proposed legislation, the committee tendered a report recommending a bill.[11] The proposed

stands not on its own footing but in whole or in part on the appeal which another film may have. As the District Court said, the result is to add to the monopoly of the copyright in violation of the principle of the patent cases involving tying clauses."

[5]26 Stat. 209 (1890).

[6]21 Cong. Rec. 2457.

[7]Rubber Tire Wheel Co. v. Milwaukee Rubber Works, 154 Fed. 359 (7th Cir. 1907).

[8]Continental Paper Bag Co. v. Eastern Paper Bag Co., 210 U.S. 405 (1908).

[9]Henry v. A. B. Dick Co., 224 U.S. 1 (1912).

[10]Bobbs-Merrill Co. v. Straus, 210 U.S. 339, 343-5 (1908); Dr. Miles v. John D. Park, 220 U.S. 373, 400-402 (1911).

[11]Rep. No. 1161, 62nd Cong. 2d Sess.

legislation was intended to cure a number of problems, including resale price fixing by patentees, tying arrangements effected through patents, and the suppression of patented inventions to prevent competition with other articles sold by the patent owners. On the latter subject, the proposed law provided for a bill in equity alleging that the patent owner, three years or more after patent issuance, had suppressed the patented invention in favor of some other product sold by the patent owner.[12] Upon a showing of such suppression, the Court was authorized to order the grant of a license to the complainant on such terms as were considered just. The proposal contained no limitations as to the subject matter of patents to which it applied. It was confined, however, to those patents shown to be to the suppressed.

An equally important aspect of the Oldfield Committee report is found in the consideration given to the intended and normal operation of patent rights. In the view of the committee:[13]

> ". . . The evils complained of, so far as they are connected with patents, arise only from the perversion of the patent monopoly to an illegitimate use. Widespread evils of which just complaint is made are due mainly to the abuses of the patent, either by making it the means of securing a monopoly more extensive than that covered by the patent or through accumulating competing patents and suppressing part of the same. The patent law was enacted before any of our trusts came into existence; when competition was the accepted law of trade, and when combinations in retraint of trade were not in contemplation. So long as such conditions continued and the avenues of competition were kept open the monopoly granted by the patent law, limited as it was, in time tended to stimulate competition. It incited inventors to new effort and capitalists and business men were encouraged to develop inventions. Under these conditions a patent, while granting a monopoly in a specific article, had rarely a tendency to monopolize any branch of the trade, because few inventions were so fundamental in character as to give to the owner of the patent a monopoly in any branch of trade and every great financial success arising from an individual patent was sure to result in rival inventions. . . ."

At a later point the committee stated:[14]

> ". . . Each patent creates in the owner the right to exclude every one from making, using, and selling devices or articles embodying the invention set forth in that patent. But it is common knowledge that there any number of patented articles protected by distinct patents that are commercial or trade equivalents: They are useful to the same end, appeal to the same patronage, and satisfy the same demand. Such patented articles are unquestionably competitive, and when the patents are separately held there is real competition in their use and sale. . . ."

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[12] *Id.*, p. 25.
[13] *Id.*, p. 2.
[14] *Id.*, p. 5.

The law proposed by the Oldfield Committee was not enacted. But the most serious practices criticized in the report shortly became illegal. Within a few months after the report, the Supreme Court held that the Sherman Act was violated by a patent licensing scheme seeking price fixing control of an entire industry.[15] Resale price maintenance of patented articles was held to violate the Act soon thereafter.[16] By section 3 of the Clayton Act the Congress forbade tying practices of the kind previously held legal.[17] And in the *Motion Picture Patents* case, the Supreme Court overruled prior decisions and refused to permit patent enforcement that would have the effect of implementing tying practices.[18]

The trend thus begun about 1912 has continued. From the foundation laid in the *Motion Picture Patents* case, the equitable doctrine of patent misuse has developed. This doctrine has been applied strictly. Activity subject to possible patent control has been greatly narrowed.[19] In some instances, the risk of a misuse holding is best minimized by a policy of granting licenses—a form of compulsory licensing.[20] Efforts to monopolize by purchasing competing inventions—a point of particular emphasis in the report of the Oldfield Committee—have been held to violate the Sherman Act.[21] Attempts to achieve a similar end by destroying the interest of prospective competitors in pursuing their own inventions have met a like fate.[22] In some instances a policy of granting patent licenses to all applicants is probably required to avoid Sherman Act violation.[23] In addition, a great many antitrust decrees have required patentees to license all comers. Some 40,000 to 50,000 patents are now subject to such decrees—a number far greater than the

[15]Standard Sanitary Mfg. Co. v. U.S., 226 U.S. 20 (1912).

[16]Bauer & Cie v. O'Donnell, 229 U.S. 1 (1913).

[17]38 Stat. 730 (1914).

[18]Motion Picture Patents Co. v. Universal Film Mfg. Co., 243 U.S. 502 (1917).

[19]The leading cases are: Carbice Corp. of America v. American Patents Develop. 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). The Congress has relaxed the strict misuse doctrine in the 1952 Patent Code. See 35 U.S.C. 271.

[20]See, e.g., the facts of Leitch Mfg. Co. v. Barber Asphalt Co. 302 U.S. 458 (1938).

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

[22]U.S. v. General Electric Co., 82 Fed. Supp. 753, 815 (D. N. J. 1949).

[23]See, e.g., Standard Oil Co. v. U.S. 283 U.S. 163 (1931).

number of patents involved in statutory compulsory licensing proceedings in other countries.[24]

These developments have doubtless influenced the pace of creating and marketing inventions.[25] But there has been minimum resort to sweeping doctrine and a maximum emphasis upon specific practices deemed anti-competitive. The effect of this *ad hoc* approach on the economic effectiveness of patents had at least been less than would have occurred through unselective legislation or more sweeping judicial doctrine.

The history brings out a key objective of competitive public policy as to patent matters—competition in making and marketing new inventions. Reference to such competition is explicit in the report of the Oldfield Committee, and in some subsequent judicial decisions.[26] It is implicit in the trend of judicial decision and legislative action. Where such competition exists, suppression of inventions, undue prices, and the like are self-defeating—for such tactics stimulate in-

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[24]*Compulsory Patent Licensing Under Antitrust Judgments,* Staff Report to Subcommittee on Patents, United States Senate, 86th Cong. 2d Sess., 1960, p. 5. For discussion of the small number of patents involved in compulsory licensing under the foreign statutes see, Neumeyer, *Compulsory Licensing of Patents Under Some Non-American Systems,* Study No. 19, Subcommittee on Patents, United States Senate, 85th Cong. 2d Sess., 1959.

[25]Important inroads on the economic effectiveness of the patent system have resulted from causes other than patent abuse. Unduly narrow holdings as to patent scope have been one such cause. See, e.g., Exhibit Supply Co. v. Ace Patents Corp., 315 U.S. 126 (1942). Unduly stringent rulings as to "invention" and the judicial statements they embody are another such cause. See, e.g., Great A&P Tea Co. v. Supermarket Equip. Co., 334 U.S. 147 (1950). The 1952 Patent Code, 66 Stat. 792, has tended to minimize the more extreme rulings on "invention."

Significantly, the Executive Department is currently urging greater investment and activity in the field of civilian technology. See, e.g., *Economic Report of the President,* House Doc. No. 28, p. xxv, and *The Annual Report of the Council of Economic Advisers, Id.,* p. 63. The latter states:

> "The private business firm, stimulated to meet the needs of the economy by the opportunity for profit and the spur of competition, is generally the most effective organization to conduct and support research and development for the advance of civilian technology. But private business firms are not always in a position to undertake research, especially where one company takes the risks and covers the costs but many companies share widely in the benefits. Research on process improvements not subject to patenting—a major source of productivity growth—and analysis of materials and methods are important cases in point. . . ."

Additional government support for civilian research and development is being sought to increase the rate of economic growth. The fact of this need suggests that there is an equal need to explore ways to make the patent system more effective and thereby reduce the need for government action.

[26]See James P. Marsh Corp. v. United States Gauge Co., 129 F(2d) 161, 165 (7th Cir. 1942) and Chicago Steel Foundry Co. v. Burnside Steel Foundry Co., 132 F (2d) 812, 816 (7th Cir. 1943).

creased activity by competitors and the creation of inventions that compete with or even displace the existing inventions. In short, a competitive curb, analogous to the competitive controls as to business activity generally, is provided as to the processes of invention and innovation. And—as applies to competitive activity generally—the increment of "price" associated with superior competitive performance reflects the superiority of the performance and stimulates others in like endeavors. It need not be urged that the patent law in its present form in every respect achieves this competition, or that some optimum is embodied in each and every provision of the patent law. The important point is that there is a sound analytical case, supported by both history and experience, for the proposition that patent rights stimulate an important form of competition with the restraints of competition on the successful competitor.

There are other considerations, such as the relation of patents to the formation and growth of new businesses, that require consideration in a general assessment of the competitive role of patents. But it is the competition in invention aspect that warrants primary attention in considering the drug patent compulsory licensing proposals.

What is the record of the drug industry? Is there competition in the creation and marketing of new products? We can approach these questions both analytically and pragmatically. Materials such as the Senate investigatory hearings, the FTC antibiotics industry report, and the hearings on the compulsory licensing proposals, provide data as to what has in fact occurred. By recourse to the content of patents in the industry and to the character of the industry structure we can analytically consider the questions.

The drug industry may be divided into a variety of product categories, the products within each category being directed to generally the same objectives and being in substantial competition with each other. The typical record for any particular product category is one of constant churning in so-called "dynamic" competition—with dramatic shifts in market positions as existing drugs are displaced by superior products of rival houses. In cardiovascular preparations, the leading company in 1951 enjoyed about 19 percent of the market, the leading company in 1960 had about 21 percent of the market, and of the four leading concerns in 1951 only one was among the four leading concerns in 1960.[27] In the case of diuretics, four different concerns enjoyed the leading market position in the 1951-1960 period, the concern with the largest sales in 1960 was not among those with signi-

[27]Hearings on H.R. 6245, 87th Cong., 2d Sess. 1962, p. 584.

ficant sales in 1951, and the concerns with largest sales in 1951, 1952, and 1953 had no significant sales in 1960.[28] And in corticosteroids, the company that pioneered the field in 1950 had only about a quarter of the business in 1954 and by 1956 its products enjoyed less than 5 percent of the market.[29] A report presented by the industry at the compulsory licensing bill hearings stated:[30]

> "The primary explanation of such dynamic sales behavior is found in the pace of discovery and introduction of new products and the displacement of older products. The vigorous and frequently violent shifts in sales patterns attest to the strength of the competitive pressures for innovations that exist in this industry. The pace of change is so great that a leadership position once achieved may last only a very few years. Ordinarily, such a position can be maintained only by a vigorous program of research and development which continues to generate a flow of new products and processes which yield more effective therapy in the fight against disease."

Analytical considerations fully support the lesson of experience. In the ethical or prescription drug industry as a whole there are a large number of companies fully capable of creating and marketing drugs in all, or essentially all the product categories. In 1951 only two companies had more than 10 percent of the total sales of the leading companies in the industry, and their percentages were about 13 and 12 percent.[31] The trend has been towards even less concentration. In 1960, the two concerns with the greatest sales had about 8 percent of the sales of the leading companies, and the top ten of the leading companies had from about 5 to about 8 percent of the total sales of those companies.[32] Sales percentages are even smaller if based on total industry sales. In 1957, the Federal Trade Commission reported a concentration ratio of "over 21" for the four leading companies in "pharmaceutical preparations" and for the four leading companies in "ethical and proprietary preparations for human use"—a value to be compared with 88 for cigarettes, 49 for synthetic rubber, 32 for druggist and medical sundries, 71 for steel plates, and 59 for household mechanical refrigerators.[33]

Patent rights in the pharmaceutical field are typically of narrow scope. The patent to the most important potent tranquilizer, chlorpro-

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[28]*Id.*, p. 592.

[29]Hearings on Administered Prices in the Drug Industry (hereinafter "Hearings"), Pt. 14, p. 8028.

[30]Hearings on H.R. 6245, 87th Cong., 2d Sess. 1962, p. 565.

[31]*Id.*, p. 567.

[32]*Ibid.*

[33]Report of the Federal Trade Commission on Industrial Concentration and Product Diversification in the 1,000 Largest Manufacturing Companies: 1950, 1957, Appendix C, Table 1.

mazine, covers only a few chemical compounds.[34] Other similar chemical compounds have been made, patented, and marketed by competitors of the company that introduced this product. And physicians have indicated a value in having the variety of products.[35] Narrow patents such as this are the rule rather than the exception. And even when pharmaceutical patents are broad in terms, experience has shown that there is ample room for competitive invention and marketing. The diuretic field provides a most dramatic example of this kind. The patent to chlorothiazide—one of the most important new drug developments of recent years—in terms covers a large number of chemical compounds. But it does not in terms cover the more active products that have since been discovered and marketed, both by the concern that created the pioneer product and by competitors.[36]

The industry thus is characterized by a large number of concerns capable of undertaking promising new drug research and marketing activities and patents that are usually of narrow scope that do not foreclose such efforts. One would expect a vigorous competition in creating and marketing new products, and that each successful new product would be subjected to the competitive restraints of actual and potential new products offered by competitors.

With these competitive aspects of the operation of patents in the drug industry in mind, let us turn to the assertions made in support of compulsory licensing.

As introduced by Senator Kefauver, S. 1552 would require the owners of patents to human prescription drugs to grant licenses to all "qualified" applicants.[37] The maximum royalty rate for any such li-

[34]Patent 2,645,640.

[35]Hearings on S. 1552, 87th Cong., 1st Sess. 1961, p. 2153.

[36]Patent 2,809,194. With respect to this matter, Senator Kefauver stated:

"A few years ago the first of these products, representing a real 'breakthrough,' was introduced by Merck under the trade name of Diuril. Shortly thereafter modifications were introduced by Squibb, Bristol, Schering, Abbott, Robins, and Pfizer. Yet, the medical literature would appear to indicate that there is no significant difference in the pharmacological properties of any of these diuretic drugs. I frankly feel that in this case Merck was denied the reward intended under the patent system for a true innovation."

[37]In form, the compulsory licensing provision of S. 1552 was similar to the language of the compulsory licensing provision of 17 U.S.C. 1(e) respecting copyrighted musical compositions. The grant of every patent for a human prescription drug was to be for a term of three years from its "effective date," followed by a period of not more than 14 years provided the holder grants licenses as required.

S. 1552 in its original form provided for licensing of pharmaceutical manufacturers. "Qualified applicant" for compulsory licensing purposes was defined as any person holding such manufacturing license.

cense was set at 8 percent of the gross sales price of the licensee. The compulsory license requirement would apply to all such patents at all times after a three year period commencing, in most instances, with the date the new drug application became effective.[38] After hearings, the bill was amended to provide essentially the same licensing, commencing three years after the date of patent issuance and with a more limited definition of gross sales price for royalty computation purposes.[39] The bill also included provisions unrelated to compulsory licensing, especially provisions dealing with the public health aspect of the industry. The bill was reported out of the Judiciary Committee with substantially all provisions other than the public health provisions deleted. When the bill was on the Senate floor, Senator Kefauver then sought to reintroduce the compulsory licensing provisions. The proposal then made would have conditioned the compulsory licensing requirement upon a Federal Trade Commission finding that the sale price of the drug was more than five times the "production cost."[40]

The object of S. 1552 was to reduce drug prices. Senator Kefauver stated that high drug prices and profits "result from control over the market and the manner in which that control is exercised."[41] In his view, "although there are many factors involved, the principal sources of market control seem to be first, patent control; second, the extensive and costly advertising and promotion costs directed to physicians; and, third, the persuasion of doctors to prescribe by brand names rather than generic names."[42] There have been no substantial contentions that patent suppression has occurred, that patents have been

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[38]The three year term free from compulsory license requirement was defined in the bill to commence on the "effective date" of the patent. Section 3 (d) (2) (3) of S. 1552 defined the "effective date" as "(*a*) in the case of a new drug . . . the effective date of the application filed with respect thereto under section 505 of (the Federal Food, Drug, and Cosmetic Act) . . . and (*b*) in the case of any other drug, the date on which application was made for that patent. Since most patented prescription drugs require new drug applications under the Federal Food, Drug, and Cosmetic Act, the new drug application date would apply. In many instances the effective date of the new drug application precedes patent issuance. The original language of the bill accordingly gave rise to the possible case of a patent having an "effective date" before the issue date.

[39]It was in this form that the bill was approved by the Antitrust and Monopoly Subcommittee on March 8, 1962. Section 3 (c) (2) (2) of the amended bill provided for "the payment by the licensee of a royalty not exceeding 8 per centum of the gross selling price received by the licensee for the sale of that drug in its finished form for use by the consumer."

[40]*Supra,* note 3.

[41]*Congressional Record,* April 12, 1961, p. 5298.

[42]*Ibid.*

purchased to limit competition, or that there have been other specific anticompetitive practices based on patents.[43] And—while price fixing charges have been made in specific cases involving the industry—it has not been argued that some common price fixing activities support the bill.[44]

Other statements respecting the proposals bring out the focus of the economic theory of the bills. Support for the proposals has been sought by comparing the prices of concerns that do not create and do not market new drugs with the prices of concerns that do not undertake these activities.[45]

Comparisons have been made of the bare costs of producing drugs and the sales price of the drugs, omitting the costs of marketing. Marketing costs are essential and heavy in the case of concerns that pioneer in new drug marketing and are very low in the case of concerns that

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[43]During the hearings on S. 1552, some reference was made to the possible suppression of some drug, such as a cancer cure. See, e.g., Hearings on S. 1552, p. 2171. No example of actual suppression of such drug was ever cited.

[44]Price fixing charges are involved, for example, in Matter of American Cyanamid Company et al, Federal Trade Commission Docket 7211, complaint filed July 28, 1958. It appears to be accepted by all concerned that the Sherman Act and Section 5 of the Federal Trade Commission Act adequately handle such price fixing problems as have occurred in connection with drug patents.

[45]See, e.g., Hearings on H.R. 6245, 87th Cong., 2d Sess. 1962, pp. 15-17 and Cong. Rec., August 25, 1962, p. 16345.

The price comparisons have emphasized drugs such as prednisone, for which no patent has yet issued because of an interference, and reserpine, for which licenses are freely issued at low royalty rates. In the case of vendors that emphasize brand names, the prices of these products are much greater than the prices of vendors that do not emphasize brand names. This difference reflects the differing marketing costs of the two types of vendors.

An indication of the error of this analysis is found in the varying prices charged for aspirin, a non-prescription drug for which the patent expired many years ago. Price variations of five or ten to one can readily be found between the vendors that emphasize brand names and those that do not. One survey included in the Senate investigatory hearings listed a price range from two cents to 85 cents per hundred tablets. Hearings, Part 21, p. 11,747.

A chart presented in the hearings on S. 1552 (Exhibit 25, p. 2294, Hearings) presented the ratio of sale price to manufacturer's cost for five pairs of drugs, one of each pair being listed as patented and the other of each pair being listed as nonpatented. Dramatically greater ratios were shown for each of the drugs listed as patented than for the comparison drug listed as nonpatented. By taking data on the same drugs but for pairs of companies as to each drug that followed similar, rather than different, product promotion and distribution policies, however, the chart was recomputed to show that in each of the five instances the ratio of sale price to manufacturer's cost for the drug listed as patented was less than that for the drug listed as unpatented. (Exhibit A, p. 2300, Hearings).

simply supply the demand for existing drugs of known characteristics and application.[46]

In short, the bills seek to bring the prices of new drugs down to the very low levels associated with the sale of some so-called "generic" drugs and propose to accomplish this end by curtailing the patent incentive to engage in new drug competition. The basis for the bills, therefore, must be that the general competitive object of the patent laws—even though achieved—is not the best objective. The real issue is whether the value of new drugs resulting from patent-induced competition in the drug industry is outweighed by the increment of price associated with such competition.

Both analytical considerations and practical evidence indicate that substantial curbs on the significance of patents will entail corresponding reductions in new drug creation and marketing. The analytical case is the same as that applicable to patent induced new product competition generally, namely, that the increment of price associated with the new product creation and marketing activity is only that increment required to bring forth the activity. New drug creation and marketing being highly competitive, the increment of price between patented new drugs and "generic" drugs is not an arbitrary

[46]The educational aspect of introducing a new drug entails large costs that must be undertaken by the pioneering concern. The introduction of tolbutamide (Orinase) brings out the immensity of what may be required in the overall process. The product is an oral antidiabetic agent. It represented a promising drug where many prior attempts had failed. One such attempt was an elaborate clinical testing program conducted by a competitor on a closely related drug that proved too toxic for marketing. The Upjohn Company, which introduced the drug, had clinical studies made on 20,000 diabetic patients before marketing, conducted a conference on clinical results and supplied 63,000 copies of the proceedings to physicians, medical schools, and medical libraries, later conducted an elaborate conference for which 80,500 copies of the proceedings were distributed and used closed circuit television and motion picture programs seen by 45,000 doctors. Emphasis throughout was on the proper usage of the drug, which is effective primarily in "adult" diabetics and not others. Hearings, Part 20, pp. 11011-11016.

The magnitude of the investment required to introduce a new drug was brought out also by the testimony of Mr. Myron Pantzer, a small drug manufacturer, who stated that "I do not feel that a firm of our size and stature from a manpower standpoint and a financial standpoint is capable of taking drugs like meprobamate and Sparine and doing actual justice to their potential return." Hearings, Part 16, p. 9363.

The importance of product promotion efforts in the drug industry is also brought out by studies of experience in the Soviet Union, where ineffective or non-existent promotion has led to poor drug quality, inadequate knowledge as to the existence and proper use of new drugs, and lack of availability of such drugs. See Bauer and Field, "Ironic Contrast: U.S. and U.S.S.R. Drug Industries," *Harvard Business Review,* October 1962, pp. 89-97.

value based on whim and monopolistic price setting. Undue prices stimulate the competing new product activity of others, which is another way of stating that prices of the new products are determined competitively.[47] It analytically follows that to the extent compulsory licensing legislation might actually reduce prices it would correspondingly reduce new drug creation.

A number of industry executives testified as to the significance of patent rights to them.[48] A representative statement was made by Mr. Eugene Beesley, President of Eli Lilly Company and of the Pharmaceutical Manufacturers Association. Testifying with respect to S. 1552, he stated:[49]

> ". . . This proposal obviously strikes directly and crucially at the industry's capacity and incentive for discovery of new and improved medicines, and we vigorously oppose it. . . .
>
> ". . . the fundamental question before Congress is whether a strong patent system does in fact provide a powerful stimulus for discovery of new and improved medicines to combat disease. If it does, as I have already said, such protection should be encouraged, not weakened; if it does not, then Congress should consider scrapping the whole patent system.
>
> "The value of patents as a stimulus for discovery is clearly understood by those who deal with the issue not in theory but in terms of actual commitments of their company's resources for research. My company is now investing more than $20 million a year in research and development. I know we could not continue to risk such investments if other manufacturers, domestic and foreign, could share in our discoveries simply by asking, without making any investment in research or any scientific contribution of their own.
>
> "Other research-oriented companies would undoubtedly be forced to the same conclusion. The consequences of such a retreat from a full research effort would certainly penalize the companies concerned, but the public welfare would receive an even more damaging blow."

A like conclusion was drawn by the Federal Trade Commission in its study of the antibiotics portion of the industry. The report states that:[50]

> ". . . there has been a strong impetus to research and development in the antibiotics industry as a result of the competition among rival

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[47]The competitive character of pricing is brought out by instances where new drugs have been introduced at price levels lower than their predecessors. This occurred, for example, in connection with the antidiabetic drug chlorpropamide, which was introduced after tolbutamide and at a lower price. Hearings, Part 20, pp. 11118-11120. Another illustration of a new drug introduced at a lower price than the predecessors is Decadron, introduced at a price about 10 percent below the competitors. Hearings, Part 14, p. 8121.

[48]See, e.g., Hearings, Part 24, p. 13835 and p. 13649.

[49]Hearings on S. 1552, pp. 2005-6.

[50]*Economic Report on Antibiotics Manufacture,* 1958, p. 226.

pharmaceutical houses in the race to obtain patents on individual antibiotic products."

In at least two instances, important drugs have been created through industry research, and licenses have been granted to all applicants on a basis similar to the licenses that would be required by the proposed legislation. One case is reserpine, an alkaloid obtained from a plant source and useful as a mild tranquilizer and blood pressure lowering drug. It was the result of research conducted by Ciba, which company owns the United States patent. Decision was made to license all applicants at a royalty rate of 6 percent of sales price. The drug has been highly successful, and is sold by Ciba and others in large quantities. Yet the royalty return to Ciba in 1958 was only $12,600. This is infinitesimal in relation to the Ciba research expenditures of $5 million in that year and the total Ciba net earnings of $4.8 million.[51]

Another drug that was licensed generally is isoniazid, a tuberculosis drug. This drug was created independently by Hoffman-LaRoche and by Squibb. Its importance is indicated by the Lasker award to the two companies as the consequence of their work on it. Decision was made to grant licenses to all applicants at nominal royalties. As it turned out, the drug—while highly successful in terms of public health—did not have the market anticipated. Sales by the numerous licensees drove the price of the drug down to a low level and the originating companies enjoyed only a small part of the total market. A representative of one of the companies has written that the "research project cannot . . . be regarded as economically successful."[52]

In apparent recognition of the extent the proposed compulsory licensing would reduce patent incentives in the drug industry, a majority of the Senate Subcommittee on Antitrust and Monopoly attacked the significance of patent rights in stimulating pharmaceutical discovery. Using comparisons of United States and foreign drug discoveries, it concluded that "in this industry the mere existence of patent protection is not a guarantee of invention, nor is its absence much of a barrier."[53] Senator Kefauver apparently had a similar thought in mind when he stated, upon introducing S. 1552, that "drug discoveries in foreign countries without product patents outnumber those in countries with patent protection by 10 to 1."[54]

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[51]Hearings, Part 16, pp. 9385-9403.

[52]See Aeschlmann, "Isoniazid, Victim of a Limited Market," 52 *Industrial and Engineering Chemistry* 22 (1960).

[53]*Administered Prices Drugs,* 87th Cong., 1st Sess., Rep. No. 448, June, 1961, p. 120.

[54]*Congressional Record,* April 12, 1961, p. 5299.

These statements were based on an apparent misinterpretation of the nature of drug patent protection in the various foreign countries. After correction is made for error of law, the figures no longer supported the point made.[55]

The data on drug discoveries in foreign countries in fact strongly support the proposition that the patent rights are important to the creation and marketing of new drugs. The law and practice relating to pharmaceutical patents varies greatly between the respective countries. In some, such as Great Britain, relatively broad patent rights to pharmaceutical products are available, but the significance of such rights is limited by broad and unselective compulsory licensing provisions.[56] In other countries, especially West Germany and Switzerland, compulsory licensing is on a selective basis that does not greatly limit the significance of patent rights, but the "derived" product protection makes the patents less important in terms of coverage than in England and the United States.[57] And in Italy, no patent rights are available to drugs or processes for their manufacture.[58] Because of these variations in patent protection, a comparison of the records of these countries in creating important new drugs gives a significant indication of the importance of patent rights, even after taking into account variations in population, economic conditions, and the like.

A tabulation of important drug discoveries made by the Senate Subcommittee and set forth in a report in support of S. 1552, shows a clear correlation between the nature of the patent laws of the respective countries and the rate of new drug discovery.[59] The most illuminating comparison is between the United States (with relatively strong patent rights in drugs), Great Britain, France, West Germany, and Switzerland as a group (having a population comparable to the United States and each having, for various reasons, drug patent rights of intermediate strength), and Italy (having no drug patent rights). The tabulations show that at the present time more than two new drug discoveries are being made in the United States for every new drug discovery in Britain, France, Germany, and Switzerland combined. The tabulation does not list a single important new drug created in Italy.

The experience of Italy is even more significant when account is taken of the Italian record in chemical industry generally. In some

[55]Hearings on S. 1552, pp. 1200-1202, pp. 2136-2137.
[56]Patents Act 1949, Section 41.
[57]Hearings on S. 1552, pp. 1200-1202.
[58]Hearings on S. 1552, pp. 2160-2162.
[59]Hearings on S. 1552, pp. 2134-2149.

aspects of industrial chemistry, Italy is a world leader. The field of organic polymers, a close relative of the organic chemistry involved in most drug manufacture, is a particular area of Italian leadership.[60] Patent rights are available in these other fields, but not with respect to drugs. In short, the Italian record is one where there are both patent rights and a record of technical accomplishment in chemistry generally and no patent rights and no record of accomplishment in the drug field.

The pioneer manufacturer of a new drug may be spurred on to some extent by advantages other than patents, such as the benefit of being the first in the field and the effect of a new drug application. But the presence of other protection available in varying degrees to the innovator does not detract from the importance of patent rights. The record is a clear warning that legislative weakening of patent rights—as by the proposed compulsory licensing—will substantially retard research and new product marketing competition.

The contentions made to support drug compulsory patent licensing have been based on asserted ineffectiveness of patents to bring about new drug discovery, and not on doubt as to the social value of such drugs when created and marketed. Perhaps if it could be said that the patents do not spur significantly greater new drug discovery and marketing efforts there might be no need to consider the importance of new drugs. But since the record indicates that the proposed legislation would indeed retard this activity, it is important to consider the value of the new drugs to the community. One study placed in the Senate hearings record concluded that the reduction in mortality between 1935 and 1960 accounted in 1960 for a contribution of over $10 billion to the gross national product.[61] Almost half of this amount, it was calculated, was attributable to the decline in death rates from tuberculosis, pneumonia, influenza, and syphilis. All of these diseases are responsive to drug treatment. The report estimated a contribution of earnings to the gross national product of $2.5 billion as a consequence of reduced man-hours lost on jobs in 1959 as compared to 1942. It was estimated that approximately 4.4 million working age people today are survivors from all possible causes of death had the 1935 death rates persisted.

A specific example of the social and economic worth of new drugs is found in the field of psychiatric drugs. The Deputy Commissioner

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[60]See, e.g., *Business Week,* July 29, 1961, p. 36 and Natta, "Precisely Constructed Polymers," *Scientific American,* August 1961, p. 33.

[61]Hearings on S. 1552, p. 2474.

of the Department of Mental Hygiene of New York testified that the availability of such drugs permitted reduction of restraint and seclusion to about one tenth of that previously required, that the number of releases in New York State hospitals had increased from about 8,000 to about 17,000 patients per year, and that contrary to all prior experience the number of patients in mental hospitals in New York fell from over 92,000 to 88,000 after the use of tranquillizing drugs was introduced.[62]

But if the records to date demonstrate a value to the drugs that have been created and marketed, the requirements of the future demonstrate the continuing need beyond all question. Some diseases, such as tuberculosis, have responded well to drugs created to date. But resistant bacteria strains are developing and will require the availability of other drugs if the progress already achieved is to be maintained.[63] And the list of important unfilled drug needs still remains long, including the need for drugs to arrest the course of circulatory disease, safe soporifics, effective cancer drugs, and many others.

Finally, there are illuminating instances where important new drugs have not been perfected and marketed in an atmosphere of competitive rivalry. Penicillin is the most dramatic example. By 1929, Dr. Fleming had data indicating the high effectiveness and low toxicity of this important drug.[64] For a variety of reasons, including Dr. Fleming's indifference to the commercial side of the matter, his lead was not pursued on the intensive basis required for successful purification and concentration of the drug. As a consequence, almost 10 years passed before the drug was investigated on the scale required to confirm its practical value, the drug was not tried on a human subject until 1941, and it was not until about 1944 that the drug was available for general use.[65]

Recent events further enhance the case for strong continued incentives to create and market new drugs. The thalidomide episode led to 1962 amendments in the federal food and drug law and to an increased standard of proof before a new drug may be commercially marketed. Both the law and more rigid administrative standards increase the risks of failure at every stage in the process of creating and

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[62]Hearings, Part 16, pp. 9083-4.

[63]See, e.g., "When Wonder Drugs Won't Work," *Business Week,* October 20, 1962, p. 180.

[64]Fleming, "On the Antibacterial Action of Cultures," *British Journal of Experimental Pathology,* 1929, p. 226.

[65]The discovery and development of penicillin is summarized at Appendix II, *Economic Report on Antibiotics Manufacture,* Federal Trade Commission.

marketing a drug, and increase the expenses incurred at each stage. The result is that new drugs reaching the marketing stage hereafter will have a significantly increased investment to be recovered and those drugs that do prove successful must bring forth a greater return if the activity in creating and marketing them is to be continued.[66]

CONCLUSION

The compulsory licensing proposed for drug product patents cannot be predicated upon a failure of drug patents to accomplish their economic mission. Vigorous competition characterizes the creation and marketing of new drugs, with rapid and large variations in market shares as new drugs replace the old and an ever-present risk that any existing drug will be displaced by a competing newcomer. Competition, not trade monopoly, fixes the return on the new drug. This is competition of the kind recognized as an important objective of the patent law, and protected and encouraged by patent and antitrust law decisions since about 1912.

The case for the legislation must accordingly rest upon a determination that this competition must be sacrificed to achieve some other end. The end sought is lowered drug prices. The quantum of such lowering to be achieved by the proposed laws is not demonstrable. Comparison of patented drug prices and some very low "generic" drug prices exaggerates the possibilities—for the same dramatic comparison can be made with reference to drugs that are not patented. It equally exaggerates the possibilities to contend that no lowering would occur because there would be no new drugs to price—for some new drugs would certainly be marketed if the proposed licensing were in effect. The important point is that—with new drug creation and marketing competition—any price reduction would be reflected in diminished new drug creation and marketing.

The lesson of Great Britain, France, Germany, and Switzerland—and especially the lesson of Italy—is that the penalty is very real. The lesson of penicillin is that tragic consequences can ensue if the competition is lacking. And the lesson of the numerous important modern

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[66]S. 1552, in amended form largely confined to the food and drug law provisions (themselves revised from the original form of the bill), was passed and is now Public Law 87-781.

For a recent statement on the increased costs of new drug development associated with this and other events see Lawson, "New Drug Slowdown," *The Wall Street Journal,* March 26, 1963 (stating that it now costs from $500,000 to $5,000,000 to develop a single drug.)

drugs for which rewards have been inadequate[67] is that the level of return—right now—is not nearly as favorable as emphasis upon the most profitable drugs would suggest. These and other considerations cast a cloud of doubt on whether compulsory licensing (or other substantial curtailment of drug patent rights) would be a good bargain under any circumstances. It seems even more clear that the bargain would be poor at the present time, when a new food and drug law has still further increased the barriers to the successful marketing of new drugs.

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[67]Patent rights have failed, for a variety of reasons, to reward adequately the creation and marketing of many new drugs. Sometimes this has occurred when the market demand turns out to be small despite (or even because of) the importance of the new drug. This occurred with isoniazid. *Supra,* note 52. Sometimes this has occurred when narrowness of the patent enables competitors—following the leader and with relatively little expense—to introduce new drugs without patent responsibility. Senator Kefauver apparently regarded Diuril as in this class. *Supra,* note 36. As to situations of this kind, the risks seem a part of the inevitable and very great risks associated with the whole process of new drug creation and marketing. It would appear that these—like the other risks—can only be accommodated through the greater returns in those instances where financial success results.

A different type of patent system failure has also occurred as a consequence of the interference procedures of the United States patent law. Patent interferences occur frequently in the field of drug patents. All too often they have led to long delays before patent issuance. Prednisone and prednisolone—two very important cortico-steroid products—have been marketed since 1955. Patents have not yet issued because of pending interference proceedings, and a long period may elapse before they do issue. There should be some way to prevent incidents of this kind. Legislation to that end would clearly be to the interest of the public and industry alike.

NOTES

Patent, Trademark, and Copyright Research Institute

We are pleased to announce that on September 1, The Patent, Trademark, and Copyright Foundation of The George Washington University will officially be known as The Patent, Trademark, and Copyright Research Institute of The George Washington University. The new name is believed to be more in accordance with our purposes and programs.

Advisory Council Officers and Members Chosen

Robert C. Watson, Chairman of the Advisory Council of The Patent, Trademark, and Copyright Foundation has been re-elected for a one year term. Formerly Commissioner of Patents, Mr. Watson is with the Washington firm of Watson, Cole, Grindle & Watson. Earl P. Stevenson, former Chairman of the Board of Arthur D. Little, Inc., of Cambridge, Massachusetts has been elected Vice-Chairman of the Advisory Council.

New members appointed to the Advisory Council are: Roy Blough, Professor of International Business, Graduate School of Business, Columbia University, New York; Donald L. Brown, Vice President & Patent Counsel, Polaroid Corporation, Cambridge, Massachusetts; John T. Connor, President of Merck and Company, Rahway, New Jersey; Robert E. Harris, Chief Patent Counsel, Chrysler Corporation, Detroit, Michigan; and Irven Travis, Vice President, Burroughs Corporation, Detroit, Michigan.

The Advisory Council which advises on policy determination and the formulation of specific programs consists of representatives from the fields of commerce, education, science, manufacturing, finance, labor and the professions, for the purpose of insuring sound and effective advice based upon broad information and wide experience.

Appointed to the Executive Committee of the Council was Sherrod E. Skinner, Chairman of the Board of Trustees, Aerospace Corporation, Los Angeles, California. Games Slayter, Vice President Research, Owens-Corning Fiberglas Corporation, Granville, Ohio has been appointed to the Research and Education Subcommittee, and W. Houston Kenyon, Jr., Kenyon and Kenyon, New York City, has been named to the Publications Subcommittee.

International Series Published

Five public lectures and discussions in the series entitled, "Current International Industrial Property Developments and the Relation Thereto of Antitrust and Trade Practice Laws and Policy" have been given under the auspices of The Patent, Trademark, and Copyright Foundation. For these occasions, the Foundation brought to Washington from abroad officials and other experts, who are in a decision-making or recommending capacity, and who would otherwise be unavailable to people in this country.

The first three meetings were on the European Common Market and Great Britain and have been published in Vol. 6, No. 4 of the *Journal.* Pieter VerLoren van Themaat, Director General of the General Direction for Competition of the Commission of the European Economic Community discussed on January 28, 1963, "Current Antitrust Developments in the European Common Market and the Relation Thereto of Industrial Property Rights."

At the second meeting, Geoffrey W. Tookey, Queen's Counsel, President of British Group of International Association for Protection of Industrial Property, on February 6, 1963, considered "Current Developments in Industrial Property Rights in Great Britain." Franz Froschmaier, Director in the General Direction for Competition of the Commission of the European Economic Community, reviewed "Progress Toward the Proposed Conventions for a European Patent and for a European Trademark," on March 7, 1963.

The fourth meeting involved "Current Developments in Antitrust and Trade Practice Laws and Policy in Japan and the Relation Thereto of Industrial Property Rights" and was held on April 18, 1963. Toru Onuma, Secretary General of the Fair Trade Commission of Japan, was guest lecturer. The minutes of this lecture and discussion are contained in this *Journal.*

"Current Developments in Industrial Property Rights in Latin America and the Relation Thereto of Antitrust and Trade Practice Laws and Policies," was the subject of the lecture and discussion given on May 23, 1963 by representatives of three leading industrial countries in Latin America—Argentina, Brazil and Mexico. The speakers were: Carlos Henrique Fróes, Momsen, Leonardos & Cia., Rio de Janeiro, Brazil; Cesar Sepulveda, Dean of the Law School of the National University of Mexico and Director of the Institute of Comparative Law of the University, and former Director General of Industrial Property of Mexico; and Juan E. F. Wodak, Deputy Technical Supervisor of the National Bureau of Industrial Property, Buenos Aires, Argentina. This lecture will appear in a subsequent issue of the *Journal.*

The presentation by the foreign

expert in each lecture was moderated by an American specialist who then led the subsequent discussion. The lectures were so organized as to encourage participation from the audience. Given on the campus of The George Washington University, the lectures were free and open to the public.

The series was made possible by support from the Alfred P. Sloan Foundation. A contribution was also received from a leading industrial firm.

"How You Get a Trademark"

"How You Get a Trademark," the second booklet in the series entitled, *The Trademark, the Maker's Monogram* has recently been published by The Patent, Trademark, and Copyright Foundation. This colorful booklet is a succinct, practical guide addressed to young people, on obtaining and maintaining a trademark. It includes information on the "search" and traces the filing of an application for a trademark to its registration. Service marks, certification marks, and collective marks are defined and illustrated. There is an interesting account of the selection of a trademark, the pitfalls to avoid and the considerations involved in advertising.

The first booklet in the series on trademarks, "Coats of Arms of the Business World" is a general introduction to trademarks. Subsequent booklets will be concerned with trademark protection and utilization. The series is produced as part of the Foundation's educational program, intended to create in American youth an awareness of the trademark system and its relation to our economy.

Priced at 15 cents per copy up to ten copies, these booklets are also available in bulk. Purchases in bulk under 5,000 are 10 cents per copy; up to 10,000, 8 cents per copy; over 10,000, 6 cents per copy.

Digest on "Patents, Inventors and Taxes" Available

"How does America treat its inventors, and their backers, in taxation? Do the tax laws offer any incentives to create inventions and to put them to work?" The latest *Digest* by the Foundation answers these and related questions. Entitled "Patents, Inventors and Taxes," it summarizes the Foundation's research studies on taxation.

The *Digest,* a summary of the results of the Foundation's research (of which this is the seventh), is distributed to members of the Foundation, executives, government officials, educators and laymen generally, as well as to those with a professional interest in this area. Other *Digests* reported Foundation findings on the commercial use of patented inventions, foreign licensing, patents in federal R&D contracts, compulsory patent licensing, and government use of Foundation research, and the international role of patents and trademarks. Copies are available upon request.

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The Utilization of Government-Owned Patented Inventions

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SUMMARY AND ACKNOWLEDGMENTS

AS ONE RESULT OF ITS EXPANDING RESEARCH and development activities, the United States government has become the largest single owner of patents. The role of government ownership in promoting technological advance by exploiting patented inventions is a much controverted issue. On June 30, 1961, the government owned 11,674 patents; their average annual rate of acquisition sharply rose from 50 patents in the mid-1940's to 1,175 patents in the late 1950's. The government's patent portfolio will probably double in the next decade. Acquiring most of its patented inventions from its own employees and from its contractors under the title policy, the government usually makes these patents freely available to industry.

The materials of the several agencies administering the government's patent portfolio were assembled and analyzed. In addition, primary factual data were obtained from random samples of inventors and licensees. The rate of commercial use of government-owned patented inventions was found to be much lower than the rate of use of privately developed and owned inventions. Differences in the rates of use among agencies administering patents are small. Government-owned patented inventions hold only slight commercial potential because most are military-oriented. Many cover technology on radiant energy, ammunition and explosive devices, and ordnance. If the government were to grant exclusive rights, the rate of commercial use would rise only slightly. Licensing is a poor measure of commercial use. Almost all

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commercialized government-owned patented inventions are used to some extent without licenses. For purposes of national defense, the government utilizes a relatively high proportion of the inventions it owns.

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PART I

INTRODUCTION

THE FEDERAL GOVERNMENT CURRENTLY owns about 12,000 patented inventions, acquired mainly from its vast R&D program. The nature and extent of the utilization of these government-owned patented inventions are points at issue in public debates about government patent policy. The controversy is over the disposition of patent rights originating from government-financed R&D work.

Although there is a fairly uniform policy among government departments of taking title to patented inventions developed by government employees, no such uniformity exists for patents arising under research and development contracts. Some agencies follow the license policy and permit contractors to retain title to patents. Other government agencies, however, follow the title policy and usually require contractors to assign patent rights to the government.

OBJECTIVE OF THE STUDY

The primary goal of this study is to determine the nature and extent of the commercial utilization of government-owned patented inventions and the causes for nonutilization. The study is undertaken to test empirically the validity of the hypotheses developed by advocates of

the title policy—that government ownership of patents promotes the greatest possible commercial use of inventions arising from federally financed R&D, and that government ownership of patents prevents dangers created by patent monopolies. For comparative purposes, and also because the matter has been neglected almost completely, attention is given to the utilization of government-owned patented inventions by the government itself.

CONFLICTING OPINIONS ON PATENT POLICIES

Controversy on the utilization of government-owned patented inventions arises from proposals to change patent policies now followed by the various government departments. The Department of Defense and the Department of Commerce are the most important agencies usually following the license policy. The Atomic Energy Commission, the Department of Agriculture, the Department of the Interior, and the National Aeronautics and Space Administration, however, follow a title policy and usually take title to patents arising from contract research and development activities.

With the exception of spokesmen for the National Aeronautics and Space Administration, officials in the government departments that take title to patents originating from contract R&D hold the view that government ownership of these patents promotes the widest possible commercial use. However, not all agency representatives contend that a policy of nonexclusive licensing should be applied to every government-owned patent. This is true particularly of the Department of Agriculture.

Support for a license policy comes from agencies following that policy, as well as from the National Aeronautics and Space Administration. In addition to other benefits to be realized by a government-wide license policy, industry, the patent bar, nonprofit research organizations, and trade associations advocate private ownership of patents arising from government research and development contracts as the most effective means to stimulate widespread use of the inventions.[1]

EXAGGERATED VIEWS

In an effort to effectuate a change in government patent policy, combatants in the struggle to achieve a government-wide title policy or a government-wide license policy have tended to distort, by over-

[1] Donald S. Watson, Harold F. Bright, and Arthur E. Burns, "Federal Patent Policies in Contracts for Research and Development," *PTC J. Res. & Ed.*, Vol. 4, No. 4 (Winter 1960), pp. 298-299.

emphasis, the importance of the utilization of patented inventions originating from government-financed R&D. In addition, the matter is entangled in legal, political, and economic issues on the role that properly should be assumed by the government in this country.

Although the patent portfolio of the government has doubled during the last five years and the government is now the largest single owner of patented inventions, government-owned patents constitute only 2 percent of all unexpired U.S. patents. These government-owned patents are a single aspect of the entire patent system, which, in turn, is but one of many factors contributing to economic growth. Similarly, the patent system is only one element that can cause monopolization and economic concentration. Neither should the utilization of government-owned patented inventions be expected to play a significant role in the process of economic growth, nor should any exclusive use of these inventions be expected to contribute greatly to difficulties associated with monopoly and increased economic concentration. This does not mean that widespread use of government-owned patented inventions is unimportant. On the contrary, all the results of public R&D should be used as extensively as is feasible and economic. It does mean that any favorable effects of innovation on economic growth, or unfavorable effects on competition, will be far less than is claimed by the defenders of the license policy and of the title policy.

A NEW PROBLEM

As is well known, the actual amount and the relative importance of government-supported R&D have changed dramatically during the last several decades. In 1930, the government sponsored about 14 percent of the R&D undertaken in this country.[2] By 1950, the contribution made by the government jumped to about 53 percent of the total, and by 1960 to about 65 percent. Direct expenditures by the government rose from approximately $2 billion to $9 billion between 1950 and 1960.[3] Substantial outlays for R&D are almost certain to continue in the future. The President's Budget of the United States for the fiscal year 1964 shows that federal government obligations for R&D amount to $15 billion.

Some of the R&D financed by the government has resulted, and

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[2] Jesse W. Markham, "Inventive Activity: Government Controls and Legal Environment," *The Rate and Direction of Inventive Activity: Economic and Social Factors,* Conference of the National Bureau of Economic Research (Princeton, N. J.: Princeton University Press, 1962), p. 591.

[3] U.S., National Science Foundation, *Review of Data on Research and Development,* 33 (April 1962), pp. 2-3.

probably will continue to result, in patented inventions. About one-half of the nearly 12,000 patents owned by the government in 1961 were acquired during the preceding five years. Between 1937 and 1945, the government took title to patents at an average annual rate of only 50 inventions. This number does not include those seized by the Alien Property Custodian. During the late 1950's, the average annual rate rose to about 1,175 patents. On June 30, 1961, private individuals and corporations owned an estimated 23,000 unexpired patents arising from government-financed R&D work. It is estimated that approximately 35 percent of the inventions were developed by government employees and 65 percent by firms under government contract.[4]

PART II

THE ECONOMICS OF GOVERNMENT-OWNED PATENTED INVENTIONS

To put it as briefly as possible, the economics of the patent system rests on the advance of technology by means of granting exclusive or monopoly rights. Advances in science and technology can stimulate economic growth. On the other hand, the exclusive use of patented inventions can preclude widespread diffusion of the technology and can hinder the maintenance of competition. The economy derives social benefits from economic growth, whereas social costs can be incurred when monopoly power increases. The philosophy underlying the patent system, of course, is that social benefits gained from advances in science and technology outweigh the social costs of exclusive rights.

Government ownership of patented inventions strikes the heart of the patent system. With relatively insignificant exceptions, it is and has been the policy of the government not to permit exclusive use of the patented inventions it owns. The government usually grants revocable, nonexclusive, royalty-free licenses upon request. Does government

[4] This estimate is based on data in the Assignment Branch of the U.S. Patent Office; information about patents owned by government employees of the Department of Defense uncovered by the Senate Subcommittee on Patents, Trademarks, and Copyrights of the Senate Committee on the Judiciary; and data presented by Professors Watson, Bright, and Burns, *op. cit.*, p. 321.

Between 1944 and 1951, contractors of the Department of Defense (DOD) annually retained title to about 650 patents. Between 1952 and 1961, the average annual number of patents retained by DOD contractors rose to 925. For the seventeen-year period, July 1, 1944 to June 30, 1961, DOD contractors acquired title to an estimated 13,500 patented inventions originating from government-financed research. During the same period, employees of the Department of Defense took title to about 8,000 patents. Contractors and government employees in all other agencies acquired title to about 1,500 patents between July 1, 1944 and June 30, 1961.

ownership of patents promote the most widespread commercial use because the inventions are freely available to all? Or instead, does government ownership of patents mean that some inventions holding commercial potential will not be developed because patent protection is absent?

ECONOMISTS' VIEWS OF THE PATENT SYSTEM

For centuries economists have been debating the relative merits of the patent system. The issues have been disentangled, but they have not been settled. In general treatises, the classical economists of the late 18th and 19th centuries expressed incidental opinions accepting patent protection as a stimulant or reward for the inventor-producer. The one well-known dissenter was the French economist, Simonde de Sismondi.[5] Spurred by a controversy in the third quarter of the 19th century as to whether European patent systems should be abolished, economists gave more direct attention to exclusive rights to patents as an incentive. The more important arguments evolving during that period are basically the same as those used today—patents are a stimulus for disclosure of new technology, for invention, and for innovation.[6]

Disclosure of New Technology

The patent is granted to the inventor in exchange for complete disclosure of the new technology embodied in the invention. In the absence of a patent system, the information disclosed would be a free good, which producers could use at will. To the extent that information is disclosed, social benefits exceed private profits. If information were not forthcoming, potential social benefit would be foregone. When patents are granted in exchange for incomplete or faulty disclosures, private profits exceed social benefits. It is alleged that such is a common occurrence today. It has been said that writing patent applications so as to obtain the maximum protection and the minimum disclosure is one of the arts in the patent profession.[7] Statistics on the rising number of patents that have been declared invalid by the courts

[5] Fritz Machlup, *An Economic Review of the Patent System,* Study No. 15 of the Subcommittee on Patents, Trademarks, and Copyrights of the Senate Committee on the Judiciary (Washington: U.S. Government Printing Office, 1958), pp. 19-20.

[6] Fritz Machlup and Edith Penrose, "The Patent Controversy in the Nineteenth Century," *Journal of Economic History,* 10 (May 1950), pp. 11-20.

[7] Seymour Melman, *The Impact of the Patent System on Research,* Study No. 11 of the Subcommittee on Patents, Trademarks, and Copyrights of the Senate Committee on the Judiciary (Washington: U.S. Government Printing Office, 1958), pp. 46-47.

are cited to give partial empirical support to this contention. In addition, it is argued that society actually secures no benefit because only those inventions that cannot be kept secret are patented.

Patents as an Incentive for Invention

As a result of the change in the organization of research, an appraisal of the effect of the patent system on incentives requires a distinction between types of inventors. The major division is between individual inventors and the captive or hired ones. The latter group can be further divided into inventors employed by private business, nonprofit organizations, and the government. Ideally, economic and statistical tools should provide a means of measuring the elasticity of the supply of inventive efforts for each of these groups to changes in the amount of patent protection.[8]

Using historical patent statistics, several authorities on the patent system indicate that the elasticity of supply of inventive activity appears to be low. The soaring increase in R&D expenditures and the number of scientists hired are not reflected by corresponding increases in the number of patents issued. Other researchers contend that patent statistics are a poor means of measuring inventive activity for several reasons: (*1*) the average input per patentable invention has increased; (*2*) standards of patentability change over time; (*3*) the reliance on secrecy as opposed to patents changes; and (*4*) a substantial amount of the research has been basic in nature and undertaken by the government.

Development and Utilization of Inventions

The introduction of new products and the use of new processes have at least three stages—development of new scientific knowledge, application of basic research, and commercial exploitation. Exploitation or innovation proceeds from invention and the development of new knowledge. Defenders of the patent system contend that even if exclusive rights do not operate as an incentive to encourage the disclosure of new technology or to stimulate invention, temporary monopoly rights are necessary to promote the utilization of inventions. The exclusive rights compensate for future uncertainties or uninsurable risks.

The patent grant puts into operation forces that have social benefits and social costs. In the short-run, exclusive rights give producers an

[8] Alfred E. Kahn, "The Role of Patents," *Competition, Cartels, and Their Regulation,* ed. J. P. Miller (Amsterdam, Holland: North-Holland Publishing Company, 1962), p. 321.

incentive to innovate, but the monopolistic position retards competitive imitation and diffusion of the new technology embodied in the invention. Society benefits from the introduction of new products and processes. If the innovation would have materialized and new products effectively marketed in the absence of the patent system, society incurs a social cost because immediate adoption by other producers is precluded by the monopoly rights given to the owner of the patent.

However, with dynamic competition in the long-run, society can gain from a proliferation of new innovations because of the monopoly rights. In Schumpeterian terminology, this is the "process of creative destruction." Anticipation of short-run monopoly profits tends to promote competition in the long-run because of the compulsion among competitors to keep ahead of rivals by developing superior substitute products or cost-reducing processes. The patent system can facilitate dynamic competition by disclosing advances in new technology to the public. The system operates to widen the production frontier. The resulting enlarged stock of new and useful technical knowledge creates greater opportunities for competitive ventures.

The social costs of exclusivity depend upon whether or not the research and competitive innovation results in superior processes and products, and whether such research and innovation would have been undertaken in the absence of the patent system. A net social loss is thought to be suffered when exclusive rights are carried beyond that contemplated by the patent grant. Such alleged abuses of the patent system include: prolonged monopoly, unwarranted suppression of patents, and cartel arrangements. These actions, however, are illegal and subject to antitrust laws. The patent system can operate to increase economic concentration by strengthening monopolistic positions and by creating opportunities for illegal collusive action. It can function, however, in the opposite direction and increase competition. The patent grant can shelter the market position of a firm entering a concentrated industry.

The tools of economic analysis have not yet been developed to the required degree of precision or level of sophistication to permit a quantitative measurement of these social costs and benefits.[9] Only

[9] Possibilities for determining the net economic value of the patent system recently have been considered by well-known economists in the fields of public policy and economic growth. Agreement exists that economics can provide only the most shadowy answers to questions about the net social benefit of the patent system. Economics, however, is helpful in understanding the direction of relative changes in social benefits and social costs which might result from changes in the patent system. See Jesse W. Markham, James S. Worley, Dwight S. Brothers, "The Value of the American Patent System: An Inquiry into Possible Approaches to its

recently have economists and statisticians undertaken case studies of individual industries to determine the role played by patents as an incentive for investment in innovation.[10] Except for spotty data from antitrust cases, virtually no empirical information is available on the nature and extent to which patented inventions are used for purposes other than actual commercialization, i.e., used for blocking competitors or control of markets.

Government-Owned Patents and Disclosure, Invention, and Innovation

The patent system as an incentive for the disclosure of new technology and invention affects the number and cost of inventions arising from government-sponsored research and development. Exclusivity to stimulate innovation affects the utilization of government-owned patented inventions.

Assuming that the patent grant operates as an incentive for the disclosure of new technology, secrecy can be detrimental to the effectiveness of public research in enlarging the base of technical knowledge. For example, if contractors were not permitted to retain title to inventions, they might be reluctant to disclose technical findings not specifically defined by the terms of contracts. The tendency would be strongest for new technology that appeared to hold commercial potential.

Another crucial matter for government-sponsored research is whether or not patent rights function as an incentive to increase the inventive efforts of government employees, to induce contractors to employ their most productive scientists on government research projects, and to encourage the most efficient business concerns to accept government contracts. The cost of government research, and the cost of maintaining a given level of national security, would increase if incentive effects of private patent rights were adverse. Advocates of a license policy contend that such is the case.

Measurement," *PTC J. Res. & Ed.*, Vol. 1, No. 1 (June 1957), pp. 20-56; Fritz Machlup, *An Economic Review of the Patent System, op. cit.*, pp. 56-80; and Alfred E. Kahn, *op. cit.*, pp. 318-336.

[10] The studies reveal that patents have made a contribution to the incentive to innovate. However, the findings are not universally applicable to all investment decisions or all patented inventions. No theory of patent-induced innovation can be derived from these studies. For a summary of the case studies, see Alfred E. Kahn, *op. cit.*, pp. 319-321; and Jesse W. Markham, James S. Worley, and Dwight S. Brothers, *op. cit.*, pp. 44-46.

The current administrative policy of the government to make the patents in its portfolio available on a nonexclusive basis, in effect, assumes either that patent-induced innovation is not important for the commercialization of these inventions, that social costs that arise from exclusive use exceed the social benefits that would accompany an increase in the rate of commercial use. These assumptions are not justifiable on a priori grounds. If anything, the reverse is more probable. Without examination, it is likely that inventions arising from military research will require more development effort before commercial utilization is possible than those growing out of industrial research. In addition, since ownership of the inventions rests with the government, control can be exercised to avoid monopolistic abuse. The current administrative policy can also assume that the administrative problems of providing for exclusive rights on some politically acceptable basis are too great.

ECONOMIC GROWTH

Rapid and widespread utilization of inventions is one of the significant forces in the process of economic development. A substantial part of our economic growth has been achieved through the general results of the research and development process: new products and new processes. Simply conceived, economic growth is a per capita increase in real goods, services, and leisure. Economic growth depends upon: (*1*) a quantitative increase in the factors of production, generated mainly by capital formation; and (*2*) a qualitative improvement in the utilization of a given amount of resources, propelled principally by technological change.

Capital Formation

Although more attention has been focused on the role of innovation on capital improvement, it also vitally affects capital formation. The introduction of new consumer products and new and more efficient capital goods has a strong impact on aggregate investment spending.

Product innovation can be viewed either as having a catalytic action on consumption expenditures or as having been induced by the desire of consumers to have a greater flow of goods. In the first instance, the annual proliferation of new and improved consumer goods stimulates the desires of consumers and brings about an increase in spending. In the second, consumer spending plays an active role, rather than the traditionally conceived passive one, in the process of economic growth. The insatiable desires of consumers spur businesses to introduce new

or improved products and to increase output. In either case, the usual net result is an expansion in plant and equipment, greater output, capital formation, and a higher level of real income.

New Technology

The second prime mover for economic growth is a change in the quality of inputs used in the production process. Increases in per capita income have resulted from major shifts in the production function, or a more efficient arrangement of inputs because of technological change. These changes in the production function have materialized in part from a continuous flow of process innovations. Increased productivity from a given amount of factors of production arises from changes in the quality of one or more inputs, as well as from economies of scale. Technological change relates only to productivity gains derived from improvements in the quality of capital.

Innovation

Economic growth, which originates from inventions, is not realized unless producing units actually commercialize inventions. Although innovational investment shades into replacement investment, it can be distinguished from it. Replacement investment is investment in new capital equipment for proved processes and products. It can be considered as the routine aspect of investment; the reproduction of capital equipment that already exists. Innovational investment pertains to the use of new and unproved processes and products. Some innovational investment takes place in the replacement process because new models of standard equipment usually embody some technological improvements. Also, some product innovations are minor and require little or no modification of equipment.[11]

Innovation can be induced or autonomous. Producers can be forced, by competitive market pressures and falling profits, to employ cost-reducing processes and to introduce product improvements to stay in business; or they can assiduously seek new techniques and new markets to reap the profits of innovation.[12] When survival of the firm depends on innovation, patent protection probably plays a less significant part in the decision to invest than when entrepreneurs actively pursue possibilities for innovation.

[11] C. F. Carter and B. R. Williams, *Investment in Innovation* (London: Oxford University Press, 1958), pp. 20-22.

[12] *Ibid.*, pp. 57-59. Also, see P. Hennipman, "Monopoly, Impediment or Stimulus to Economic Progress," *Monopoly and Competition and Their Regulation*, ed. Edward H. Chamberlin (New York: St. Martin's Press, 1954), pp. 433-435.

As an integral part of the process for competitive survival, much product-oriented research, invention, and innovation is believed not to be directly affected by patent protection. Since the 18th and 19th centuries, there has been a change in the direction of applied industrial research. In an earlier era, invention and innovation were concentrated on developing more efficient means of producing relatively well-known products, whereas today the most substantial portion of industrial research is devoted to product improvement or to the development of new products. The introduction of new products, or at least quality variation, now is thought to be a variable in the competitive process as important as changes in prices and quantities offered for sale. Because of the contest to keep abreast or ahead of rivals for survival, it is possible that product innovation would continue at a rapid rate in the absence of a patent system.

If the innovation is required for survival, the primary executive decision probably is whether or not to continue to reinvest capital in the firm. The gamut of alternative investment opportunities is wide for firms actively seeking innovational investment opportunities. Non-innovational investment possibilities probably are even larger. Innovational projects can include: development of trade secrets, unpatented inventions, patented inventions owned by the firm, patented inventions developed by independent inventors or competitors and available by purchase or by license, and government-owned patented inventions.

Executive decision makers probably make at least rough calculations on the expected yield of the contemplated innovational investment compared with the productivity of other investment outlets. Allowances, even if little more than guesses, are made for uncertainty concealed by the future. Patent protection can reduce the risks associated with immediate imitation by competitors. Other human and physical risks, however, exist. A few of these risks include: reaction of competitors, or creative destruction in the Schumpeterian sense, which can bring about premature obsolescence; products might not be accepted by consumers or manufacturers; innovations might be launched too close to business recessions; or essential raw materials might be excessively scarce and costly.

To some extent, the value of the patent system as an incentive for innovational investment depends on personal and subjective judgments. Executive decisions are not made in a vacuum. They reflect personal opinions concerning institutional surroundings. They also mirror innate tendencies toward pessimism, optimism, or conservatism possessed by the decision maker. The benefits that can be derived from

patent protection, in any given situation, probably would vary from firm to firm.

Government-Owned Patents and Economic Growth

Some unknown proportion of the new products and new processes contributing to the economic growth of this country are covered by patents. A small number of these are patented inventions owned by the government. Although the great majority of all government-owned patents are military-oriented, about 10 percent were developed by civilian departments to satisfy commercial needs. Of the civilian departments, only the Tennessee Valley Authority avowedly attempts to develop inventions to the point where they can be used commercially without further development effort. With the exception of inventions administered by that agency, there is no self-evident reason to believe that government-owned patented inventions originating from research designed to improve civilian technology require less engineering or financial development before commercialization is possible than those developed by private industry for similar purposes. In addition, it is doubtful that many products and processes covered under government-owned patents and originating from defense research activities are important for the induced innovation process and competitive survival. As an incentive for the commercial utilization of all but a few government-owned patented inventions, patent protection is probably at least as necessary for government-owned patented inventions as it is for privately owned and developed patented inventions.

The utilization of inventions by the government also contributes to increases in real income through capital formation and the use of new technology. The government produces social goods to satisfy social wants—primarily national defense. Between 1946 and 1961, government procurement of goods and services for national defense rose from 5 percent to 10 percent of the gross national product. Because the profit motive is absent in government, patent protection is not necessary for government investment in innovation. Patent rights are necessary, however, to protect the government against costly infringement suits. The government can be protected in its procurement activities by actual ownership of patented inventions or by licenses to use inventions.

GOVERNMENT-OWNED PATENTS AND MONOPOLY

Advocates of a title policy contend that government ownership of patents is necessary to maintain free access to technology developed at government expense and to prevent further economic concentration.

Inseparably interrelated with the prevention of monopoly, is avoidance of any adverse effect that might occur when the public is left at the mercy of a single firm owning a revolutionary new invention originating from government-financed research. Although patented inventions usually are small components of complete products and processes, it is conceivable that a revolutionary new invention might embody all the necessary technology for something as important as weather control or a cure for cancer.

The problem of monopoly and economic concentration arising from market imperfections is compounded, so advocates of the title policy argue, when titles to patented inventions are retained by contractors. Most of the dollar volume of R&D contracts is awarded to the largest firms and it is possible that a license policy would increase industrial concentration. The monopoly aspect of the patent grant also is a potential tool for abuse of the competitive system. Extension of monopolistic practices beyond those intended by the patent system, however, collides with the antitrust laws, the principal means for maintaining competition. Patent law does not specifically exempt patent matters from antitrust legislation, nor does antitrust law release patents from its authority. Consequently, patent monopolies are subject to antitrust regulation.

There are four major abuses of the patent system in attempts to monopolize. First, patent owners have limited the ways in which licensees can utilize patented inventions. The courts have upheld price and quantity restrictions imposed by an individual licensor upon an individual licensee, but they have invalidated industry-wide price-fixing, for example. Tying clauses controlling supplementary products by means of license agreements are also unreasonable under the law. Secondly, competitors have interchanged patents to use the pooled patents as a basis for collusion. Thirdly, patentees have attempted to monopolize by blocking competitors from manufacturing for or selling in a market by holding exclusive rights to almost all complementary and competing patents in a particular field of technology. Finally, patent owners have suppressed patents. They do not use some inventions which hold commercial potential, nor do they license other business firms to use them.

With a few minor exceptions, there is no monopoly element in the utilization of government-owned patented inventions originating from the patent grant. These inventions are freely available to all. A change in administrative policy, providing for exclusive use, however, would put the utilization of these patented inventions in a position similar to that of privately owned patents in relation to the antitrust laws.

PART III

THE ACQUISITION OF PATENTS BY THE GOVERNMENT

Nearly all of the patented inventions owned by the government arise from work of government employees and contractors.[13] The government does, however, acquire a few patented inventions by means of purchase, donation, and international treaty.

GOVERNMENT PATENT RIGHTS TO INVENTIONS MADE BY EMPLOYEES

Executive Order 10096, dated January 23, 1950, provides for the establishment of a uniform patent policy among the various government agencies for acquisition of inventions developed by government employees. The Executive Order directs that:

> The government shall obtain the entire right, title and interest in all inventions made by any government employee *(1)* during working hours, *(2)* with a contribution by the Government of facilities, equipment, materials, funds, or information, or of time or services of other Government employees on official duty, or *(3)* which bear a direct relation to or are made in consequence of the official duties of the inventor.

Where the contribution of the government to the development of the invention is insufficient to justify acquisition of title, the inventor

[13] Although the government patent portfolio is small compared with the combined seizures of approximately 50,000 patents from enemy nationals and alien interests during World War I and World War II, the large patent portfolios acquired by the Alien Property Custodian were temporary. During World War I, under the original provisions of the Trading with the Enemy Act of 1917, the Alien Property Custodian held seized patents in trust. Title to these patents remained with the enemy and alien owners of the inventions. Provision was made to return the patents after the cessation of hostilities. The Trading with the Enemy Act was amended on November 4, 1918, principally as a result of administrative difficulties. The amendment permitted the Alien Property Custodian to vest or seize approximately 12,300 patents.

With the outbreak of World War II, the Trading with the Enemy Act of 1917 was again amended. The President was authorized to establish a government body to vest and administer the property of enemies and nationals of enemy-occupied countries. On March 11, 1942, the Alien Property Custodian was established. Actual vesting was deemed necessary to prevent misuse of techniques essential to the war effort, and also to prevent royalties arising from license commitments from going to the enemy. The patent property of residents of enemy-occupied countries also was vested to insure proper supervision because the rightful owners could not regulate the exploitation of the inventions. The Alien Property Custodian seized about 48,000 patents and patent applications either directly or through vesting corporations owning patented inventions. The unexpired patent holdings of the Alien Property Custodian constituted, at the peak, about one-twentieth of all unexpired U.S. patents. See R. L. Voit, "Powers and Policies of the Alien Property Custodian Relating to Patents," *George Washington Law Review,* 12 (April 1944), pp. 330-332; and U.S. Office of Alien Property Custodian, *Annual Reports* for the fiscal years, 1943 through 1946.

retains title and grants to the government an irrevocable, nonexclusive, royalty-free license.

Interpretation of Executive Order 10096

Executive Order 10096 also established a Government Patents Board to administer the patented inventions owned by the government. The Chairman of the Government Patents Board stated that each government agency or department was to apply the principles established in Executive Order 10096. The decisions rendered by the various agencies, however, were subject to review by the Chairman of the Government Patents Board. Also, an employee was entitled to file an appeal to the Chairman when the determination of the agency gave full title to the government.

The interpretation of Executive Order 10096 by the different agencies has resulted in widely divergent policies on the stringency used in acquiring title to patented inventions developed by employee-inventors. Agencies interpreting strictly the principles set forth in the Executive Order, such as the Department of Agriculture and the Tennessee Valley Authority, tend to assign more employee inventions to the government than do departments construing it more liberally, such as the Department of Defense.[14]

Argument Against the Acquisition of Employees' Inventions

Defenders of the license policy argue that if the government permits its employees to retain title to patented inventions originating from their work, better qualified scientific and technical personnel would be induced to enter into government service. This is important, they contend, because of the inability of the government to match salaries offered by industry.[15] This argument is valid only if patent rights act as an incentive and if other compensations offered by the federal government are insufficient to attract qualified scientific personnel into federal service.

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[14] U.S. Congress, Senate Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, *Patent Practices of the Government Patents Board,* 86th Cong., 1st Sess., 1960, pp. 12-13. Also see Marcus B. Finnegan and Richard W. Pogues, "Federal Employee Inventions Rights—Time to Legislate," *Journal of the Patent Office Society,* 40 (May 1958), pp. 232-235.

[15] U.S. Congress, House, Subcommittee No. 3 of the Committee on the Judiciary, *Hearings, Rights of Government and Its Employees in Inventions Made by Such Employees,* 85th Cong., 2d Sess., 1958, p. 304.

Number of Patents Arising from Employee Sources

On June 30, 1961, the government owned about 4,500 unexpired patents that originated from research and development work of employees. As Table 1 shows, about 40 percent of all patents in the portfolio of the government are developed by government employees.

Table 2 presents similar information by government agencies and departments administering government-owned patented inventions. It shows that the percentage of patented inventions developed by employees is the highest for the Department of Agriculture (98 percent), the Department of the Interior (97 percent), the Tennessee Valley Authority (91 percent), and the Department of Health, Education, and Welfare (84 percent). About one-third of the patents administered by the Department of Defense are inventions made by government employees. As expected, the Atomic Energy Commission holds very few patented inventions developed by its employees. The Commission relies on private firms under contract for almost all of its research and development.

TABLE 1

U.S. GOVERNMENT-OWNED PATENTS ACQUIRED FROM EMPLOYEES AND OTHERS
1944-1961

Year	Number			Percentage	
	Total	Employee	Other[a]	Employee	Other[a]
1944[b]	67	58	9	87	13
1945	87	74	13	85	15
1946	150	80	70	53	47
1947	157	93	64	59	41
1948	374	188	186	50	50
1949	498	202	296	41	59
1950	637	199	438	31	69
1951	675	198	477	29	71
1952	712	242	470	34	66
1953	678	199	479	29	71
1954	624	194	430	31	69
1955	701	234	467	33	67
1956	939	349	590	37	63
1957	980	375	605	38	62
1958	1,193	456	737	38	62
1959	1,434	483	951	34	66
1960	1,170	519	651	44	56
1961[c]	598	288	310	48	52
Total	11,674	4,431	7,243	38	62

[a] Nearly all of these patents are acquired from contractors.
[b] Includes patents issued between July 1 and December 31, 1944.
[c] Includes patents issued between January 1 and June 30, 1961.
Source: Tabulated from data in the files of the U.S. Patent Office, Assignment Branch, Index of Government Patents.

TABLE 2

U.S. GOVERNMENT-OWNED PATENTS BY AGENCY AND SOURCE
1944[a]-1961[b]

		Number		Percentage	
		Employee	Other[c]	Employee	Other[c]
Agriculture	1,192	1,164	28	98	2
Atomic Energy	2,690	24	2,666	1	99
Defense	7,228	2,789	4,439	39	61
Commerce	194	117	77	60	40
H. E. W.	31	26	5	84	16
Interior	231	224	7	97	3
T. V. A.	69	63	6	91	9
Other	39	24	15	62	38
TOTAL	11,674	4,431	7,243	38	62

[a] Includes patents issued between July 1 and December 31, 1944.
[b] Includes patents issued between January 1 and June 30, 1961.
[c] Nearly all of these patents are acquired from contractors.
Source: Tabulated from data in the files of the U.S. Patent Office, Assignment Branch, Index of Government Patents.

PATENTED INVENTIONS ASSIGNED TO THE GOVERNMENT BY CONTRACTORS

The matter of the disposition of patent rights originating from R&D contracts was relatively unimportant before the National Patent Planning Commission began its investigations. The Commission was established in the latter part of 1941, about the same time the government began to finance large amounts of contract R&D work.[16]

[16] The findings of the Commission lead the staff to conclude that the disposition of patent rights arising from contracts cannot be determined by any fixed rule. Each contract should be considered individually. The staff of the Commission concluded that, as a general rule, title to patents originating from contract research should not be retained by the government. The Commission held that the government does not need the right to exclude that is conferred by the patent grant and that the government does not usually compete with private industry in commercial enterprises.

Before the National Patent Planning Commission had made recommendations, the President authorized the Attorney General to study the patent policies of the government departments. Recommendations made by the Attorney General on patent rights originating from contract R&D were diametrically opposed to those made by the National Patent Planning Commission. The Attorney General stated that the public interest requires that all patent rights arising from contract research and development be assigned to the government. The contractor was to be permitted to retain title to patented inventions only when he had made a substantial independent contribution to the development of the invention before the government let the contract. See U.S. National Patent Planning Commission, *Message from the President of the United States Transmitting the Second Report of the U.S. National Patent Planning Commission: Government-Owned Patents and Inventions of Government Employees and Contractors* (Washington: U.S. Government Printing Office, 1945). Also, see U.S. Department of Justice, *Investigations of Government Patent Practices and Policies: Report and Recommenda-*

Arguments Against a Title Policy

In addition to the contention that government ownership of patented inventions retards commercial utilization, advocates of a license policy hold that retention of patent rights by contractors promotes efficiency in procurement. If the value of patent rights is a significant factor for contractors, then acquisition of title can provide an incentive for superior research and development work. It can also act as an inducement to the more efficient private enterprises to accept government research and development contracts. Greater efficiency can result in either: (*1*) more, and presumably better, research and development with the same utilization of resources; or (*2*) the same amount of research activity using fewer factors of production.

Statements of government officials in agencies taking title to patented inventions indicate that there is no evidence of reluctance on the part of business firms to accept government contracts.[17] A study undertaken by Professors Watson, Bright, and Burns on government research and development contracts, however, reveals that there are instances when firms refuse to accept contracts because they cannot retain title to patented inventions.[18]

Arguments for a Title Policy

Advocates of a title policy also have arguments to supplement those on economic growth and prevention of monopoly against retention of patent rights by contractors. They hold that economic injustice occurs when the public is forced to make a double payment for a patented invention. This can happen when title to the patented inventions remains in private hands. The public initially pays for the research and development from which the inventions originate. Then there is a second payment in the form of monopolistic prices when the public buys the finished product. This, to be certain, assumes that the patented inventions are developed and commercialized.

There are three counter arguments to this: First, that contractors pay for a substantial part of the costs of developing inventions in the form of existing experience, knowledge, and skill. Secondly, that the public pays for and receives the full benefit of research and development work

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tions of the Attorney General to the President (Washington: U.S. Government Printing Office, 1947), Vol. I.

[17] U.S. Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, *Hearings, National Patent Policy*, 87th Cong., 1st Sess., 1961, pp. 2-3.

[18] Watson, Bright, and Burns, *op. cit.*, pp. 331-336 and pp. 356-361.

specified in contracts. Public payment is not for the inventions but for the research and development work. Finally, if there is a double payment, such a payment is analogous to subsidies to farmers, the merchant marine, and other interest groups.[19]

Proponents of the title policy also contend that if the government retains patent rights, it can recover all or part of its research and development expenditures through royalty-bearing licenses. The recovery of these expenditures is deemed to be equitable because it shifts the burden of paying for research and development from the general taxpayer to the purchasers of the final products who benefit from the inventions.[20]

Number of Patents Arising from Research and Development Contracts

On June 30, 1961, the federal government owned about 7,250 patented inventions acquired from nonemployee sources—about 60 percent of all government-owned patents. See Table 1. Almost all of these patented inventions originated from research under government contracts. A small and unknown number of these were donated, bought, or acquired as a result of international agreement. About 98 percent of these nonemployee inventions are administered by the Department of Defense and the Atomic Energy Commission. See Table 2. Of the other agencies, only the Department of Commerce has any sizable holding of nonemployee patents. The contract R&D sponsored by the National Aeronautics and Space Administration is too recent in origin to have an impact on the patent portfolio of the government.

As Table 3 reveals, the Department of Defense, Atomic Energy Commission, and National Aeronautics and Space Administration conduct the greatest amount of contract research and development—about 91 percent of the total. Of the other government agencies with patent holdings of appreciable size, the Department of Agriculture, Department of Commerce, Department of the Interior, and the Tennessee Valley Authority finance very little contract research and development.

The Departments of Defense and Commerce usually follow a license policy and permit contractors to retain title to patents. Although relatively unimportant in terms of the amount of extramural research and development, as well as patent holdings, the General Services Admin-

[19] U.S. Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, *Hearings, Government Patent Policy,* 87th Cong., 1st Sess., 1961, Part II, p. 574.

[20] U.S. Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, 86th Cong., 2d Sess., 1961, *Patent Practices of the Federal Aviation Agency,* pp. 10-11.

TABLE 3

FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT
FISCAL YEAR 1962[a]
(Millions of Dollars)

Agency	Grand Total	Intramural	Extramural		
			Total	Profit Organizations	Other
Department of Agriculture	$ 154	$ 114	$ 40	$ [b]	$ 40
Atomic Energy Commission	879	14	866	509	357
Department of Commerce	47	36	11	8	3
Department of Defense	6,211	1,422	4,790	4,365	425
Department of Health, Education and Welfare	513	113	400	13	387
Department of the Interior	87	70	18	2	16
National Aeronautics and Space Administration	1,390	340	1,051	880	171
Tennessee Valley Authority	3	3	[b]	[b]	[b]
TOTAL ABOVE	9,284	2,112	7,176	5,777	1,399
TOTAL ALL AGENCIES	$9,535	$2,167	$7,368	$5,847	$1,521

[a] Estimates are based on amounts included in the Federal Budget for 1962.
[b] Less than $1 million.
Note: Detail may not add to totals because of rounding.
Source: U.S., National Science Foundation, *Federal Funds for Science X, Fiscal Years 1960, 1961 and 1962* (Washington: U.S. Government Printing Office, 1962), pp. 88-89.

istration, Office of Civil and Defense Mobilization, and Post Office Department also usually permit contractors to retain patent rights. The National Science Foundation follows a license policy. Most of the research sponsored by that agency, however, is basic and few patentable inventions arise from such research.

The Atomic Energy Commission, the Department of Agriculture, the Department of Health, Education, and Welfare, the Department of the Interior, and the Tennessee Valley Authority generally employ a title policy. Together, however, the last three agencies following a title policy hold less than 20 patents originating from R&D contracts. The Federal Aviation Agency and the National Aeronautics and Space Administration follow a title policy. At present, however, these two agencies administer very few patents.

PART IV

OTHER STUDIES OF UTILIZATION

Information about the commercialization of privately owned patented inventions is essential to put the matter of the use of government-

owned patented inventions into proper perspective. To be sure, the objectives and direction of a substantial part of government-financed research and development differ markedly from the research and development efforts of private organizations. Some extremely important government achievements have significant commercial, as well as military applications. For example, inventions arising from government-sponsored research have commercial applications in the fields of aeronautics, communications, and atomic energy. Often, however, the fruits of government research and development hold little commercial potential. It is to be expected that the extent of commercial use of military-oriented inventions is somewhat lower than the commercial use of inventions developed by business firms for the sole purpose of marketing new products or devising more efficient methods of production. The most obvious examples are in the field of weapons.

EARLY ESTIMATES ON THE RATE OF USE

Before the late 1950's, the only published data on the commercial use of patented inventions were founded on speculative conjectures and educated guesses based on personal experience. As a rule, these armchair estimates indicated that the percentage of all patented inventions actually commercialized was very small, between one percent and 18 percent. In addition, many were estimates of the proportion of patented inventions that proved to be profitable to the inventor or to the corporation owning the patented inventions, rather than the proportion of all inventions that actually had been commercialized.[21]

COMPREHENSIVE EMPIRICAL STUDIES ON COMMERCIAL USE

At least two empirical studies have been undertaken to ascertain the extent of commercial use of patented inventions owned by individuals and corporations. The results of these separate studies are in close agreement. They provide factual evidence that a substantially higher proportion of patented inventions is actually commercialized than was formerly believed.

One study was undertaken by Joseph Rossman and Barkev S. Sanders. Based on the systematic random sampling technique, these investigators selected 2 percent of all U.S. patents issued in 1938, 1948, and 1952 to be studied. Questionnaires requesting information on use were sent

[21] Jacob Schmookler, "Comment on the Supply of Inventors and Inventions," *The Rate and Direction of Inventive Activity: Economic and Social Factors,* Conference of the National Bureau of Economic Research (Princeton, N.J.: Princeton University Press, 1962), pp. 167-168.

to inventors and assignees. Rossman and Sanders defined use as "making or selling the patented invention or using the patented invention in the production of goods and services, or making financial arrangement (s) with a third party (ies) for the production, use, or sale of the patented invention." The earliest findings, based on approximately a 33 percent response, indicated that about 54 percent of the sampled patents had been or were in commercial use. Subsequent replies have not materially altered the proportion of patents found to be commercialized.[22]

Another study, conducted at the Harvard Business School, was on the value of patents to the corporation. In an effort to determine the actual commercial use of patented inventions, a group of 172 corporations owning 200 or more U.S. patents each and a group of 124 corporations with holdings in the range of 90 to 138 patents each were selected to be questioned.[23] Replies were received from 26 percent of the 266 corporations contacted. In addition, personal interviews were held with officials of 22 corporations. The random sampling technique was not used to select the corporations. The total patent holdings of these 91 corporations amounted to about 31 percent of all unexpired U.S. patents owned by domestic corporations at the end of 1956.

Of the 91 corporations from which replies were received, 66 firms were willing to supply information on the commercial use of their patented inventions. Commercial use was defined as "making or selling the patented inventions, or using the patented inventions in the production of goods and services, or making arrangements with a third party for the use or sale of the patented inventions." Data provided by the respondents showed that on the average about 54 percent of the patented inventions are used. The rate of use does not differ significantly between the large patentees and those with smaller patent holdings.

COMMERCIAL USE OF PATENTED INVENTIONS HELD BY THE ALIEN PROPERTY CUSTODIAN

Not all government-owned patented inventions have originated from government-financed research and development. The largest patent portfolio held by the government resulted from vesting operations of the Alien Property Custodian during World War II.

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[22] Joseph Rossman and Barkev S. Sanders, "The Patent Utilization Study," *PTC J. Res. & Ed.*, Vol. I, No. 1 (June 1957), pp. 74-111.

[23] Otto J. Bachman, et. al., *Patents and the Corporation* (2d ed., Bedford, Mass.: Patents and the Corporation, 1959).

Early information supplied by the Custodian on the utilization of vested patented inventions was published in the 1945 Annual Report. Licensees reported that 26 percent of the licensed patented inventions had been subjected to research or actually brought under production. The 1945 Annual Report of the Custodian did not provide an estimate of the number of patented inventions that actually had been commercialized.

More complete data on the use of Custodian-owned patented inventions were published in the 1946 and 1947 Annual Reports. For the 1945 Reporting Period, 799 licensees supplied statements on the utilization of 9393 formerly enemy-owned patented inventions. These reports showed that about 10 percent of the inventions had been used in actual production. As expected, the production was geared mainly to war products. Research designed to determine the usefulness of licensed patented inventions for future production was undertaken on another 13 percent. For the next Reporting Period, 1946, the estimated rate of use in actual production derived from data submitted by licensees dropped from 10 percent to 7 percent.

In the light of the present knowledge that at least 50 percent of privately financed and owned patented inventions are commercialized, an estimated rate of use of between 7 percent and 10 percent for patented inventions licensed by the Custodian seems quite low. Although the Annual Reports of the Alien Property Custodian do not specifically outline reasons for nonuse, they do suggest possible reasons for the lack of commercialization of these patented inventions by licensees. The Annual Reports indicate that many, if not the majority, of vested patents did not disclose sufficient information or know-how to make the inventions immediately workable on a commercial basis. Inadequate know-how was a difficulty that burdened a substantial number of licensees.[24]

USE OF INVENTIONS ARISING FROM RESEARCH AND DEVELOPMENT FINANCED BY THE GOVERNMENT

Data currently available on the use of inventions arising from government-sponsored research and development work cover patented inventions actually owned by the government and those owned privately, i.e., where the contractor or the employee retains title to the patent. It is convenient to review information on commercial use according to the government agency administering the patents.

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[24] U.S., Office of Alien Property Custodian, *Annual Report for the Fiscal Year Ending June, 1945,* pp. 105-106.

Department of Agriculture

Under the auspices of the Senate Subcommittee on Patents, Trademarks & Copyrights, Herschel F. Clesner, with the cooperation and assistance of the Agricultural Research Service and other Divisions of that Department, prepared reports on the utilization of inventions assigned to the government and administered by the Department of Agriculture.[25] In accordance with the usual policy, the Department of Agriculture does not require persons and firms licensed to use its patented inventions to report on how they use them. Because of the vigorous program of the Department of Agriculture of rendering technical assistance, that Department probably has more reliable data on the commercialization of its inventions than any other government agency.

Personnel in the various research laboratories of the Department of Agriculture provided information on the commercial use of inventions to the Subcommittee. Data on commercial use were assembled for 67 projects, covering 180 inventions. Among these inventions, information on actual use was supplied for 125 different unexpired patents as of July 1, 1960, 16 patented inventions which had been dedicated to the public, 33 inventions on which patent protection had expired,[26] and one abandoned patent application. In addition, information on potential commercial application was supplied on 4 patented inventions. On July 1, 1960, the patent portfolio of the Department of Agriculture totaled about 1,177 unexpired patents. Use was reported on 125, or slightly more than 10 percent, of the 1,177 patents in the portfolio of the Department of Agriculture.[27]

Some of the patented inventions administered by the Department of Agriculture and put into actual commercial use have helped to raise the health and living standards of this country. These patented inventions also have attracted a great deal of attention in public debates on federal patent policy. The Northern Utilization and Research Development Division of the Agricultural Research Service helped develop a relatively low-cost, large-scale method of making penicillin. To a large extent, these production processes resulted in the widespread availability of this drug at a relatively low price. Dextran, a carbohydrate used as a substitute for human blood plasma, was also developed

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[25] U.S., Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, *Patent Practices of the Department of Agriculture*, 86th Cong., 2d Sess., 1961.

[26] Although most of the expired patents were issued in the 1930's, one was issued as early as 1907. *Ibid.*

[27] *Ibid.*, pp. 27 and 47-117.

by the Northern Division in cooperation with other government agencies and industrial concerns. During the Korean War, five firms produced large quantities of Dextran for battlefield and hospital use. Another drug, Rectin, used to restore weakened blood capillaries, was developed by the Eastern Division.

Along less striking lines, the following are some of the more important patented inventions developed by the Department of Agriculture that have been commercialized: (*1*) processes which yield a high or intensified flavored maple syrup; (*2*) recovery processes to restore and maintain fruit flavor essence; (*3*) dehydrofreezing process to preserve foods; (*4*) dehydrated mashed potatoes; (*5*) fruit and vegetable juice powders; (*6*) frozen orange juice concentrate; (*7*) a loom device for weaving water- and wind-resistant fabrics; (*8*) improved methods for the commercial production of vitamins B_2 and B_{12}; (*9*) aerosol bombs; (*10*) an insecticide effective for the extermination of household pests; (*11*) the squeeze-bottle atomizer; and (*12*) an automatic box filler.[28]

The Atomic Energy Commission

Commercial use of patented inventions administered by the Atomic Energy Commission (AEC) has been widely quoted to be about 15 percent. No study or report, however, can be found to verify this estimate. The figure is probably accepted and cited as a result of a statement made by Congressman Erwin Mitchell, from Dalton, Georgia, and published in the *Congressional Record.*[29] On June 2, 1960, Congressman Mitchell stated that about 15 percent of the patented inventions in the portfolio of the AEC are used commercially. In his statement, Congressman Mitchell indicated that the House Committee on Science and Astronautics was assembling data to support this estimate. The House Committee on Science and Astronautics has not in fact conducted any study to estimate the extent of commercial use of patented inventions held by AEC. In all likelihood, Congressman Mitchell inadvertently stated in a heated debate that about 15 percent of the patented inventions administered by AEC are commercialized. It has been suggested to the writer that what he probably meant to say was that about 15 percent of the patents held by the Commission have Type A licenses issued on them.[30]

The one area in which officials of the Commission are certain that every industrial concern must use patented inventions administered by

[28] *Ibid.*

[29] U.S., *Congressional Record,* 86th Cong., 2d. Sess., 1960, XCVI, Part 9, p. 11,758.

[30] Conversation with Mr. Philip Yeager, Counsel for the House Committee on Science and Astronautics, October 15, 1962.

the Commission is in the manufacture of nuclear reactors. Commercialization of these government-owned patented inventions takes place with and without firms being issued formal licenses. To an increasingly great extent, industrial and agricultural firms use radioisotopes, atoms that disintegrate by emitting radiation. Radioisotopes are artificially produced in nuclear reactors. Radioisotopes are making particularly significant contributions to medical research, diagnosis, and therapy. The radiation emitting property of radioisotopes makes them important for tracing chemical and biological reactions and for destroying cancerous tissues.

In terms of possible use, representatives of the Commission believe that slightly over 100 patented inventions, on which nonexclusive licenses, royalty-free, have been issued are of such a nature that any firm could use them. The inventions have commercial applications outside the field of atomic energy. Inventions covered under these patents include such things as pumps, valves, and circuits. The Atomic Energy Commission administers an additional 100 patented inventions that have commercial applications only in the field of atomic energy. The technology embodied in these inventions, however, is simple and the inventions can be commercialized by almost any firm entering the atomic energy industry. These patented inventions include simple devices, such as radiation counters and dosimeters.[31]

Department of Defense

Two surveys have been conducted to ascertain the extent to which Department of Defense (DOD) contractors actually have commercialized their patented inventions stemming from military research and development projects. In the summer of 1960, Professors Watson, Bright, and Burns sent questionnaires to 116 DOD contractors. The firms and organizations were selected because they held title to 298 randomly sampled patented inventions. The universe from which these patents were chosen consisted of about 6,000 patented inventions growing out of research financed by the Department of Defense.

Out of the 143 sampled patented inventions for which a reply was received, 19 had been put into actual commercial use, or about 13 percent of the total. Evidence from this study did not reveal that the commercialized patented inventions have much commercial value. Only two inventions were reported to have increased commercial sales.

[31] U.S., Congress, House, Special Subcommittee on Patents and Scientific Inventions of the Committee on Science and Astronautics, *Hearings, Patent Policies Relating to Aeronautical and Space Research,* 87th Cong., 2d Sess., 1962, Part 2, pp. 209-210.

In no instance did the use of these inventions result in a significant reduction in the cost of production. In order of importance, the five most frequently cited reasons for not developing the patented inventions for commercial use were the following: (*1*) insufficient market demand; (*2*) product for government use only; (*3*) development not pressed; (*4*) product outside the normal market line of the company; and (*5*) insufficient competitive advantage.[32]

Also, during the summer of 1960, the Senate Subcommittee on Patents, Trademarks & Copyrights sent a questionnaire to DOD contractors. It is probable that many contractors received both the Watson, Bright, and Burns questionnaire and that sent by the Subcommittee. The Subcommittee selected the 100 leading Department of Defense prime contractors, based on the net value of contracts awarded in fiscal 1959. An additional 20 less important prime contractors were also sent questionnaires. Out of the 120 contractors, replies were received from 78, or about 63 percent of the total.

Actual commercial use, either by the contractor or by firms licensed by the contractor, was less than 7 percent of all patented inventions resulting from military contracts. In no instance did commercialization of these inventions result in lower costs of production. In most cases, the Subcommittee found it impossible to ascertain the commercial value of the patented inventions. The inventions were usually used as parts of complete products and sold as a part of the complete product. During the 10-year period, eight firms reported sales of products incorporating the patented inventions in excess of $1 million. For the eight firms, the combined sales of these products amounted to about $246 million for the decade—approximately $25 million annually. Only some fraction of the $25 million actually can be attributed to that part of the product that incorporated the patented invention arising under military contracts.[33]

During the same 10-year period, 1949 to 1959, fourteen businesses reported receiving income from royalties or from the sale of the patents. Two of these firms indicated that the income was in excess of $1 million. Two other concerns did not specify the earnings from this source. For the twelve firms indicating actual income, the average annual amount was only about $35 thousand.[34]

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[32] Watson, Bright, and Burns, *op. cit.*, pp. 321-325.

[33] U.S., Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights, of the Committee on the Judiciary, *Patent Practices of the Department of Defense*, 86th Cong., 2d Sess., 1961, p. 36.

[34] Donald S. Watson, "New Information on the Operation of the License Policy in Federal Contracts for Research and Development," *PTC J. Res. & Ed.*, Vol. 5, No. 4, (Winter 1961-1962), pp. 287-294.

In addition to the questionnaires sent to contractors, the Subcommittee sent questionnaires to firms licensed to use government-owned patented inventions administered by the Departments of Army, Navy, and Air Force. These questions were mainly directed toward gaining information on the commercial use to which licensees put these patented inventions. Some data, however, were obtained on the commercial value of the commercialized inventions. Information on the commercial utilization of government-owned patented inventions as reported by firms licensed to use these Department of Defense administered inventions is probably an extremely inadequate measure of actual use. Only 193 of the 7,228 patented inventions (unexpired on June 30, 1961) administered by DOD have ever had licenses issued on them. If use were reported on each of the 193 licensed patented inventions, and if this were the sole measure of use, the rate of use would be less than 3 percent. Unfortunately, the Departments of Army, Navy, and Air Force do not keep records on the commercialization of inventions held in their patent portfolios.

Because the rate of licensing on DOD patents is so low, data on use supplied by licensees are not a sufficiently sound basis for even a very rough estimate of the rate of commercial use. The findings of the Subcommittee, however, furnish factual information on the kinds of government-owned patented inventions commercialized, reasons for nonuse of inventions, and an indication of the commercial value of commercialized government-owned patented inventions. The Subcommittee directed its attention to the commercial use of Department of Defense administered patented inventions by licensees for the period between 1937 and 1958. During that period the military departments granted 154 licenses to 89 different business firms. Information on commercial use was received from 49, or about 55 percent, of the 89 concerns.

The 49 firms responding had been issued 152 licenses on a somewhat smaller number of patented inventions. More than one license had been issued on some of the patented inventions. Of the 152 licensees, 23 percent reported that the patented invention had been commercialized at some time during the 20-year period. The 25 licenses were under 19 different patented inventions. They were held by 18 different companies.

The Subcommittee attempted to measure the commercial value of the patented inventions for the period between 1937 and 1958 from information on sales supplied by the responding firms. The Subcommittee admittedly was hindered in deriving the exact dollar value of the patented inventions because of incomplete record-keeping by the

firms. Also, the licensed patented invention usually covered only a component of the finished product. As previously indicated, the same problem existed when an attempt was made to ascertain the commercial value of patented inventions arising from military contracts which were owned by the contractor.

Sales of products incorporating these government-owned patented inventions were in excess of $8 million for the 12 years between 1946 and 1958. However, six of the eighteen firms enjoyed 75 percent of the sales. In terms of average annual income, six firms had earnings of about $83 thousand, and the average earnings of twelve amounted to about $9 thousand. The patented invention, however, directly contributed to only part of these average annual earnings. In addition, one of the firms was not a U.S. business organization; it was incorporated in Canada.

The Subcommittee requested licensees to indicate the reasons why commercialization did not materialize. The most frequently cited reasons were (*1*) overcrowded markets; (*2*) insufficient market demand; (*3*) marketing costs too high; and (*4*) a desire to watch economic developments before undertaking production.[35]

Other Agencies

On June 30, 1961, the combined patent holdings of all other agencies totaled 585 patented inventions, or only 5 percent of all unexpired government-owned patents. Furthermore, 95 percent of these patents were administered by the Departments of Commerce, Interior, Health, Education, and Welfare, and by the Tennessee Valley Authority. With the exception of those patented inventions held in the patent portfolio of the Tennessee Valley Authority, data on commercial use are not available.

Most of the patents administered by the Tennessee Valley Authority are in the fields of chemistry and chemical engineering, and minerals and metallurgy. More specifically, the patent-related research and development of that agency has been in the field of fertilizers. Licenses have been granted to over 100 fertilizer and equipment manufacturers on patents covering the manufacture of high-analysis granular fertilizer. An estimated two-thirds of the annual production of this granular fertilizer is produced under licenses issued by the Tennessee Valley Authority.[36]

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[35] *Ibid.*, pp. 38 and 84.

[36] U.S., Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, *Hearings, Government Patent Practices, op. cit.*, pp. 99-100.

The present patent policy of the Department of Health, Education and Welfare is to dedicate patentable inventions to the public. With such a policy, licensing becomes an unnecessary practice. Of the 31 patents administered by Health, Education, and Welfare, officials believe that three of the patented inventions have probably been commercialized.[37] Although many of the patented inventions administered by the Department of Commerce were developed for use by the government itself, revocable, nonexclusive, royalty-free licenses have been granted to business firms. Officials of that agency believe that two patented inventions, covering electroplating of nickel and cobalt, have wide commercial application. The inventions embody relatively simple technology, and are suitable for use in plating surfaces difficult or impossible to plate by former methods. Over 100 licenses have been granted on each of these two patented inventions.[38]

PART V

THE UNIVERSE, THE SAMPLE, AND THE SURVEYS

The factual information uncovered by the Senate Subcommittee on Patents, Trademarks, and Copyrights is not a sufficient basis for an estimate of the rate of use of government-owned patented inventions. To estimate the nature and extent of commercial and government use it is necessary to conduct an analytical and empirical study. An investigation based on a complete census, or the entire universe of all government-owned patents, is impractical. In addition, a scientific study of government-owned patents does not require a complete census. Sampled observations can be employed to infer facts about the entire population of government-owned patents.

To obtain factual information about the utilization of government-owned patented inventions, three distinct groups of individuals and business firms were sent questionnaires or letters: (*1*) inventors of government-owned patented inventions; (*2*) individuals and firms licensed to use government-owned patents; and (*3*) individuals and firms requesting information about government-owned patents from the Small Business Administration.

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[37] U.S., Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights, of the Committee on the Judiciary, *Patent Practices of the Department of Health, Education, and Welfare,* 86th Cong., 1st Sess., 1960, pp. 16-17.

[38] U.S., Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, *Patent Practices of the Department of Commerce,* 86th Cong., 2d Sess., 1961, pp. 11-12.

Inventors were queried in the belief that they have information on use because of strong personal interests in following the life-cycle of their creations. Furthermore, inventors are able to supply other information about government-owned patents, such as the amount of further development required for commercial use, reasons for nonuse, government actions to disseminate information about the inventions, and the extent of use without licenses. Licensees were questioned primarily to determine whether or not the rate of licensing is an adequate measure of use. It was hoped that officials of firms licensed to use government-owned patents could also furnish information on the extent of use without licenses.

To obtain supplementary information about use of government-owned patents without licenses, questionnaires were sent to individuals and firms requesting information about government-owned patents from the Small Business Administration. It was not possible to use the random sampling technique for this group because there is no clearly defined universe from which to take a representative sample.

COUNT OF PATENTS AND LICENSES

Before it was possible to take a random sample from the universe of all government-owned patents and one from the number of licensed patents, it was necessary to have an accurate count of the patent portfolio of the government, as well as the number of patents on which licenses have been issued. When this study began in the fall of 1961, no precise figure on the number of government-owned patents was available from government sources. In the spring of 1962, the Office of Technical Services in the Department of Commerce began to maintain a current index of all unexpired government-owned patents.

Number of Government-Owned Patents

Because the number of patents owned by the government changes daily, as patents expire and are issued, the universe of all government-owned patents is restricted here to those issued during the 17 years between July 1, 1944 and June 30, 1961. A count of the number of government-owned patents can be based on data obtained from four different sources: (*1*) card files or lists maintained by the various agencies or departments administering these patents; (*2*) the index of government-owned patents kept by the Office of Technical Services, U.S. Department of Commerce and previously maintained by the Government Patents Board; (*3*) *The Index of Patents* published an-

nually by the U.S. Patent Office; and (*4*) a card index of patents assigned to the government maintained by the Assignment Branch of the U.S. Patent Office.

The fourth source is used as the appropriate universe of government-owned patents for this study. The card index in the Assignment Branch of the U.S. Patent Office was chosen because all government agencies or departments must file copies of any document giving them an interest in a patent or a patent application with the U.S. Patent Office. In addition, it is a public index and readily accessible. The index is divided into three parts. The first, arranged in numerical order, lists all patents in which the U.S. government has any interest. Another, classified by agency, contains patents assigned to the government. The third, also arranged by agency, records patents on which the U.S. government has a license. Table 4 shows the number of government-owned patents recorded in the Assignment Branch. The total number, 11,674, is the universe from which the random sample of patents was taken for the purposes of requesting information from inventors.

The number of government-owned patents listed in the card index of the Assignment Branch is about 500 patents greater than the number obtained from the *Index of Patents.* The two other sources also yield still other totals for the number of patents assigned to the government. The total given by the Office of Technical Services is less than that obtained from the Assignment Branch. The files maintained by the various agencies yield a total greater than both. Records in the Office of Technical Services show that the government was issued approximately 11,000 patents between July 1, 1944 and June 30, 1961. Data supplied primarily by patent counsel of the various government agencies administering government-owned patents indicate that the government holds title to about 316 more patents than those recorded by the Assignment Branch. Most of the discrepancy arises from information contained in the records of the Departments of Army, Navy, and Air Force, which reveal that these agencies are charged with the administration of several hundred patents not recorded by the Assignment Branch.

No attempt was made to solve the mystery as to why the various government sources yield totals on the number of government-owned patents that differ so greatly. Such an endeavor necessitates the extremely time consuming chore of listing the patent number of each patent from each of the four sources and cross-checking the lists.

TABLE 4

U.S. GOVERNMENT-OWNED PATENTS
(Assignment Branch of the U.S. Patent Office)
By Agency
Calendar Years, 1944-1961

Year	Department of Agriculture	Atomic Energy Commission	Department of Commerce	Department of Interior	Tennessee Valley Authority	Department of Army	Department of Air Force	Department of Navy	Other Agencies	Total
1944[a]	33	—	10	3	4	10	—	5	2	67
1945	47	1	2	6	5	21	—	3	2	87
1946	52	6	3	7	1	51	—	30	—	150
1947	41	18	3	9	1	60	—	25	—	157
1948	100	35	6	11	1	161	1	57	2	374
1949	80	65	7	16	6	223	1	96	4	498
1950	94	151	15	20	6	217	10	121	3	637
1951	90	167	5	26	7	188	14	167	11	675
1952	87	149	7	42	7	217	14	182	7	712
1953	61	124	8	18	6	258	28	166	9	678
1954	44	142	5	13	1	166	40	212	1	624
1955	59	150	13	16	2	174	34	250	3	701
1956	76	267	24	12	6	185	60	309	—	939
1957	71	257	15	7	2	231	61	332	4	980
1958	53	307	23	4	3	305	94	401	3	1,193
1959	98	511	24	11	2	253	153	373	9	1,434
1960	64	197	21	7	6	287	137	447	4	1,170
1961[a]	42	143	3	3	3	133	50	215	6	598
Total	1,192	2,690	194	231	69	3,140	697	3,391	70[b]	11,674
Percent of Total	10.2	23.0	1.7	2.0	0.6	26.9	6.0	29.0	0.6	100.0

[a] 1944 includes only July through December. 1961 includes only January through June.
[b] Includes the patent holdings of the following agencies: Department of Health, Education, and Welfare, 31; Department of Justice, 10; National Aeronautics and Space Administration, 7; Office of Civil Defense, 1; Federal Aviation Agency, 1; Civil Production Administration, 1; Federal Communications Commission, 1; Federal Power Commission, 2; Federal Works Agency, 3; Department of Treasury and Internal Revenue Service, 4; Veterans Administration, 1; General Services Administration, 6; and Reconstruction Finance Corporation, 2.

Source: Card Index of Patents Maintained by the Assignment Branch of the U.S. Patent Office. Compiled in October, 1961.

Number of Government-Owned Patents on Which Licenses Have Been Issued

With the exception of the Department of Commerce,[39] a list of licensed patents and the licensees was readily available from the various government agencies administering government-owned patents. Table 5 shows the number of government-assigned patents on which licenses have been issued. It should be noted that the number of licenses issued is considerably larger than the number of patents on which licenses have been issued. More than one license has been granted on some patents.

TABLE 5

GOVERNMENT-OWNED PATENTS ON WHICH LICENSES HAVE BEEN ISSUED[a]
By Agency
July 1, 1944–June 30, 1961

	Number	Percent of Total
Department of Agriculture	263	17.7
Atomic Energy Commission[b]	949	63.8
Department of Defense	193	13.0
All Other Agencies[c]	82	5.5
Total	1,487	100.0

[a] Includes only those patents issued between July 1, 1944 and June 30, 1961 on which licenses had been granted between July 1, 1944 and June 30, 1961.
[b] This does not include over 100 patents administered by the Atomic Energy Commission on which the sole license issued was to a foreign government.
[c] Includes the following: Department of Commerce, 30; Department of Interior, 24; Tennessee Valley Authority, 24; and Department of Health, Education, and Welfare, 4.
Source: Information supplied by the various government agencies and departments administering government-owned patents.

THE METHOD OF TAKING THE STRATIFIED RANDOM SAMPLE

For convenience, the sample taken from all government-owned patents and the sample taken from government-owned patents on which licenses have been issued are considered together in the following brief discussion on methodology. Randomness requires selection from the universe in such a way that every unit has the same probability of appearing in the sample. To improve representativeness, each of the samples was stratified by agency. Representation of patents from each

[39] Records of the Department of Commerce on government interests in patents are kept in a single file. The records do not distinguish between patents owned by the government, patents licensed by the government, and patents licensed to the government. To obtain information about patents licensed by the government, it was necessary to cross-check patent numbers and titles listed in the Assignment Branch with those in the files of the Department of Commerce.

of the agencies is assured by stratifying the samples. The number of items taken from each stratum was proportionate to the number in the universe. The adequacy, or size of the sample, is a function of the degree of precision desired. The formula for sampling from a finite universe was used to determine the size of the samples.[40]

At a 95 percent confidence level with $p = \pm .06$ as the confidence interval, the size of the random sample for all government-owned patents is 271, and the size of the sample for government-owned patents on which licenses have been issued is 234 patents. These confidence limits are points, the upper and lower limits of an estimate, that can be determined and expected to include the universe parameter 95 times out of 100.

THE SURVEYS

The 271 patented inventions, randomly sampled from all government-owned patents, were developed by 387 individuals. In February, 1962, questionnaires were sent to those inventors for whom a current address was available. A follow-up letter was sent to inventors who had not responded by April, 1962. Copies of the questionnaire and the accompanying letter are shown in the Appendix.

The Questionnaire Sent to Inventors

The questionnaire is divided into three parts: (*1*) information about the inventor, (2) information about the sampled patent, and (*3*) attitudes and opinions held by the inventor. Part I is designed mainly to cross-check information obtained from Part II, particularly information on commercialization of the sampled patent. Part II is the most important section of the questionnaire. Its purpose is to produce factual information on utilization or reasons for nonuse of the sampled patented invention. There is a threefold reason for including Section III, on attitudes and opinions held by inventors. First, it is included to gain additional perspective on the relative importance of the matter of the disposition of patent rights resulting from government-sponsored research and development. Secondly, it is hoped that statements and

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[40] $$\text{Variance} = \frac{N-n}{N-1} \cdot \frac{p(1-p)}{n}$$

The sizes of the samples were obtained when the equation was solved for n. For both samples, the precision limits set for the variance and the proportion, p, were 0.0009 and 0.50, respectively. The relevant universe, N, differed for each of the sampling problems. N was 11,674 for all government-owned patents and N was 1,487 for those government-owned patents on which licenses have been issued.

comments made by inventors will confirm or disprove statements made by many public officials about the effect of government patent policy on incentives. Finally, it is expected that replies to the questions in that section will reveal new ideas on the utilization of government-owned patented inventions from some of the most professionally competent individuals in the scientific community.

By September 15, 1962, the cut-off date, completed returns had been received for 180 different sampled patents—or 66 percent of the 271 patents in the random sample. The rate of response is considerably higher in terms of the number of sampled patents for which at least one inventor was located—75 percent. Table 6 shows the number and percentage distribution of replies according to the agency administering the sampled patent. The response rate is lowest for the three military Departments. It is believed that the lower rate of return is the consequence of reluctance on the part of employee-inventors to respond to questions even remotely associated with security-classified information. It is known that some of these employee-inventors requested permission to respond to this questionnaire from superior authorities.

Considering the total number of inventors in the survey, the percentage of completed returns is substantially lower than that on sampled patents—53 percent of the total number of inventors. However, if the rate of reply is measured against the total number of inventors to which a questionnaire was sent, 282, the response rate is 73 percent. It is unfortunate that more multiple responses were not received. Replies from more than one inventor on the same patent serve the very useful function of verifying the accuracy of the information supplied.

The Letter Sent to Licensees

A letter requesting information on the commercial use of government-owned patented inventions was sent to firms licensed to use the patents in February, 1962. See the Appendix for a copy of the letter. The follow-up letter sent to nonresponding firms was mailed in June, 1962. An informal letter, rather than a questionnaire, was sent in the belief that firms are more willing to reply to a letter than to a questionnaire.

Of the 240 different firms licensed to use sampled patents, it was not possible to obtain addresses for 43 firms. In almost every case, some address was available from the department administering the patent, but a considerable number of licenses had been issued to individuals who had subsequently moved, or to concerns that had gone out of business, changed names or merged with other organizations. As

TABLE 6

REPLIES TO QUESTIONNAIRES SENT TO INVENTORS OF GOVERNMENT-OWNED PATENTED INVENTIONS (BY SAMPLED PATENT)

Reply Status	Total Replies		Department of Agriculture		Atomic Energy Commission		Department of the Army		Department of the Air Force		Department of the Navy		Other Agencies	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Total patents in survey	271	100.0	28	100.0	62	100.0	73	100.0	16	100.0	79	100.0	13	100.0
Completed replies	180	66.4	20	71.4	44	71.0	46	63.0	10	62.5	50	63.3	10	76.9
No reply received	91	33.6	8	28.6	18	29.0	27	37.0	6	37.5	29	36.7	3	23.1
No current address	28	30.8	3	37.5	2	11.1	11	40.7	2	33.3	9	31.0	1	33.3
No reply received	59	64.8	5	62.5	15	83.3	16	59.3	4	66.7	17	58.6	2	66.7
Inventor deceased	4	4.4	0	00.0	1	5.6	0	00.0	0	00.0	3	10.4	0	00.0

Table 7 shows, at least one reply was received for 55 percent of the sampled patents.

STATISTICAL INFERENCES: REPLIES FROM INVENTORS

In the survey to inventors, a reply was received on 66 percent of the sampled patents. Not every inventor, however, was able to provide information on commercial and government utilization. Nonresponse creates the possibility that nonresponding individuals differ from those responding. If differences exist, nonresponse can bias the results of the study.

If it can be assumed that nonresponse is random, the size of the sample can be reduced to include only those sampled elements for which a reply is available. It is necessary, however, to assume that the characteristic being studied does not differ among respondents and nonrespondents. With a smaller sample, the precision of the result decreases because the standard error of estimate is larger and the confidence limits wider. Recognizing the possibility of the existence of a nonresponse bias, a reduced sample of 158 patents for commercial utilization and a reduced sample of 148 patents for government use, establishes 95 percent confidence intervals of $p \pm .05$ and $p \pm .08$, respectively.[41]

REPLIES FROM LICENSEES

The rate of return of letters sent to individuals and firms licensed to use government-owned patents is lower than that of inventors—55 percent compared with 66 percent. Some check on the reliability of the results of this sample is available in the form of a comparison with the results obtained by the Senate Subcommittee on Patents, Trademarks, & Copyrights' survey of firms licensed to use patents administered by the Department of Defense. The rate of use estimated from this sample for Department of Defense patented inventions is not substantially different from that derived by the Subcommittee. The percentage of patented inventions reported to have been commercialized by licensees responding to this study is 32 percent compared with 23 percent for the Subcommittee. The reliability of this comparison,

[41] Although the sample size is reduced, the standard error of estimate, .05, is smaller than that initially determined. This is true because the worst possible case for the proportion, .50, was used to insure the largest possible sample size. The standard error of estimate is lower when the value of the proportion is some other value. Compare this result with the standard error of estimate for the government utilization problem, where the value of the proportion is closer to that of the initially estimated, .50.

TABLE 7

REPLIES TO LETTERS SENT TO FIRMS LICENSED TO USE GOVERNMENT-OWNED PATENTED INVENTIONS (BY SAMPLED PATENT)

Reply Status	Total Replies		Department of Agriculture		Atomic Energy Commission		Department of Defense		Other Agencies	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Total patents in survey	234	100.0	42	100.0	149	100.0	30	100.0	13	100.0
Completed replies	129	55.1	22	52.4	80	53.7	19	63.3	8	61.5
No reply received	105	44.9	20	47.6	69	46.3	11	36.7	5	38.5
No current address	29	27.6	6	30.0	18	26.1	4	36.4	1	20.0
No reply received	73	69.5	14	70.0	48	69.6	7	63.6	4	80.0
Refused to reply	3	2.9	—	—	3	4.3	—	—	—	—

however, must be accepted with caution. The difficulties created by incomplete returns also existed for that study.

The response rate for this sample is not sufficiently high to permit the sample to be inflated and deemed representative of all government-owned patents on which licenses have been issued. The characteristics of the responding licensees, however, correspond closely to those of the firms and organizations that supplied information for the study conducted by Professors Watson, Bright, and Burns on federal patent policies in contracts for research and development. The individuals, firms, and organizations responding to this survey are representative of a wide cross-section of licensees. Even if these replies are inadequate to be considered truly representative of all licensed firms, the wide diversity in the types of individuals and firms responding provides a basis for judgment.

PART VI

THE COMMERCIAL USE OF GOVERNMENT-OWNED PATENTED INVENTIONS

The commercial use of government-owned patented inventions has much to do with the kinds of inventions in the patent portfolio of the government. What proportion of government-owned patents holds little commercial potential because of the nature of the products or processes covered under the patents? A second question is this: What amount of further engineering or financial development is necessary before commercialization is possible?

THE PATENT PORTFOLIO OF THE GOVERNMENT

There can be a close relationship between the kinds of inventions owned by the government and the amount of further development required for use. This relationship can be visualized as a spectrum. At one extreme are inventions holding no potential commercial use; further development is not relevant for these inventions. They have military application only. Such inventions might include bomb ejector mechanisms or radio jamming systems. A short quotation from a reply received by an inventor in the Department of Defense when queried about the commercial potential of his invention illustrates the point: "... is not applicable to commercial use until mercenary armies become popular again." At the other extreme are inventions that are ready for commercialization without development. These inventions might include devices for the modification of fibers or the production of foods.

TABLE 8

CLASSIFICATION OF PATENTS ISSUED BETWEEN 1955 AND 1960, GOVERNMENT-OWNED AND ALL PATENTS

Title of Classification	Class Number	Government-Owned Patents		All Patents[a]		Government-Owned as a Percentage of all Patents
		No.	Percent	No.	Percent	
Radiant Energy	250	695	10.8	5,072	1.9	13.7
Inorganic Chemical Procedures	23	525	8.2	3,263	1.2	16.1
Chemistry, Electrical and Wave Energy	204	318	5.0	2,087	0.8	15.2
Ammunition and Explosive Devices	102	285	4.4	947	0.4	30.1
Ordnance	89	270	4.2	708	0.3	38.1
Communications, Radiant Energy	343	264	4.1	1,703	0.6	15.5
Chemistry, Carbon Compounds	260	255	4.0	1,252	0.5	20.4
Measuring and Testing Devices	73	177	2.8	2,942	1.1	6.0
Electricity, Measuring and Testing	324	167	2.6	1,976	0.7	8.5
Communications, Electrical	340	143	2.2	2,939	1.1	4.9
Repair and Manufacture of Electrical Lamp and Discharge Devices	315	143	2.2	2,699	1.0	5.3
Wave Transmission Lines and Networks	333	139	2.1	1,248	0.5	11.1
Metallurgy, Production of a Metal or an Alloy	75	122	1.9	1,887	0.7	6.5
Power Plants and Motors	60	113	1.8	2,438	0.9	4.6
Electric Lamp and Discharge Devices	313	105	1.6	1,995	0.7	5.3
Foods and Beverages	99	99	1.5	2,627	1.0	3.8
Electrical Circuit Makers and Breakers	200	89	1.4	4,952	1.8	1.8
Aeronautics	244	88	1.4	1,453	0.5	6.1
Machine Elements and Mechanisms	74	84	1.3	4,888	1.8	1.7
Optical Instruments	88	84	1.3	2,222	0.8	3.8
Telephony	179	83	1.3	3,331	1.2	2.5
Registers	235	81	1.3	1,884	0.7	4.3
Coating, Processes and Miscellaneous Products	117	78	1.2	2,589	1.0	3.0
Manufacture of Articles from Metal	29	66	1.0	2,755	1.0	2.4
Electricity, Motive Power Systems	318	64	1.0	1,533	0.6	4.2
Total Above		4,537	70.7	61,390	22.9	7.4
Total Issued		6,417	100.0	268,428	100.0	2.4
Percent Classified		70.7		22.9		

[a] Includes government-owned patents.

Source: U.S., Patent Office, Assignment Branch, and U.S., Patent Office, *Index of Patents* (Washington: U.S. Government Printing Office, 1955 through 1960).

Between these extremes are those inventions requiring various degrees of further development—extensive, moderate, or slight. To be sure, the kind of invention can affect the amount of development required for commercial use. Some military-oriented devices have commercial application after extensive engineering and financial development. Other inventions developed for military purposes, however, have immediate commercial application. Some inventions developed for industrial use need extensive development to bridge the gap between success in a laboratory and actual commercial exploitation.

Kinds of Inventions Owned by the Government

Table 8 shows a classification of government-owned patents issued between January 1, 1955 and December 31, 1961. Except for minor adaptations, the title of the classes are the official titles. The format of the *Index of Patents*, published by the U.S. Patent Office, does not readily permit a classification of patents issued before 1955. Over 55 percent of the patents included in this study, however, can be classified by kind of invention. The 25 classes shown in the table are ranked in order of the number of patents issued. The table gives a comparison of the number and percent of government-owned patents in a particular class and the number and percent of all U.S. patents in the same class. Government-owned patents are also shown as a percentage of all patents issued.

The defense orientation of government-sponsored research and development is reflected in the kinds of inventions assigned to the government.[42] The first five classes include about one-third of all government-owned patents, but only 5 percent of all U.S. patents issued. These five classes include patents covering technology on radiant energy, inorganic chemical procedures, electrical and wave energy chemistry, ammunition and explosive devices, and ordnance. Government-owned patents constitute a significantly greater proportion of all U.S. patents in these and the next two highest ranking classes than the proportion in other classes. Government-owned patents comprise between 14 percent and 39 percent of all patents in these classes. In contrast, government-owned patents are about 2 percent of all unexpired patents.

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[42] For a detailed discussion of the kinds of patents held by the Atomic Energy Commission see H. Fredrick Hamann, "An Appraisal of the Atomic Energy Field After 20 Years of the Title Policy," *PTC J. Res. & Ed.*, Vol. 6, No. 3, (Fall 1962), pp. 377-409.

Amount of Development Work

Patent protection to induce innovational investment is less important when inventions are completely developed. This does not mean that all risks are eliminated and that patent protection has no incentive effect. Risks, such as those associated with advertising and marketing of the product, still exist. Questions two and three of Part II of the questionnaire sent to inventors were designed to discover the proportion of government-owned patents requiring development for commercialization, and the extent of such development. As Table 9 shows, inventors supplied information on 154 sampled patents.

About half of all government-owned patented inventions require further development for commercial use. With the exception of the combined group, "other agencies," very little difference exists in the amount of development required on inventions administered by the military departments and the civilian. It is not unexpected that the "other agency" category has proportionately more completely developed inventions. The avowed R&D policy of the Tennessee Valley Authority is to develop inventions to the point where industry can profitably employ them. The proportion of patented inventions administered by the Department of Agriculture that requires no development for use is only slightly lower than that for inventions held by the Atomic Energy Commission and the Department of Defense. The R&D mission of the Department of Agriculture is to improve technology in the agricultural sector of the economy. Generally, commercialization of the results of the research is the primary end. This evidence gives some support to the contention that an exclusive licensing policy for some Department of Agriculture patents is necessary to encourage private firms to invest in the development of inventions. As previously indicated, officials in that Department advocate an exclusive licensing policy.

TABLE 9

SAMPLED PATENTED INVENTIONS REQUIRING FURTHER DEVELOPMENT FOR COMMERCIALIZATION

Agency or Department	Total No.	Yes		No	
		No.	Percent	No.	Percent
Department of Agriculture	19	9	47.4	10	52.6
Atomic Energy Commission	38	16	42.1	22	57.9
Department of Defense	87	41	47.1	46	52.9
Other Agencies	10	8	80.0	2	20.0
TOTAL	154	74	48.1	80	51.9

Inventors indicated that the amount of necessary development for commercialization of most government-owned patents is slight or moderate. See Table 10. Approximately 35 percent of all government-owned patents require slight development, 40 percent moderate, and 18 percent extensive. Inventors did not supply information on the

TABLE 10

INVENTORS' ESTIMATES OF
THE AMOUNT OF FURTHER DEVELOPMENT REQUIRED FOR
COMMERCIALIZATION OF SAMPLED PATENTED INVENTIONS

Agency or Department	Total No.	Extensive No.	Extensive Percent	Moderate No.	Moderate Percent	Slight No.	Slight Percent	Blank No.	Blank Percent
Department of Agriculture	10	1	10.0	5	50.0	4	40.0	0	0
Atomic Energy Commission	22	5	22.7	7	31.9	9	40.9	1	4.5
Department of Defense	46	8	17.4	19	41.3	14	30.4	5	10.9
Other Agencies	2	—	—	1	50.0	1	50.0	—	—
TOTAL	80	14	17.5	32	40.0	28	35.0	6	7.5

stage of development for 7 percent of the inventions. These estimates on the extent of further development required for commercial use must be interpreted cautiously. The question, and consequently the replies, were qualitative. The amount of development that one individual deems to be moderate might be considered extensive by another. Also, it is possible that inventors tend to underestimate the extent of development because they are not charged with the actual or potential exploitation of the inventions. A number of inventors stated that the question was not applicable because the inventions had government use only and held no commercial potential. Some of these inventions might hold commercial potential with extensive development work.

Other evidence suggests that the tendency toward underestimating the amount of required development effort might not be too marked. When multiple replies were received on the same sampled patented invention, there was an extremely high degree of agreement. The two or more responding inventors frequently gave the same qualitative estimate.

COMMERCIAL USE REPORTED BY INVENTORS

Information supplied by inventors shows that the rate of commercial use of government-owned patented inventions is between 10 percent and 15 percent.

Commercial Use of Sampled Patented Inventions

Table 11 presents data on the commercialization of 158 sampled patented inventions owned by the government. Of these, inventors report that 23, or 15 percent, have been commercialized. The level of use does not differ significantly among the agencies administering the inventions. The estimated rate of use reported for inventions admin-

TABLE 11

COMMERCIAL USE OF SAMPLED PATENTED INVENTIONS REPORTED BY INVENTORS

Agency or Department	Total No.	Used		Not Used	
		No.	Percent	No.	Percent
Department of Agriculture	20	3	15.0	17	85.0
Atomic Energy Commission	38	6	15.8	32	84.2
Department of Defense	90	12	13.3	78	86.7
Other Agencies	10	2	20.0	8	80.0
TOTAL	158	23	14.6	135	85.4

istered by the Department of Agriculture is 15 percent, for the Atomic Energy Commission the rate is 16 percent, and 13 percent for the Department of Defense. There is a somewhat higher rate of commercialization on inventions administered by all of the other agencies—20 percent.

The Department of Agriculture and the Atomic Energy Commission follow a title policy. The Department of Defense acquires patent rights to inventions arising from research contracts when contractors decline to file patent applications, presumably because the inventions hold little commercial potential. In addition, officials of the Department of Defense interpret the provisions of Executive Order 10096 liberally. Proportionately more employee-inventors in the Department of Defense retain patent rights than do inventors in the Department of Agriculture. On a priori grounds, it would be reasonable to conjecture that the rate of use is considerably lower on Department of Defense patented inventions than on inventions administered by the Department of Agriculture and the Atomic Energy Commission. This, however, is not the case.

Part of the difference between the expected rates of use and the actual rates can be explained by the publicity accompanying the commercialization of inventions administered by the Department of Agriculture and the Tennessee Valley Authority. Examples of the use of patented inventions held by these agencies are frequently cited as

evidence of widespread commercialization of all government-owned patented inventions. The research and development missions of the Department of Agriculture and the Tennessee Valley Authority require these agencies to work closely with industry to disseminate information on technological advances. This constant liaison is a source of information about commercial use.

No attempt was made to elicit information from inventors about the commercial value of utilized patented inventions. There is little reason to believe that inventors are able to provide information on the effect of use of the sampled patented inventions on the sales or costs of firms using the inventions. However, information was obtained on the extent of commercial use. Of the 23 commercialized patented inventions, 8 have been used extensively, 7 moderately, and 6 only slightly. No information was supplied for two inventions.

There are two checks to test the accuracy of the reported incidence of commercial use. The first comes from multiple responses on the same sampled patented invention. The other is an estimate of the level of commercial use of all government-owned patented inventions developed by the inventors. Almost without exception, when more than one inventor supplied information on the same sampled patent, the inventors agreed that the invention was or was not used. When one inventor could not supply information about the commercial use of the invention, his partner did have such information. Question 4 of Part I of the questionnaire requested the inventor to indicate the number of *all* of his U.S. patents assigned to the government. Question 6 asked the inventor to give the number of those government-owned patented inventions that have been commercialized. The 206 responding inventors have assigned title to 1,216 patents to the government. Of these, 116, or slightly less than 10 percent, have been commercialized. Even though the check provides but a rough estimate of the commercial use of government-owned patented inventions, the discrepancy between the estimates is slight—10 percent of *all* of the inventors' government-assigned patents as compared with 15 percent of the *sampled* patents. By agency the rates of commercial use for the 1,216 patents are: the Department of Agriculture (11 percent), the Atomic Energy Commission (17 percent), and the Department of Defense (10 percent).

Classification of Commercialized Patents

The list of sampled patented inventions reported by inventors to have been commercialized cannot be furnished because the inventors

were assured of anonymity. It is possible, however, to show commercialized patented inventions owned by the government according to patent classifications used by the U.S. Patent Office. Table 12 presents this information. With the exception of three inventions administered by the Atomic Energy Commission, the commercially used inventions do not fall within the five most important classes for

TABLE 12

CLASSIFICATION OF PATENTED INVENTIONS REPORTED COMMERCIALIZED BY INVENTORS

Title of Classification	Class Number	Number of Patents
DEPARTMENT OF AGRICULTURE		
Chemistry, Carbon Compounds	260	2
Measuring and Testing Devices	73	1
Total		3
ATOMIC ENERGY COMMISSION		
Chemistry, Electrical and Wave Energy	204	2
Electricity, Conversion Systems	321	1
Radiant Energy	250	1
Metallurgy, Production of a Metal or an Alloy	75	1
Inorganic Chemical Procedures	73	1
Total		6
DEPARTMENT OF DEFENSE		
Electricity, Measuring and Testing Devices	324	2
Wave Transmission Lines and Networks	333	2
Electricity, Residual Class	317	1
Electricity, Conversion Systems	321	1
Chemistry, Carbon Compounds	260	1
Compositions	252	1
Material or Article Handling Mechanisms	214	1
Batteries, Primary, Secondary, and Thermal	136	1
Education, Processes and Apparatus	35	1
Supports	248	1
Total		12
OTHER AGENCIES		
Communications, Electrical	340	1
Optics	88	1
Total		2
TOTAL ALL AGENCIES		23

all government-owned patents. As previously indicated, about one-third of all government-owned patents are classified in these five categories.

Extent of Further Development

Of the 23 sampled patented inventions reported commercialized, only one required extensive development before commercialization was feasible. Another needed moderate development. Eleven of the inventions required slight additional development, and 10 were completely developed by the government before use. None of the commercialized inventions administered by the Department of Defense or the Department of Agriculture required more than a slight amount of development for commercial use. Again, caution should be exercised in accepting the precision of these estimates because they are qualitative in nature, based only on the considered judgment of the inventor.

Question 8 of Part I of the questionnaire was designed to elicit additional information about the relationship between commercial use of government-owned patented inventions and the amount of further development work required for that use. Inventors employed by industry were asked whether they or their employers had ever undertaken any further engineering or development efforts for the commercialization of any government-owned patented invention. They were also asked to indicate whether these development efforts resulted in the commercialization of the invention, and whether a patent was issued on the improvements.

Among the 147 inventors who had industrial employment experience, 22 knew of instances when commercialization materialized because of further development work. Five inventors cited instances when development work was undertaken, but commercial use did not result. Patents were issued on 12 of the 27 improved inventions. From the hundreds of government-assigned patents about which inventors must have first-hand knowledge, it is surprising that only 12 actual examples of improvement patents were cited.

Inventions Held Under Secrecy Orders

For reasons of military security, some government-owned patents are held under secrecy orders for years. When any patent application is held under a secrecy order, information about the invention cannot be made public. Although the U.S. Patent Office keeps all patent applications secret until the application is allowed, officials in government agencies can disseminate information about these inventions before patents are issued. Also, inventions that are to be assigned to

the government can be, and are, licensed and used before patents are issued. Such procedures are not permitted for applications held under secrecy orders. Some government patent attorneys believe that inventions held under secrecy orders lose commercial potential because they become obsolete.

A check was made on sampled patents administered by the Atomic Energy Commission to determine the extent to which government-owned patents are held under secrecy orders. Slightly over half of the patents have been held under secrecy orders. As Table 13 reveals, the average time lag between application for a patent and its issue for these patents is 101 months. The time lag for those not held under secrecy orders is 34 months. For all sampled patents administered by the

TABLE 13

AVERAGE TIME IN MONTHS ELAPSED BETWEEN PATENT APPLICATION AND PATENT GRANT

Agency or Department	Time (Months)
ATOMIC ENERGY COMMISSION	
All Sampled Patents	69
Sampled Patents Under Secrecy Order	101
Sampled Patents Not Under Secrecy Order	34
Sampled Patents Commercialized[a]	83
DEPARTMENT OF AGRICULTURE	
All Sampled Patents	39
Sampled Patents Commercialized	38
DEPARTMENT OF DEFENSE	
All Sampled Patents	56
Sampled Patents Commercialized	52
OTHER AGENCIES	
All Sampled Patents	40
Sampled Patents Commercialized	54
Average All Sampled Patents	56
Average All Sampled Patents Commercialized	58
Average Time Lag for all U.S. Patents[b]	42

[a] Four of the six commercialized inventions were held under secrecy orders.
[b] Statement of Commissioner of Patents, David L. Ladd, U.S., Congress, House, Special Subcommittee on Patents and Scientific Inventions of the Committee on Science and Astronautics, *Hearings, Patent Policies Relating to Aeronautical and Space Research*, 87th Cong., 2d Sess., Part 2, p. 123.

Atomic Energy Commission, the average lag is 69 months. This compares with an average time lag for all U.S. patents of 42 months. The secrecy order status for patents administered by the other agencies was not determined. However, it is reasonable to assume from the average time between application and patent grant that a substantial number

of Department of Defense patents are also held under secrecy orders. The average time for these patents is 56 months.

A comparison of the average time lag of commercialized sampled patented inventions with all sampled patents gives one measure of the effect of secrecy orders on commercial use. If the effect were great, if secrecy orders reduced the rate of use because of obsolescence, the average time lag would be substantially lower for commercialized patents than the average time lag for all sampled patents. From the data, it is difficult to discern any strong effect of secrecy orders on the rate of commercial use. In fact, the average time lag is slightly higher for commercialized patents than for all sampled patents—58 months compared with 56 months. This information, coupled with the fact that rapid obsolescence is not one of the more important reasons cited for nonuse of inventions, indicates that obsolescence arising from reasons of national security probably is not great.

Reasons for Nonuse of Government-Owned Patents

An appraisal of the effect of government ownership of patented inventions on economic growth must consider reasons for nonuse of inventions as carefully as the extent of actual commercialization. Some patented inventions originating from government-sponsored R&D hold little commercial potential. It does not matter whether the government or private individuals hold title to them.

Overwhelmingly, inventors cited the same two reasons for nondevelopment of these inventions for commercial use as those given by contractors when they retained title to inventions arising from government-sponsored research—the invention is for government use only and there is insufficient market demand. See Table 14. Insufficient market demand is also an important reason given by private firms for not commercializing patented inventions that are developed from private funds.

No invention administered by the Department of Agriculture was reported to have government application only. This reason, however, is the most important cause for nondevelopment of Atomic Energy Commission and Department of Defense patents. To check on the precision of replies, as well as to gain additional insight on the kinds of government-owned patents that hold little commercial potential, inventions that inventors stated are for government use only were classified. About one-fourth of the patents cover technology on ordnance, ammunition, and explosive devices. Over half of these inven-

TABLE 14

REASONS FOR NONUSE OF GOVERNMENT-OWNED PATENTED INVENTIONS REPORTED BY INVENTORS

Reasons for Nonuse	Total		Department of Agriculture		Atomic Energy Commission		Department of Defense		Other Agencies	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Rapid obsolescence	21	10.3	1	3.8	9	17.6	10	8.4	1	14.3
Insufficient time	5	2.5	1	3.8	2	3.9	2	1.7	0	—
For government use only	54	26.6	0	—	14	27.5	39	32.8	1	14.3
Insufficient market demand	54	26.6	10	38.5	11	21.6	31	26.1	2	28.6
Government holds title to patent	17	8.4	2	7.7	7	13.7	6	5.0	2	28.6
Insufficient venture capital	1	.5	0	—	1	2.0	0	—	0	—
Outside product line	15	7.4	1	3.8	1	2.0	12	10.1	1	14.3
Insufficient competitive advantage	21	10.3	8	30.8	5	9.8	8	6.7	0	—
Neglect to develop invention	11	5.4	2	7.7	1	2.0	8	6.7	0	—
Other	4	2.0	1	3.8	0	—	3	2.5	0	—
TOTAL	203	100.0	26	100.0	51	100.0	119	100.0	7	100.0

tions fall into the five most important classification groups for all government-owned patents.

Seventeen inventors believed that their patented invention would have been commercialized if the government had not held title to the patent. About three-fourths of these inventions required a moderate or a slight amount of development work for commercialization. Only one needed extensive development.

Editor's Note: This paper on "The Utilization of Government-Owned Patented Inventions" will be concluded in Volume 7, Number 3.

Some Possibilities and Limitations of Patent Interference "Reform"

GEORGE E. FROST*

SUMMARY AND INTRODUCTION

THE UNITED STATES PATENT LAW requires the patentee to be the "first" inventor.[1] It thereby recognizes and encourages the physical act of completing the invention and deemphasizes the act of filing an application. This requirement carries with it an important procedural complication at the patent application level—the necessity of adjudicating rival claims of priority of invention. Such rival claims occur when an applicant for patent seeks patent coverage to the same subject matter as that of an issued patent or another pending application.[2] Since the filing date is not necessarily controlling, decision frequently requires the taking of testimony and a ruling thereon.

The Patent Office conducts highly formalized "interference" proceedings. Such proceedings may result in a decision that one party is the first inventor, a decision that there really is no "interference," or a ruling that neither party is entitled to a patent.[3] In principle, the

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[1] Nearly all foreign patent systems are based on issuance of patent applications to the first patent applicant to file. Since the priority date for patentability purposes is thus a fixed official record date, interference proceedings are unnecessary. In Canada, which has a patent law modeled in many respects after the United States law, "conflict" proceedings provide a rather limited procedure similar in principle to the United States interference practice. Proposals have been made in Canada to eliminate the "conflict" procedure.

[2] Under 35 USC 135, interference may be declared "with any pending patent application, or with any unexpired patent." This statute further requires, however, that a claim copied from a patent must be copied prior to one year from the date on which the patent was granted. A claim to substantially the same subject matter as the patent claim is treated in the same manner as the exact patent claim. This limitation usually confines applicant-patentee interferences to cases where the patent has recently issued.

[3] Ruling that one party is the first inventor is termed an "award of priority." It may be made on order to show cause under Patent Office Rule 225, on motion for judgment on the record under Rule 252, or "final hearing" under Rule 256. Decision that there really is no "interference" normally occurs on motion to dissolve under Rule 232. Ruling that neither party is entitled to a patent may occur on a motion to dissolve by a party under Rule 232, or on dissolution on motion of the Examiner under Rule 237.

determination is simple. In actual practice, it has entailed proceedings that are often prolonged and expensive. The practice has been criticized as leading to inequities, inordinate delay, and undue expense.

There is a current movement towards patent interference reform. The subject was touched upon in the 1961-62 Management Survey of the U. S. Patent Office. The present Patent Office administration is studying the matter. A coordinating committee of the various patent law associations has been formed to deal with this subject. It seems likely that change in some form will soon come.

The present paper is directed to a reassessment of the underlying purpose and nature of patent interference proceedings and to evaluation of some of the proposals for change.

I

THE GENESIS OF INTERFERENCE LAW lies in the patent infringement defense of "prior invention." This defense was set forth in Section 5 of the Patent Act of 1790.[4] The act provided for issuance of a show cause order on the patentee:

> "and in case no sufficient cause shall be shown to the contrary, *or if it shall appear that the patentee was not the first and true inventor or discoverer,* judgment shall be rendered by such Court for the repeal of such patent . . ."

The Patent Act of 1790 was replaced by the Patent Act of 1793,[5] which made it a defense in a patent infringement action to show that the patentee "had surreptitiously obtained a patent for the discovery of another person." This defense was carried forward in the 1836 Patent Act,[6] and in the subsequent statutes. At the time the 1952 Patent Code[7] was enacted, the statute was Section 4920, R.S., which in its pertinent portion read:

> "That he (the patentee) had surreptitiously or unjustly obtained the patent for that which was in fact invented by another, who was using reasonable diligence in adapting and perfecting the same; . . ."

The defense that the patentee is not the "first inventor" is now provided by the combined effect of Sections 282 and 102(*g*) of the Patent Code. The former provides that invalidity of the patent "on any ground specified in part II of this title as a condition for patentability" is a defense to an infringement suit. In Section 102(*g*), the

[4] 1 Stat. 109.
[5] 1 Stat. 318.
[6] 5 Stat. 117.
[7] 66 Stat. 792.

Code states under the title "conditions for patentability" that a "person shall be entitled to a patent unless . . .

> (*g*) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other."

Section 102(*a*) of the Patent Code and the predecessor statutes set forth another, closely related, defense to a patent infringement suit. This is that the "invention was known or used by others in this country . . . before the invention thereof by the applicant for patent." The courts have construed the terms "known" and "used" in this and the predecessor statutes to mean knowledge or use of the completed invention, thus making this section also turn fundamentally on the existence of a prior invention.[8]

The status of prior invention as a defense to an infringement suit—whether based on Section 102 (*g*), 102 (*a*), or otherwise—does not turn on whether the actual first inventor has or could have filed his own patent application or has or could have obtained a patent. This point was brought out dramatically in *Alexander Milburn Co. v. Davis-Bournonville.*[9] In a terse opinion, the Court there held that a prior filed United States patent is conclusive evidence that the invention was "known or used" in the United States prior to the filing date of the patent in suit. It was argued that Whitford (the applicant of the prior-filed application) was not himself seeking a patent to the invention and did not claim the same. The Court replied in part:[10]

> "The question is not whether Clifford showed himself by the description to be the first inventor. By putting it in that form it is comparatively easy to take the next step and say that he is not an inventor in the sense of the statute unless he makes a claim. The question is whether Clifford's disclosure made it impossible for Whitford to claim the invention at a later date. The disclosure would have had the same effect as at present if Clifford had added to his description a statement that he did not claim the thing described because he abandoned it or because he believed it to be old. It is not necessary to show who did invent the thing in order to show that Whitford did not."

The Court distinguished the *Cornplanter* case,[11] which had held that an earlier filed abandoned patent application was not conclusive proof of prior invention.

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[8] See, e.g., *In re* Schlitter and Uffer, 110 USPQ 304 (CCPA 1956).
[9] 270 U.S. 390 (1926).
[10] *Id.*, p. 401.
[11] The Cornplanter Patent, 23 Wall. 181 (1874).

Prior to 1836, rather informal procedures were apparently used in some instances to identify which one of several patent applicants was entitled to a patent.[12] In the Patent Act of 1836[13] an express statutory provision was included, under which priority of invention was to be determined in the Patent Office. The provision was consistent with the general objects of this act, which established the Patent Office with its present patent examining function and brought to an end an unhappy experience with a patent registration system under the 1793 Act.[14] In the words of Section 8 of the 1836 Act:

> "whenever application shall be made for a patent which, in the opinion of the Commissioner, would interfere with any other patent for which application may be pending, or with any unexpired patent which shall have been granted, it shall be the duty of the Commissioner to give notice . . . (and, implicitly, to determine) . . . the question of priority of right or invention. . . ."

This statute has been continued, virtually in *haec verba*, to the Patent Code.

The Patent Office interference practice of today has developed from administrative and judicial decisions made in the light of the statutory basis for interferences and in the light of the statutory provisions for the determination of priority of invention in patent infringement suits. It is now settled—both in Patent Office interference proceedings and in infringement proceedings—that the filing of a patent application disclosing an invention is the equivalent of an actual reduction to practice of that invention.[15] This so-called "constructive reduction to practice" was found logically necessary to support judicial decisions in infringement suits. These had held (*1*) that the inventor may obtain a valid patent without doing any physical act other than filing the patent application[16] and (*2*) that the judicial decisions holding that a "reduction to practice" is required before an invention is completed.[17] Also—both in the Patent Office interference proceedings and in infringement proceedings—it has long been settled that where the first of two rival inventors is the first to conceive of the invention and is also the first to reduce the invention to practice, he is the first inventor, and if the

[12] See P. J. Federico, "Operation of the Patent Act of 1790," *Journal of the Patent Office Society*, Vol. 18, No. 7 (1936), p. 74.

[13] *Op. cit., supra*, note 6.

[14] *Op. cit., supra*, note 5.

[15] The classic case, and one of the most analytical decisions on this point, is Automatic Weighing Machine Co. v. Pneumatic Scale Corp., 166 Fed, 288 (1st Cir. 1909).

[16] See, e.g., The Telephone Cases, 126 U.S. 1 (1888).

[17] E.g., Clark Thread Company v. Willimantic Linen Company, 140 U.S. 481 (1891).

first to conceive is the last to reduce he is the first inventor only if he diligently worked toward a reduction to practice from a time prior to the entry of the second to conceive.[18] This doctrine was derived in the Patent Office interference cases by analogy with the statutory provisions respecting the defense of prior invention in infringement suits.[19]

Questions of priority thus arise in two settings. One is the infringement suit, where the defendant can insist that the patentee is not the first inventor and can rely upon the activities of an earlier inventor even though the earlier inventor did not or could not obtain a patent. The other is the Patent Office interference proceeding. Here the issue arises only to the extent that there is an "interference," that is an effort by one patent applicant to obtain patent to the invention patented or sought to be patented by another. There are some procedural variations that may be viewed as giving certain interference proceedings a broader aspect than strictly rival claims to the same invention, as is discussed hereafter. But there is nevertheless an important distinguishing principle between the interference practice and the infringement suit defense. This principle is that the prior inventorship of one not seeking a patent is immaterial in the interference whereas the existence or absence of a patent or patent application of the alleged prior inventor is immaterial in the infringement suit.

II

Present Patent Office interference practice is based on a highly formalized step-by-step procedure. The respective steps are provided for by Patent Office rules. The progress of the interference from each step to the next is determined, generally, by one of several interference examiners who makes procedural rulings as each step is concluded.

When the interference is "declared," dates are set for the filing of preliminary statements. A time period (subject to extensions) is set for this purpose. Within this period, the parties are required to file a

[18] This rule is now embodied in Section 102 (*g*) of the Patent Code (35 U.S.C.). The statement of the Code is not in strict accord with all of the prior decisions (including the Automatic Weighing Machine case, *op. cit., supra,* note 15). It also follows doctrines announced in some of the cases but perhaps not entirely settled. The Code, nevertheless, follows closely what was generally regarded as the law.

[19] The first statutory expression embodying the idea of diligence was that of Section 15 of the 1836 Patent Act (5 Stat. 117). It stated that it was a defense to a patent infringement suit to show that the patentee "had surreptitiously or unjustly obtained the patent for that which was in fact invented or discovered by another, who was using reasonable diligence in adapting and perfecting the same." By analogy to this infringement suit defense it was concluded that where one of two rival inventors conceived first and was the last to reduce to practice he was the first inventor if he was "using reasonable diligence in adapting and perfecting the same."

statement giving their dates of invention as specified in Patent Office Rule 216. In the absence of such a statement, a party is held to his Patent Office application filing date.

The preliminary statement is a statement of allegations, not a showing of proofs. For example, the interferent is entitled to put down any acts claimed to prove conception of the invention, whether or not the same can be proven with corroboration as required to establish them for priority purposes.

At the conclusion of the preliminary statement period, the examiner of interferences (after delay determined by his work load) reviews the preliminary statements. If any are incomplete, additional time is specified within which acceptable statement must be filed. If the dates alleged in the preliminary statement of a party would not, if proven, demonstrate priority of invention over the Patent Office filing date of another party, an order is issued to show cause why judgment should not be entered on the record against the first party. If the examiner of interferences finds that there remains an issue of priority of invention in view of the preliminary statement allegations, he sets the motion period time (again subject to extensions).

Upon commencement of the motion period each party is entitled to examine the Patent Office file of his opponent. He may bring any one of a variety of motions set forth in Patent Office Rules 231 to 235. Normally, no other motions are possible. Generally, these motions are that neither party is entitled to the count because of prior art, that one party is not entitled to the count because of the nature of his patent application, or that the interference should be altered in some respect.

At termination of the motion period, the interference examiner again takes up the interference (after delay determined by his work load). If motions have been filed, he enters an order on whether and to what extent they are subject to hearing. If there is any motion issue to be heard, he sets down a date for the hearing (which is usually before the primary examiner who handled the applications prior to the interference). In such event, the parties may file briefs and argue the motion. Since the interference examiner does not pass judgment upon the merits of the motions, any motion that satisfies the formal requirements of sufficiency—no matter how unjustified on the facts—will serve to bring about a motion hearing. Following hearing, the primary examiner makes his ruling on the motion or motions, at which time the interference is returned to the interference examiner.

Petitions to the Commissioner may be taken from the ruling on motions. Proceedings are suspended until the Commissioner makes

his ruling on such petition. At times log jams have led to prolonged delays in deciding such petitions, giving a party the opportunity, at will, to impose a long delay on his opponent.

When rulings have been made on motions and all petitions have been disposed of, the interference examiner then sets down the testimony dates. These, again, are in sequence. A fixed time, usually about eight weeks from the order, is put down for the completion of the testimony of the junior party. From that date to a later date, usually about four weeks later, is put down for the completion of the testimony of the senior party. A period running from the completion date for the senior party to a date of about two weeks later is put down for the rebuttal testimony of the junior party.

When the testimony periods have been completed, the interference goes on to final hearing before the Board of Interference Examiners. Briefs are filed and oral argument is made. The Board then makes its determination of priority of invention.

The determination of priority of invention by the Patent Office is subject to two forms of judicial review. One is by direct appeal to the Court of Customs and Patent Appeals. This review is on the record before the Patent Office. The other is by bill in equity in a United States District Court. Review by this method entails trial *de novo* and results in a judgment subject to the same appeal process (including petition for certiorari in the Supreme Court) as normal district court judgments. If either party prefers to have review by trial *de novo* in the district court, he can require the other party to follow this route.[20]

This ponderous step-by-step interference procedure and the possible court review proceedings have led to some instances of exceedingly prolonged patent application periods. The most dramatic example of recent years is *Jorgensen et al.* patent 2,705,484.[21] This patent issued in 1955 after an application period of over 23 years. Of the 23 years, over 20 were taken up in a series of interference proceedings. A more

[20] 35 USC 141 provides that a party dissatisfied with a decision of the Board of Interference Examiners may file appeal to the United States Court of Customs and Patent Appeals. Ruling in such appeal is on the record before the Patent Office, 35 USC 144. The Code also provides for review by civil action filed in a United States District Court by a party dissatisfied with a decision of the Board of Interference Examiners, 35 USC 146. Section 141 further provides that upon the filing of an appeal to the Court of Customs and Patent Appeals, any other party may file notice of election to have all further proceedings conducted as provided in 35 USC 146, namely, by civil action. The party filing the appeal then has a thirty day period within which to file such civil action, 35 USC 141. Consequently, if either party chooses to have review only by civil action he can achieve that end.

[21] For a discussion of the history of the Jorgensen et al. patent see Hearings, *American Patent System*, Oct. 10-12, 1955, United States Senate, pp. 287-291.

recent example of prolonged patent pendency due to interference proceedings is that of the patent applications to the drugs prednisone and prednisolone, for which a number of conflicting patent applications were filed about 1955.[22] These products have been on the market since 1955. No patent has yet issued, nor is one likely to issue for some time. During this delay period—already over eight years—the drugs have been obtained from imports or otherwise by vendors who make no claim to invention, pay no royalties, and have incurred no substantial risk of having to pay royalties.

These and other dramatic examples of undue patent application delay may be attributed to specific interferences. But it should be noted that a different story emerges when averages are considered. A survey of over 1000 interferences declared in 1939 and 1940, for example, showed that the average time required for all interferences was about 13 months.[23] And even in those interferences where testimony was taken, the time required for testimony and final hearing averaged about 13 months.

III. DO INTERFERENCES ACHIEVE THEIR PURPOSE?

A fundamental inquiry ought to precede consideration of specific aspects of patent interference practice, namely, the extent interferences significantly alter the issuance of patent applications. It has been urged that the senior party in an interference so often prevails that the effort and expense of interferences is not justified. The Patent Office Management Survey Report mentions this point, stating that about 80 percent of interferences are "won" by the first party to file.[24] While the Report did not recommend abolishing interferences, it is apparent that this figure influenced the rather sweeping proposals made.

More sophisticated figures cast doubt on the significance of the 80 percent overall percentage. One tabulation of all interferences over a recent ten year period has shown the following approximate results:

About 31 percent—dissolved (no question of priority existing)
About 44 percent—priority awarded to the senior party
About 17 percent—priority awarded to a junior party (about 15 percent to the first junior party, 2 percent to the second junior party, and under 1 percent to subsequent junior parties)
About 7 percent—split awards, consolidated, pending, etc.

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[22] For controversies that have attended testimony in these interferences see Korman v. Nobile 125 USPQ 280 (1960) and 133 USPQ 178 (1962).

[23] Hearings, *American Patent System, op. cit., supra,* note 21, p. 290.

[24] *1961-62 Management Survey of the U.S. Patent Office,* print by Senate Subcommittee on Patents, 87th Cong., 2d Sess., 1962, p. 59.

Even the above figures understate the effectiveness of the Patent Office interference procedure. For example, an "award of priority" is made under Rule 225 when a junior party fails to allege dates of invention sufficient to overcome the record dates of a senior party. Such rulings involve no testimony. In such interferences the delay and effort is small in relation to the delay and expense in interferences that involve testimony.

If attention is confined to those interferences decided after the taking of testimony, the statistical prospects of a junior party become much more favorable. Statistics similar to those above listed indicate that after testimony there are approximately two awards of priority to junior parties for every three awards of priority to senior parties. If these data are approximately correct (and are regarded as the measure of the success of interference practice in awarding patents to the first inventor rather than the first to file patent application) it can hardly be said that existing interference practice is failing to achieve the intended purpose.

The Patent Office is currently compiling detailed statistics on interference experience. With these detailed statistics in hand, a more reliable statistical conclusion as to the success of interference practice will be possible. In the meantime, the above data indicate that interferences are a good deal more successful than the 80 percent figure of the Management Survey Report suggests and that the most pertinent figures may well make a stronger case for the present practice than is generally assumed.

IV. INTERFERENCE OR OPPOSITION?

Many criticisms of the interference law and practice stem from apparent inequities arising from the interference "count" concept. Generally, the present practice requires that each party to an interference must have a patent application in which the "count" can properly be made as a claim. The present practice also generally requires that interference proofs be directed to the subject matter of the count. Both requirements are usually applied strictly. It is not enough that a patent application disclose the "equivalent" of the count recitations,[25] or that a count element missing in the proofs or an application disclosure is not required for patentability.[26] Horrible examples may be cited of parties who have lost interferences because of failure to meet apparently trivial language in the count. These examples, together with instances of inordinate technical controversy as to the

[25] *Manual of Patent Examining Procedure,* Section 1101.

[26] See, e.g., American Machine and Foundry v. Liggett and Myers, 172 Fed. Supp. 12 (D.N.J., 1959); affirmed 272 F (2d) 451 (1959).

counts, have prompted suggestions that the "count" concept be discarded and some less formal, less rigid, statement of the issue be substituted.

The count problem is not new. It has been the subject of decision and Commissioner's Order in the area of greatest difficulty, namely, applicant-patentee interferences. In these interferences a patent applicant, acting under what is now 35 USC 135, copies a "claim which is the same as, or for the same or substantially the same subject matter as," the claim of an issued patent. Since the claim of the issued patent is not normally subject to change, the amendatory process is available only as to the patent applicant. Consequently, occasions arise wherein there is clearly a conflict of invention but no common count can be placed in both the application and the patent.

As the current statute implies, it is not essential in this applicant-patentee case for the applicant to "make" exactly a claim of the issued patent. In this respect, the statute codifies the decision in *ex parte Card and Card.*[27] In this case it was held that a patent applicant cannot avoid an interference with a patent "when the real invention claimed is the same." It was concluded that the patent applicant need not be able to introduce in his application a claim precisely like that of the issued patent, and that interference would be declared if the applicant introduced a claim "substantially the same" as that of the issued patent. In the period of over sixty years since *ex parte Card and Card,* a number of interferences have been declared upon the basis of the doctrine it enunciated, especially in the field of chemical patent applications.

The practice in applicant-patentee interferences was further liberalized and detailed by the Commissioner's Notice of April 5, 1954.[28] The notice sets forth a rather detailed analysis of possible situations that have arisen. These include the case where the application disclosure is more narrow than the claim of the patent (and hence does not permit the applicant to "make" the claim of the patent), the case where the application disclosure supports a claim broader than the patent claim (and the broader claim is required to enable the applicant to use priority proofs outside of the patent claim), and mixed cases. In the first instance, the interference is declared on the patent claim and the most nearly identical possible application claim is indicated as "corresponding substantially" to the count. In the second case, the applicant is required to copy the patent claim for the interference, he

[27] 1905 Commr. Decisions 383.

[28] Notice of April 5, 1954; *Manual of Patent Examining Procedure,* Section 1101.02.

may make a showing of the need to substitute a broader count, and the interference is redeclared with the broader count. In this instance an indication is made that the patent claim is to substantially the same subject matter as the application claim.

The event that precipitated the decision in *ex parte Card and Card* was the effort of a patent applicant to obtain a claim without interference proceedings. This is a relatively common occurrence. During the course of application proceedings, a recently issued patent is often cited as a reference. The patent applicant thereupon may continue to seek a claim differing from the claims of the reference patent, or may introduce such a claim. An affidavit may be filed under what is now Rule 131 setting forth alleged earlier dates of invention than the filing date of the patent. If the reference patent "does not claim the rejected invention," an affidavit of this kind overcomes the reference.[29] Where, as in *ex parte Card and Card,* the claim sought is directed to substantially the same subject matter, the affidavit is not effective and the claim is available only through interference proceedings.

Some recent decisions portend a possible relaxation of the standards in determining whether claims are substantially the same for purposes of Rule 131 affidavit. For example, in *In re Hidy et al.,*[30] the Court of Customs and Patent Appeals held that an eight step process claim reciting an anion exchange step was to the same invention as the claim sought, which was to a four step process and recited a cation exchange step. Decisions of this kind necessarily imply that interference proceedings will be established under *ex parte Card and Card* and the Commissioner's Notice and suggest that this practice may be further liberalized.

The *ex parte Card and Card* practice in applicant patent interferences has not been extended to applicant-applicant interferences. It has been reasoned that since both parties are applicants they can

[29] Patent Office Rule 131 is directed to affidavits of prior invention to overcome a publication or patent cited as a reference. The rule permits the filing of an affidavit showing invention prior to a domestic patent reference only where such patent "does not claim the rejected invention." The theory is that in this instance there is no occasion for interference because the patentee does not have a patent to the rejected invention. Therefore the applicant can dispose of the reference by showing that his own invention date precedes the Patent Office record date of the patentee. In the other case—where the patent claims the invention—the rule follows the theory that there is an interference. The applicant in this instance must demonstrate priority through *inter partes* interference proceedings. If the patent issued more than one year before the applicant claims the subject matter or substantially the subject matter of the patent, then neither interference nor affidavit under Rule 131 will overcome the reference.

[30] *In re* Hidy and Phillips, 133 USPQ 650 (CCPA 1963).

modify their claims as required to bring about a common count for interference. Normally it is possible for patent applicants to do just this, at least through the filing of continuation-in-part applications. The problem of the common count is to this extent less acute than in the applicant-patentee type of interference. But this is not always so.

A "range" problem illustrates the sort of difficulty that may occur. Suppose the senior applicant discloses a range of 20 to 29 and the junior applicant discloses 20 to 40. Suppose further that the best priority proofs of the junior applicant are in the range from 30 to 40. In theory, at least, the junior applicant should argue that the interference count should be for the 20 to 40 range and that if the senior applicant wishes to contest priority, he should file a continuation-in-part patent application disclosing the 20 to 40 range and thereby supporting such count. But if this question arises more than one year after a printed publication of the junior applicant's disclosure (e.g., by a technical paper), then the senior applicant may have a basis to insist that he cannot file a continuation-in-part presenting the broad claim.

A situation such as the above—involving an apparently insoluable dilemma—is very rare. But for every such instance there are many more cases where devising a common count, although possible, presents great difficulty. And every such instance generates or is likely to generate an intense controversy in which the rival applicants strive to advance their own interests while the examiner taxes his ingenuity in an effort to arrive at the necessary common count. Often the examiner is compelled to make a decision, especially as to patentability, with an overhanging possibility that determination one way may result in an ultimate reversal at a later date, with the need then to proceed with the interference or even to issue a patent without an interference that should have occurred and would have occurred had the ruling been otherwise.

A decision published a few years ago stirred hope that the applicant-patentee interference practice would be extended to applicant-applicant interferences. This decision, *Waldeck v. Lewis*,[31] also illustrates how—as a practical matter—the rigidities of the present practice may lead to problems which are theoretically avoidable but practically important. There, Lewis disclosed benzene and toluene in the claimed process. Waldeck disclosed benzene, toluene, and xylene in a Markush group for the same process. The count in the interference at the time of the ruling apparently encompassed only benzene

[31] 120 USPQ 88 (1955, published in 1959); See Note (1960) 28 *The George Washington Law Review* 462.

and toluene. In any event, a petition to the Commissioner by Waldeck sought interference on the full benzene, toluene, xylene Markush grouping. The petition was granted, thus suggesting that a similar procedure might be followed generally in applicant-applicant interferences.

The fact was that *Waldeck v. Lewis* involved a problem that could have been avoided. It is perfectly well settled that a "generic" count covering benzene, toluene, and xylene could be "made" by both parties without undue license with principle.[32] Such a count could have been framed. But the case went all the way to a petition to the Commissioner without any indication of consideration of such a count, and the extent of controversy, expense, and delay, was just as if no such count could be framed.

In any event, the promise of *Waldeck v. Lewis* was dissipated in subsequent Patent Office refusals to follow the practice seemingly indicated by the ruling.

For these various reasons, a strong case can be made for loosening the present rigid "count" concept, at least in applicant-applicant interferences. Indeed, it has been suggested that the difficulties in all interferences are so great, and the value of the "count" idea so limited, that the whole idea of counts should be discarded. But before even mild changes are made in this connection, consideration should be given to how the existing practice has come into being, the virtues of the practice, and the limitations of what can be accomplished by so-called reforms. And caution is even more strongly indicated when relatively radical steps, such as complete elimination of counts, are considered.

The key concept of the United States law is that interferences—not oppositions—shall take place in the Patent Office. The basic proposition is that where an applicant seeks to patent the same invention as that sought to be patented by another applicant (or already patented in a patent that is not a statutory bar), a determination of priority of invention should be made before issuance of patent to the applicant.

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[32] On possible "generic" expression might be "benzene having less than three methyl substituents," language that encompasses benzene, toluene (one methyl substituent), and all the xylenes (two methyl substituents). A leading case on generic counts in chemical application matters is Blodgett et al. v. Richter, 79 F (2d) 922 (CCPA 1935). In that case the expression used in a process claim for making paper pulp was treating "with an aqueous alkaline solution of a reactive compound of sulphur." Richter disclosed only a single "reactive compound of sulphur," namely, sodium sulphite. In a decision of February 9, 1933, under the practice then existing, the examiner of interferences held that in view of the prior art Richter was entitled to make the count. Subsequently, priority was awarded to Richter. The Court of Customs and Patent Appeals refused to reverse the Office decision to set up the interference.

Virtually every proposal to overcome the limitations of the count concept rests at least in some measure upon a departure from this interference concept in the direction of oppositions. This does not mean that such proposals are necessarily unsound for this reason, but it does mean that they should be considered for what they are, departures in principle from the prior concepts.

Let's consider the seemingly ultimate extreme of a complete substitution of the opposition concept for interferences. In this case it would not be necessary for the examiner to determine that an applicant is seeking to patent the same invention as that patented or sought to be patented by another. Rather, it would only be necessary for the examiner to conclude that the other applicant, or patentee—if first to invent what is sought to be claimed—stands as a bar to patentability. In such instance it would not matter that the rival inventor did not claim or show an intent to claim the subject matter—for the question would not be whether the rival wants a patent but rather whether his invention dates, if prior, would bar patentability. But if the intent or purpose of the rival is to be immaterial, why should it matter that the rival has a pending application or patent? Why shouldn't abandoned applications be used for oppositions for the same reasons? At the very least, a recourse to procedures of this kind would probably result in many more *inter partes* "opposition" proceedings than the current number of interference proceedings. Yet the common thought of all commentaries on interferences is that there should be fewer, not more, such proceedings.

To be sure, it is not necessary to move to the ultimate condition considered in the above paragraph. Proposals seriously made to date all seem to stop far short of this extreme. But the need for an arbitrary compromise with the logic should dictate a somewhat gingerly approach rather than any headlong discard of the idea that interferences, not oppositions, are appropriate.

This problem has an additional aspect. It should not be assumed that problems are cured just because a new test or a new standard is substituted for an admittedly troublesome existing test or standard. One of the common problems today is that of determining whether an applicant can "make" a particular claim for interference. One seemingly effective way to overcome the difficulty is to use "identity of invention" or "identity of inventive concept" as the test rather than whether a particular count can or cannot be "made" in a strict and literal sense. But is this a real step forward? Is the old problem overcome—or is just a new and equally difficult standard substituted?

Let's turn to an illustration. Some years ago there were a number

of related patent applications filed by one Prutton. Broad and sweeping lists of chemical compounds were stated to be useful in oil additives. One of these disclosures was involved in an appeal to the Court of Customs and Patent Appeals from an interference award of priority.[33] The award resulted when Prutton was not given the benefit of one of his earlier sweeping patent applications as a constructive reduction to practice. The case was decided on the issue whether the earlier Prutton application "supported" the count. But the question would have been equally difficult if the issue was whether Prutton disclosed the same inventive concept as the rival, whether the Prutton earlier application precluded a valid patent to the rival, or some other variation of the count concept.[34].

Critics of the strict count concept make a strong case that something should be done at least in applicant-applicant interferences. But it seems equally clear that a complete discard of the requirement demands either an all-out move to opposition principles or making some rather arbitrary compromise between theory and practice. Moreover, it is doubtful that such a change will reduce the number of difficult decisions nearly as much as initial consideration might suggest.

Perhaps the most constructive approach to the interference versus opposition problem would be to follow—in applicant-applicant interferences—essentially the procedure of the Commissioner's Order. And even in this instance there is much to be said for the same limitation as contemplated in that order—that departure from the "count" concept should occur only on a showing of genuine necessity.

V. RIGID FORMALITIES AND RULES (PRELIMINARY STATEMENTS)

Another frequent criticism of the interference practice is that it is too rigid and inflexible. In the preliminary statement, for example, the requirements of Rule 216 must be complied with as to content,

[33] Prutton v. Fuller, 230 F (2d) 459 (1956).

[34] In Prutton v. Fuller, *op. cit., supra,* note 33, the issue was whether the Prutton earlier disclosure provided a constructive reduction to practice to an interference count that recited "an oil-soluble magnesium sulfonate." The court examined the history of the Fuller application (from which the count came) to conclude that "the use of magnesium sulphonates in the claimed compositions, as distinguished from sulphonates of calcium or other metals is the essence of the invention recited by the counts." The court then considered Prutton's earlier disclosure, found long lists of possible detergents, including sulphonates of magnesium, calcium and other metals, but found no specific disclosure that singled out the magnesium sulphonates from the others. Without singling out the magnesium sulphonates the court concluded, the earlier application could not be a disclosure of an invention that resided in singling them out from the others. In this sort of case, which is common, the same inquiry would be required whether or not the idea of a formal count is used.

and the statement has the absolute effect of limiting the earliest date of proof as set forth in Rule 223. Indeed, the latter rule states that the party "will be strictly held in his proofs to the dates set forth." Moreover, the preliminary statement may be corrected only in "case of material error arising through inadvertence or mistake" and "upon a satisfactory showing that the correction is essential to the ends of justice." Rule 222 further makes it clear that once testimony is taken an effort to correct a preliminary statement is not likely to be successful.

A somewhat similar point can be made with respect to motion practice generally. The rules do not even provide for the filing of a late motion. And failure to bring a necessary motion to amend the count, challenge the disclosure of an opponent, or bring in another application, may cause loss of the interference. Why, the argument goes, should a party be so strictly required to follow formalities?

This problem results from step-by-step inflexible and highly formalized interference procedure. It stands in contrast to the relatively flexible procedure under the Federal Rules of Civil Procedure. Under the Federal Rules, interrogatories, depositions, and other steps are not generally subject to specific deadlines but rather are controlled largely by discretionary rulings by the district judge.

The Federal Rules, however, cannot be simply substituted for the present interference rules. Indeed, the experience of other agencies hardly suggests that the rules are of such general utility. Proceedings before the Tax Court, the Federal Trade Commission, and other agencies are all based on rules that depart substantially from the Federal Rules.

One departure from the Federal Rules approach is dictated by the particular nature of an interference as a controversy involving the public as well as the parties. The most certain way to assure adequate concern for the rights of the public is by rules. The most uncertain way to reflect public interests is by *ad hoc* decisions in those particular issues that the parties happen to raise in their own self-interest.

The preliminary statement requirement is an example. Elimination of preliminary statements and the substitution of interrogatories at the pleasure of the parties would be in keeping with the principle of the Federal Rules. But in any given case the parties might or might not propound the key questions respecting claimed dates of invention. There is virtual unanimity among those experienced in interferences that preliminary statements are desirable. They lead to early termination of many interferences. In addition they often shorten required proofs and narrow issues to be contested. If this belief is well-founded,

preliminary statements should continue to be required in every interference.

This does not mean, of course, that the present preliminary statement practice is the optimum, or even that experiments directed to modifications should not be pursued. But it does indicate that the solution does not reside in a simple recourse to the unguided and wholly elective discovery procedures of the Federal Rules.

Motions to amend under Rule 233 and, more clearly, motions to include another application under Rule 234 illustrate another instance where apparently rigid formalities have an important place. Under the present practice, even a senior party may be under an obligation to bring a motion to amend or to include another application, or suffer the risk of estoppel. In the leading case of *Avery v. Chase*[35] it was held that such estoppel is not confined to strict *res judicata* principles. Rule changes have narrowed the extent of the estoppel. But it remains clear that failure to bring a proper motion may foreclose a priority claim in a later interference. But is this bad? How many interferences should be forced upon a party? Is it not desirable in the public interest, at least, to bring out all issues and resolve them when the parties first come face-to-face? Is this not a doctrine—like the more narrow doctrine of *res judicata*—that achieves equity in a great many more cases than the number in which equity is denied?

Critics of the present interference practice make a stronger case, however, when they focus on the rigidities of the current step-by-step procedure. This procedure leaves minimum room for discretionary determination of the order of making decisions. Under the present practice, for example, a motion to dissolve on the ground that the opponent cannot make the count almost always entails the filing of briefs, oral argument, and formal decision by the examiner. Frequently there is a petition to reconsider and modify the decision and a petition to the Commissioner from the ruling of the examiner. There

[35] 101 F (2d) 205 (1939). The majority opinion in this case proceeds on the basis that the Patent Office rule providing that an applicant in an interference "may" bring motion to have interference declared on another application owned by him was compulsory in the sense that a failure to bring in such application precluded a later interference on that issue even if the Patent Office was willing to declare the same. The majority rejected International Cellucotton v. Coe, 85 F (2d) 869 (1936), which had held that estoppel arose only to the extent dictated by the more narrow doctrine of *res judicata*. Subsequently, the Patent Office changed the rule, to provide that motion may be brought only where the additional application discloses subject matter common to the interfereing applications, or application and patent. See present rule 234. This greatly narrowed the scope of the rule and hence the extent that the "rule 109" estoppel applied. See *ex parte* Thomas, 94 USPQ 398 (1952) and Note (1953), 21 *The George Washington Law Review*, 503.

have been cases where steps of this kind have occupied well over a year and have required elaborate briefing and other activity. And so long as the motion is proper on its face, proceedings are suspended and the whole sequence of decisions must be followed.

In the case of some motions, for example, motions under Rule 235 relating to burden of proof, it is the practice to defer consideration until final hearing as provided by Rule 236 (*b*). But even here the procedure rests largely on general policy based upon the content of the motion document on its face rather than a specific consideration of the advantages and disadvantages of deferral in the particular interference.

While the problems associated with the current rather rigid step-by-step procedure may not be as great as has been urged by some, the case for some relaxation is strong. The advantages to be gained appear especially marked if a change to the trial examiner system is made, since then a specific individual may be charged with responsibility for determining the interference as a whole.

VI. INTERFERENCE TRIAL AND TESTIMONY

Relatively few interferences go to testimony. Trial procedure is accordingly rather unimportant in terms of average effect on all interferences. But the interferences involved in testimony tend to be the most important interferences. And when specific cases are considered—especially some of the horrible examples—it becomes evident that trial and testimony procedure is an important consideration.

Present testimony practice is based on strict rules in some respects and few rules in other respects. Rules 251 to 253 and 271 and 286 set forth many formalities—including the admonition that "the established rules of evidence . . . will be applied strictly by the Office" (Rule 286). But if issues arise under 35 USC 24 pertaining to the production of documents or compelling a witness to answer specified questions the provisions of the Federal Rules apply. In such instances rulings are made by district judges in fashion generally similar to like controversies arising in court proceedings.

As a practical matter interference testimony is taken more or less informally. Questions are propounded, objections are made, and answers are given (or not given) without direct control by the Patent Office and only rarely with any judicial control. The Patent Office ends up with a record of testimony largely composed of what one party seeks and the other does not oppose. The Board of Interferences, and perhaps the Court of Customs and Patent Appeals, must then arrive at a conclusion from the record that one party or the other is entitled

to award of priority. And in reaching this conclusion it may be necessary to conclude that one party or the other is not to be believed.

For the most part, litigants in interference controversies follow the principle of laying the facts on the table. Usually a threat of resort to 35 USC 24 results in obtaining the evidence desired by a party. But the inconvenience of obtaining a court ruling results in occasions where the evidence is not completely obtained. Perhaps more important, the inability of the Board of Interference Examiners to ask questions may result in a key question never being asked and never being answered.

These limitations of the present interference testimony practice account at least in part for the rigid rule of corroboration. Under the present practice it is necessary to have corroborating testimony—even in the case of a joint inventor—for each and every step sought to be proven.[36] Thus the inventor must have a corroborated conception, corroborated reduction to practice, and corroborated diligence to the extent that he seeks to prove any conception, any reduction to practice and any diligence. The most persuasive argument in support of the strict corroboration requirement is that interference decision is made solely on a deposition record.

The present testimony practice also provides support for the present dual review procedures. It is always possible for an interferent to insist that review be had by trial *de novo* through bill in equity in the United States District Court. A major justification for such review is that a party should, in some measure, have the opportunity for a decision by a tribunal that has heard his witnesses.

A possible improvement could be attained by following the trial examiner system, which is now used by most other administrative agencies. Generally, the hearing examiner is charged with the duty of supervising the taking of testimony, including rulings on evidence and posing questions himself when considered necessary. He also has the duty of preparing some form of initial decision. Generally, the trial examiner travels about the country to take evidence at places and times most convenient to the parties. In most instances trial examiners are assigned cases on some systematic basis.

The trial examiner system is not a cure-all. But it does offer at least the following features not available with present procedure:

1. Initial decision on the facts made by a person who has heard the witnesses and can draw conclusions on credibility upon the basis of direct observation.

2. Testimony subject at all times to the supervision of the person

[36] See, e.g., Kear v. Roder, 115 F (2d) 810 (CCPA, 1940).

who will make at least initial decision and who can give prompt rulings on evidence and can ask questions as necessary to supplement the interrogation by the parties.

3. A basis not available with present practice to streamline review proceedings by limiting the same to appellate court type of review on the record made before the trial examiner.

4. A convenient way to provide for pre-trial conferences in which the testimony procedure can be worked out on an *ad hoc* basis without recourse to assigned periods unrelated to the particular interference testimony needs.

5. A way to place motion procedure on a discretionary basis with rulings by the person most familiar with the advantages and disadvantages in the particular interference of making rulings on the motions first or, in the alternative, proceeding with priority decision first.

Because of these various probable advantages, the trial examiner system warrants careful consideration as one way to overcome some of the present interference practice problems.

VII. INTERFERENCE DELAY

The Manual of Patent Examining Procedure cautions the examiners that an "interference is often an expensive and time-consuming proceeding."[37] Even in terms of "average" proceedings, the delay is significant. For example, the average for 1939-1940 interferences was about three months in the preliminary statement period, about eight months in the motion period (including time required for ruling on motions) and about thirteen months in the testimony and final hearing stage. An "average" interference going to final hearing, therefore, entailed a delay of about two years in this period.[38]

The significance of interference delays becomes far greater, however, when attention is directed to the extreme cases. There have been many instances of patent applications which have remained pending in excess of a decade, with interferences contributing a major part of the delay. The *Jorgensen et al.* patent of 1955[39] and the prednisone and prednisolone interferences,[40] both referred to above are illustrations. Other cases can be cited.[41]

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[37] Paragraph 1101.

[38] Hearings, *American Patent System, op. cit., supra,* note 21.

[39] *Idem.*

[40] See decision in Korman v. Nobile, *op. cit., supra,* note 22.

[41] Some additional instances of prolonged delay include Gulick patent 1,815,733, 14 years pendency (involved in Schriber-Schroth v. Cleveland Trust Company, 305 U.S. 47 (1938); Etten patent 2,755,653, 21 years pendency (involved in a number

Significant reduction of interference delay doubtless will require tightening all along the line. In addition, statistically present opportunities to prevail in the interference must be foreclosed in at least some measure. For example, the presently available review of interference decisions by bill in equity has resulted in numerous reversals of Patent Office decisions. These cases—because of the late date of the final decisions—account for a great many of the instances of unduly prolonged patent application periods today. Whatever the merits of this form of review, and whatever the proportion of reversals of Patent Office decisions, the extremely long patent application delays that often occur appear to outweigh the justice achieved. In this instance, at least, the dictate of expediency ought to prevail over the statistical chance of greater justice.

Fortunately, review by trial *de novo* on bill in equity is not the only way to assure sound decisions. The trial examiner system, discussed above, would seem to offer most of the advantages of court trial with a judge presiding, and ought to be accompanied by a great time saving as compared to those interferences that now end up in a trial *de novo*.

Another way to minimize the problem of delayed patent issuance is to issue all interfering patent applications at an early date with an indication that certain claims are subject to interference. While this suggestion usually evokes the reaction that it is both radical and inequitable, a case may be made that it is neither.

As to being radical, the issuance of all interfering patent applications is similar to rather than different from what happens in many interferences today. All applicant-patentee interferences involve an issued patent. It is subject to the interference decision just as much as an application issued subject to an interference would be. The Patent Office also now issues the patent to the party adjudged to have priority when a bill in equity is filed—again resulting in a patent issued subject to interference.[42] Indeed, because of this practice, an interference involved in a bill in equity in court normally entails at least one issued patent. A procedure for issuing all applications, subject to the interference, at a rather early date may be looked upon as an enlargement of the existing practice rather than an innovation contrary to such practice.

As to being inequitable, the issuance of all interfering patent applications is hardly less equitable than the current practice in the many cases

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of judicial decisions, including Etten v. Lovell, 83 Fed. Supp. 178 (W.D.Pa., 1949); and Kronmiller patent 2,475,430, 13 years pendency (see Minneapolis-Honeywell v. Milwaukee Gas Specialty, 174 F (2d) 203 (7th Cir. 1949).

[42] *Manual of Patent Examining Procedure*, Para. 1109.

involving applicant-patentee interferences or interferences involved in bill in equity. The point is quite properly made that a patent involved in an interference is not likely to be of much value in bringing infringements to an end. But this looks only to one aspect of the matter. Once a patent has issued, damages for infringement can be recovered even if actual suit is stayed until interference decision. It is even conceivable that in some instances a court might award temporary relief to the patentee. In many instances, at least, the terminal part of the patent term is of limited commercial importance. A right to collect damages for infringement at an earlier time might well more than offset the loss of a more extended term. At least it is not obvious that in all cases issuance of interfering applications subject to the interference decision will result in loss to the applicants.

The case for patent issuance subject to interference decision does not appear so strong that such issuance should occur immediately upon declaration of interference. Preliminary statements often result in prompt conclusion of the interference. Issuance of patents on applications prior to that time offers little reduction in the application time and would seem to complicate proceedings unnecessarily.[43] The same may be said as to the opportunity of each applicant to study the opposing applications and bring necessary motions. If patent applications are frozen prior to such opportunity, applicants are deprived of an important way to strengthen their applications. Data indicate that motion period proceedings under the present practice occupy an average of about eight months.[44] Doubtless this time can be shortened or other steps taken to assure that applicants can study the opposing applications and bring motions before patent issuance takes place.

Most importantly, the problem of prolonged patent application periods resulting from interference delay is amenable to corrective action. Such action—although it must perhaps foreclose some rights currently available to applicants—does not necessarily entail uncompensated disadvantages to the applicants.

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Many problems, difficulties, and inequities can be attributed to the Patent Office interference practice and procedure. And there are as many proposal for "improvement" as there are commentators on the practice. They range from adherence to the present practice to a com-

[43] Hearings, *American Patent System, op. cit., supra,* note 21, p. 290 (indicating that in the 1939-1940 period preliminary statement periods averaged about three months).

[44] *Idem.*

plete abolition of interferences.[45] Fundamentally the problem is one of perspective. To insist that nothing can be done and that changes should not be considered seems out of keeping with the vital importance of the interference practice as well as a fair assessment of the possibilities. But it is equally unsound to suggest wholesale discard of current practice, especially when undesired and unanticipated adverse results may well take place. There is a strong case to be made for improvement, but this is not equivalent to a strong case for change. In many respects the experience with the present practice and the experiences with other administrative procedure point the way to constructive change that would have minimum prospect of adverse results. Such change warrants favorable consideration, and current activity in interference "reform" is a healthy movement towards that end.

[45] For a recent suggestion that a fixed priority date, such as the application date, be substituted for the present practice, thus eliminating interferences, see Dienner, "Simplifying the Examination of U.S. Patent Applications," *Journal of the Patent Office Society*, Vol. 45, No. 7 (1963), p. 79.

The Upgrading Of Patented Inventions and Their Use Here and Abroad

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This is the conclusion of the report published in the Spring 1963 issue (Volume 7, Number 1) of the Journal on "The Upgrading of Patented Inventions and Their Use Here and Abroad." The summary preceding that report is reprinted below for the convenience of our readers who may not have ready access to the previous number.

SUMMARY

MOST COUNTRIES, UNLIKE THE UNITED STATES AND CANADA, require annual payment of renewal fees to keep patents in force within the maximum period allowed by law. Analysis of these statistics adds new insights regarding the economic role of patented inventions.

The rates with which patents are allowed to lapse are surprisingly uniform for different countries despite the wide variation in the renewal fees charged. This indifference in the rate of abandonment of patents to the markedly different amounts of renewal fees imposed by different countries suggests strongly that if not all, the overwhelming majority of patented inventions kept in force through the fifth year by payment of one or more renewal fees are revenue producing inventions.

To the extent that this inference is correct, the percentage of patents remaining in force through the fifth year, should be qualitatively roughly comparable with the proportion of the United States patents reported in current or past use, and those licensed, even though not reported in commercial use.

Such a cross-comparison not only strengthens our confidence in the

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findings of the number of patented inventions utilized commercially in the United States, but also tends to corroborate other evidence that the utilization rate derived from the Patent Utilization Study probably errs on the side of being conservative.

These cross analyses strengthen our confidence in the findings regarding the economic importance of patented inventions for all industrial nations.

Through parallel reasoning one might infer, and therefore, look for corroborating evidence of relationships revealed by these foreign patent statistics regarding parallel relationships in the United States patents where such information cannot be obtained directly. The most important relationship of this sort found is the progressive upgrading of inventions that are patented throughout this century.

From our cross analyses we are led to conclude:

1. That in the United States the revenue producing patented inventions at this time probably exceed 60 percent.

2. That the percentage of such patents might be almost as high and possibly higher in Germany, and not much lower for Sweden and Great Britain.

3. That the level of this percentage depends in part on the initial selectivity of patentable inventions prescribed by patent laws of different countries.

4. That there has been in most countries, including the United States, a progressive upgrading of the quality of inventions that are patented. This trend is characteristic of patented inventions at least during the 20th century.

5. That despite the apparent acceleration of new inventions many inventions put to commercial use remain in use for many decades, and some indefinitely.

This interim report also brings together for wider use all the available patent statistics on the survival rate of patented inventions and interrelationships between annual number of inventions patented and their survival rate through the payment of annual renewal fees.

GERMANY

Legal Provisions

The patent law for Imperial Germany was enacted in 1877. How-

ever, in 1891 the act was radically modified. We have, therefore, confined our statistics to patents issued since 1891. Since that date the changes in the German patent laws have not been radical. The German patent law in force since 1891 requires relatively exacting criteria for patentability implemented by examination with respect to novelty, invention and utility of the alleged invention. All patent applications which satisfy these criteria are then published for opposition. In Germany as well as in England and most other countries, unlike in the United States and Canada, prior publication or use of the invention generally disqualifies it for patenting.[51] The novelty search is not confined to prior German patents but extends to the patents and publications of all countries.[52]

The fee at the time of filing the application is 50 marks. If the application meets the criteria for patented inventions and is published for opposition the fee for this is 60 marks or a total of 110 marks with an exchange value of $26.

Once the patent is granted it is subject to the payment of annual renewal fees to remain in force. Prior to 1936 the first renewal fee became payable one day after the first anniversary of filing—if the patent had been granted by that time. However, since 1936 the law was amended so that the first renewal fee falls due one day after the third anniversary of the filing date, if by that time the patent has been granted. The current annual renewal fees in German marks are as follows:

Year after Filing	Fee in Marks	Year after Filing	Fee in Marks	Year after Filing	Fee in Marks
3rd	50	9th	325	15th	1,175
4th	50	10th	400	16th	1,350
5th	80	11th	525	17th	1,525
6th	125	12th	675	18th	1,700
7th	175	13th	825		
8th	250	14th	1,000		

For a patent which is kept in force for the maximum duration

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[51]In the United States an invention even though put to use is patentable if the duration of such prior use does not exceed one year. In Canada this period is two years. Years ago it used to be two years in the United States too.

[52]Perhaps because of higher initial costs in patenting or other reasons not well understood there is more intensive prior searching by inventors or their patent attorneys in the United States than anywhere else, including Germany. See Federico, P. J., *supra*, note 2.

allowed under the law the renewal payments would amount to 10,230 marks, or according to official exchange value $2,435. If one were to add to this the payments for filing and publication fees the total would amount to 10,340 marks, or $2,461.

Normally, the payment of the renewal fee, once the patent is granted, becomes due two months after each anniversary (since 1936 after the third). However, if the patent is not granted by the time the first renewal fee becomes due after filing, it falls due two months following the granting of the patent. The fee, if not paid when it falls due, could be paid one month later, following an official notice from the Patent Office, with a fine of 10 percent for this delay. The patent lapses if the fee is not paid at this time. However, under certain circumstances a lapsed patent may be reinstated, these practices of allowing patentees to pay later must have become very frequent in the war years. When a patent lapses for non-payment of a renewal fee, notice of it is published in the official organ of the Patent Office, the *Patent Blatt.*

Payment of fees for the first six years, that is the filing and publication fees and the first four or three annual renewal fees may be differed or suspended for indigent patentees.[53] Such a patentee might even claim reimbursement of the costs of preparing drawings, models, etc., and reduction in the costs of patent litigation, if one occurs. It would be of interest to ascertain to what extent this and certain other inducements to needy inventors are taken advantage of by patentees, and how much these provisions enhance German patenting.[54]

The German Patent Office is given wide discretionary authority to withhold sending the notice of payment of renewal fees due in the case of patentees who are unable to pay or who request postponement. Deferment of payment of renewal fees may also be arranged on specific request after the notification for payment by the Patent Office has been sent out. The Office can arrange the payment of renewal fees on installment basis in cases of hardship.

Also since 1936 amendments, the employers are required by law to reward appropriately their employees for successfully patented inven-

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[53]This perhaps contributes to the relatively high proportion of German patents surviving through the fifth year as we saw in Table 1. And as might be seen in Table 9 which follows.

[54]Germany has one of the highest per capita patenting, see Federico, P. J., *supra,* note 2, pp. 154-55.

tions. This law which was passed by the Nazis was retained by West German Republic.[55] There are a number of other provisions in the law designed to protect and reward the inventor. For instance one of the amendments requires the assignee corporation to put the name or names of inventor on the letter patent. Another amendment allows a defrauded inventor to predate his patent application to the date used by the fraudulent applicant.[56] As we said, no information is available to us as to how frequently these inducements are used, and what, if any, stimulating effect they have had on German inventing for patents.

There are provisions in the German law by which the Patent Office can revoke a patent or require its compulsory licensing if the invention is not being exploited in Germany. Thus, the German Patent Office has much wider discretionary powers than the Patent Office in the United States.

Originally the maximum duration that a patent could be kept in force was 15 years. In 1923 this was amended to a maximum of 18 years. However, since the time begins to run the day after the patent is filed—that is, sometimes years before the patent is actually granted, the effective maximum is for an appreciably shorter period of time. One of the recommended amendments in 1932 was to start counting the lapse of time to determine the life of a patent from the date of publication instead of the date of filing. This provision was abandoned, however, in 1936 amendments.[57]

GERMAN PATENT STATISTICS

German patent statistics are published annually in the official publication in considerable detail.[58] Annual statistics are available from

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[55]These amendments customarily associated with the Nazi Regime were recommended as early as 1913 but were frustrated by World War I. In 1932 they were again recommended to the German parliament, but their enactment did not take place until 1936. Vojáček, J. I., *supra,* note 37, pp. 146-150.

[56]Since Germany does not have regular interference procedures as we have in the United States, normally the individual who files first an application for a valid invention is granted the patent. Similar provisions are common for most other countries.

[57]For these provisions of the German law, see Howard, F. A., "Patents and Technical Progress," *PTC J. Res. & Ed.,* Vol. 4, Conference Number, 1960, pp. 57-66. More specifically Vojáček, J. I., *supra,* note 37. Also Federico, P. J., *supra,* notes 2 and 33.

[58]Annual issues of *Blatt für Patent—Muster—und Zeichenwesen,* 1928 to-date. A table showing the annual number of applications resulting in patents and their survival rate may be obtained from the Foundation.

1891-1945 and 1948-1960. Survival of patent statistics are not available for patents filed for in the years 1944 to 1950, and there are some gaps in the renewal statistics for patents filed in 1951-53. The German Patent Office closed early in 1945. Local offices were opened in Darmstadt and Berlin near the end of 1948 merely to accept the filing of applications. The Patent Office, as such, was formally opened in Munich in 1950, but examination of the applications filed up to January 1, 1952, was dispensed with, although oppositions were entertained. Formal examination procedures were not instituted until in 1952. Therefore, such statistics as there are for these intervening years are essentially applications, perhaps much of it filed by foreigners. These limitations in the basic data can not be overcome merely by fitting an empirical formula to the observations and extrapolating or interpolating, as the case might be, as a substitute for missing data—yet that is what Dernburg and Gharrity have done.[59]

Annual statistics show a slow progressive increase in the number of patents issued by Germany between 1891 and 1938, just prior to World War II. Such statistics as we have after World War II give no indication of any sharp decline in the numbers, despite the fact that West Germany since World War II has only about three-fourths of its former population. The sharp decline in applications resulting in patents after 1956 reflects largely the time lag between the filing and publication date of the patent and the time when the patent is finally granted.[60]

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[59]*Supra,* note 39.

[60]The corresponding statistics reported in the 1961 volume show consistently lower numbers as may be seen for applications filed from 1948 through 1960, respectively. The first figure is supplied in the 1962 volume and the second in 1961.
1962—13,483; 22,033; 30,205; 27,995; 18,385; 17,956; 17,630; 16,346; 15,217; 12,657.
1961—13,456; 21,963; 30,074; 27,816; 17,917; 17,252; 16,561; 14,781; 12,809; 9,503.
1962—16,346; 15,217; 12,657; 9,994; 5,249; 742.
1961—14,781; 12,809; 9,503; 5,738; 1,030; 3.

This consistent discrepancy would indicate that in the post-war period in Germany perhaps only about a third of the patents applied for are issued within the first three years and possibly only about 50 percent within five years, and some patent applications might be delayed for as much as 12 to 13 years before granting. See *Blatt für Patent—Muster—und Zeichenwesen,* 63, Jargang, No. 3, 1961, p. 95 and 64th year, No. 3, 1962, p. 92. This phenomenon by itself could account for the very high survival rates of German patents if similar delay occurred prior to World War II.

In the first decade the model number of patents issued is 5 to 6 thousand, in the decade 1901-10 it is 10 to 11 thousand. During the third decade the averages drop sharply as a result of World War I, and the sharp increase in 1920 is a reaction from this drop. In the fourth decade the model number is 18,000 to 19,000, with some backsliding in the decade starting with 1931. In the forties the figures are completely distorted by World War II so that nothing can be concluded from these statistics, while in the fifties the limited evidence suggests a level not too far below that experienced in the twenties, despite the reduced population as a result of dismemberment of Germany into East and West.

Except for the war and postwar years, during which there are sharp valleys and peaks attributable to mobilization, demobilization, and destruction resulting from World War II, the one outstanding peak in the number of patents issued by year of filing occurs in 1934. It is possible that the Nazi regime, plus the anticipation of special privileges for employed inventors about to be incorporated into the law accounts for this sharp increase. However, the sharp drop in the survival rate of these patents shows the futility of this approach if we are correct in our inference as to the cause and effect relationship for this numerical increase. The annual fluctuations and the general increase in the number of patents issued may be seen in Charts IV and V in the Conference Number of the Foundation's *Journal.*[61]

The percentages showing the annual survival rate of patents, indicate a gradual upward shift mostly limited between early and late 1890's. A sharp increase occurred with World War I, by 1918 the percentage surviving through the second year was nearly all of those granted. It is probable that part of this increase was the result of a real upgrading by the exclusion of less significant inventions from being patented and perhaps some of it as a result of increasing administrative backlogs.

The survival rate in percentages for the first and second decade show more perceptible increases. Again the influence of World War I to accelerate this ascent markedly is apparent. After World War I these survival rates decline somewhat, but they remain far above the levels prevailing before World War I. Prior to World War II, by

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[61]Sanders, B. S., *PTC J. Res. & Ed.,* Vol. 6, Conference Number, 1962, pp. 150-151.

about 1933, (except for applications filed in 1934 as we have observed) these percentages begin to climb again, and as we have noted, no data are available for the war years. After World War II these percentages have not declined markedly they are at a somewhat higher level than the decade in which World War II began. It is also possible that in some measure the progressive increase in survival after World War II could also be attributed to administrative delays in granting the patent.[62]

The survival rates for fifth and sixth year like that of third and fourth show progressive increase. This increase is very much accelerated by war, but after World War I the decline in percentages is limited to two or three years. In the mid twenties the percentages surviving are almost as high as in the war years. There is some decline as 1930 is approached, but this trend is reversed by 1931 and the climb continues. The levels of survival have remained high after World War II as far as we have any clues.

The course indicated for changes in survival rates for the fifth and sixth year is more or less characteristic of percentages reflecting increased survival rates for later years. This similarity would suggest that the progressive increase in survival rate through fifth and sixth year and beyond must be largely genuine and could not be attributable to any large increase in administrative backlogs[63] or to administrative leniency with respect to payment in renewal fees, except perhaps during the war years.

A comparison of the year to year variation between number of patents applied for and their survival rate indicates what we found with respect to British patents, that wherever there is a sharp drop in the number of patents granted, the percentage of these patents surviving is higher than for neighboring years. For years in which there is a sharp increase, this is usually associated with a decrease in the survival rates from this cohort of patents. In other words a sharp increase in the number of patents applied for in a given year that are granted usually results in qualitative decline, conversely a sharp decline in the number of patents applied for in a given year that are granted results in an upgrading in quality.

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[62]See note 60 and the text on p. 60, *PTC J. Res. & Ed.*, Vol. 7, No. 1 (Spring 1963).

[63]Except when such backlogs bring about a genuine upgrading in the patents that are eventually granted.

This inverse relationship may be seen from Charts IV and V, referred to earlier.[64]

Table 9 shows the percentages of patents surviving for specified years, from decade to decade for all patents granted from those applied for in a specific year and those patents which have survived through the fifth year.

The mean percentage rate of survival for all patents from decade to decade shows an upward trend for all cells except for three. Two of these are the second and third year survival rates of patents issued in the decade 1931-40, these exceptions disappear if we exclude from the total the patents applied for in 1934. We have already called attention to the highly atypical nature of the number of patents applied for in 1934, and the unusually low survival rates of these patents. The third exception is the 11th year survival of patents applied for in 1951-60 compared with those in the decade 1931-40 (no information is available for 1941-50). This reversal could easily be accounted for as a chance variation, since it is based only on 1951 experience when postwar patent examination plans were being reinstated gradually following the closing of the German Patent Office and associated disorganization occurring after World War II.

The decade to decade increase in the mean survival rate of patents which had survived at least five years is less regular, nevertheless, the prevailing pattern is an upward trend. There has been, therefore, a general upgrading of German patents at least up to the beginning of World War II. Beginning with late thirties, as a result of the war and eventual closing of the German Patent Office for a number of years, the conclusion would have to be more guarded—but on the whole one is led to infer that the trend has not been reversed—even though there is no overwhelming evidence that further upgrading is continuing.

Table 10 shows the mean years patents applied for in a specified year remain in force. Besides annual averages, decimal averages are also shown. To enable one to discern trend in survival rates for recent years the mean durations for shorter periods of time in addition to 18 and 15 years, which coincide with the maximum period of protection, have also been computed. These are thus average years in force prior to expiration, i.e., up to a maximum of five years, eight years, and ten years, respectively.

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[64]See note 61.

TABLE 9

MEAN PERCENTAGE OF GERMAN PATENTS FILED IN A GIVEN YEAR SURVIVING THROUGH SPECIFIED YEAR AND PERCENTAGE OF THOSE SURVIVING THROUGH THE FIFTH YEAR SURVIVING SPECIFIED YEARS BEYOND THE FIFTH, GROUPED IN DECADES, 1891-1960.[1]

Year of Application	Percentage of Survival at Specified Years after Application																Terminal Year
	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1891-1900	81.8	55.6	39.6	29.3	22.7	18.1	14.8	12.1	10.0	8.3	6.8	5.8	4.7	4.1	....	....	....	1905-14
1891-1900	....	....	....	100.0	77.6	61.7	52.7	41.2	34.0	28.4	23.4	19.8	16.1	14.0	....	....	....	1905-14
1901-1910	84.6	63.1	46.3	34.1	26.1	20.9	17.3	14.6	12.5	10.4	8.7	7.4	5.9	4.4	3.6	2.6	1.8	1915-27
1901-1910	....	....	....	100.0	76.4	61.1	50.7	42.8	36.6	30.5	25.6	21.7	17.4	12.8	10.4	7.6	5.3	1915-27
1911-1920	91.9	78.4	67.3	56.3	45.7	36.5	27.9	21.3	16.8	13.3	10.5	8.1	6.3	5.0	4.0	3.6	2.9	1928-37
1911-1920	....	....	....	100.0	81.2	64.9	49.5	37.8	29.8	23.7	18.7	14.4	11.2	8.9	7.2	6.4	5.1	1928-37
1921-1930	98.9	91.3	78.5	63.7	50.8	40.5	32.4	26.3	21.3	17.6	14.7	12.8	11.4	9.4	7.9	6.6	9.7	1938-47
1921-1930	....	....	....	100.0	79.8	63.5	50.8	41.3	33.4	27.6	23.0	20.0	17.9	14.8	12.3	10.5	15.7	1938-47
1931-1940	93.5	90.4	84.5	76.5	67.4	57.7	48.5	39.8	32.6	31.4	26.7	22.3	....	....	....	....	....	1948-57
1931-1940	....	....	....	100.0	90.0	79.3	69.1	59.2	50.8	44.2	38.7	33.6	....	....	....	....	....	1948-57
1931-1940[2]	99.6	96.3	90.2	81.9	72.7	62.8	53.1	43.4	34.9	31.4	26.7	22.3	....	....	....	....	....	1948-57
1931-1940[2]	....	....	....	100.0	90.3	79.9	69.5	58.8	49.1	44.2	38.7	33.6	....	....	....	....	....	1948-57
1951-1960	99.9	99.1	94.9	88.4	79.2	68.8	58.2	48.4	39.0	29.8	....	....	....	....	....	....	....	1968-77
1951-1960	....	....	....	100.0	89.8	78.5	67.0	56.4	46.6	37.7	....	....	....	....	....	....	....	1968-77

[1]Data compiled from annual issues of *Blatt fur Patent—Muster und Zeichenwesen*. The statistical information is generally given in the March issue, No. 3 of this official publication. Pre-World War II data were derived from volumes 34, 1928 to 50, 1944. The German Patent Office closed in 1945 and did not reopen and resume its full operation until 1952. Postwar statistics are from the 64th volume of the same publication, 1962, p. 95.

[2]1931-1940 exclusive of 1934.

The examination of mean life of all patents surviving up to five years as the maximum shows in general a progressive increase, this general pattern can be seen from the increasing mean survival for each decade. Again for the decade 1931-1940 we have shown two separate averages, one including 1934 and the other excluding it. The general upward trend is also apparent for all the other averages.

SWITZERLAND

The first patent law in Switzerland was promulgated in 1888 after much opposition, since patents were regarded as privileges contrary to democratic ideas and ideals. In Switzerland patent application is examined as to novelty but there is no opposition proceedings. By and large the requirements for patenting are comparatively much less stringent than in the United States, Germany or even in Great Britain. According to Jan Vojáćek Ing.

> ". . . objections as to patentability, apart from those pertaining only to the form of the application, occur from time to time in Switzerland . . . , but so rarely that these must be considered exceptional cases."[65]

Renewal fees are charged from the second year. The maximum life of the patent is now 18 years from the time of filing. Prior to 1941 the maximum period allowed was 15 years. Data with respect to patent survival available beyond 15 years was so limited, however, that we saw no point showing it for a few years. Therefore, our tabular data are limited to 15 years. As it was observed before, however, when the life of the patent was extended to 18 years the survival percentages previously characteristic of the 15th year became characteristic of the 18th year. Thus, the mean survival percentage for the preceding full decade for which survival information is available (patents applied for in 1918-1927) is 7.9, 6.8 and 4.6 percent for the 13th, 14th and 15th year respectively. The averages available for a few years show 9.0, 6.7 and 4.6 percent for 16th, 17th and 18th year, respectively.

The filing fee is 60 Swiss francs—equivalent to about $14. Indigent inventors receive special consideration with respect to the first three annual renewal fees. And there is generally a three months grace period. There are also provisions for reinstating lapsed patents. The aggregate annual renewal payments for the maximum period is 2,530 francs equivalent to $589. The total cost including the filing fee is

[65]Vojáćek, J. I., *supra,* note 41. Until 1907 in Switzerland process patents were not granted, only those inventions could be patented which could be represented by a model. This excluded all the chemical inventions. For improvement of textile fibers this restriction against process patents continued until the 1930's.

TABLE 10

MEAN YEARS OF LIFE OF GERMAN PRINCIPAL PATENTS THROUGH THE 5TH, 8TH, 10TH, 15TH, AND 18TH YEAR FROM THE TIME OF APPLICATION, 1891-1957.[1]

Year of Application	Terminal Year	All Patents Maximum					Year of Application	Terminal Year	All Patents Maximum				
		5 Yr.	8 Yr.	10 Yr.	15 Yr.	18 Yr.			5 Yr.	8 Yr.	10 Yr.	15 Yr.	18 Yr.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1891	1905	2.80	3.26	3.46	3.73	-----	1921	1938	3.65	4.61	5.00	5.89	5.99
1892	1906	2.92	3.44	3.66	3.95	-----	1922	1939	4.06	5.11	5.54	5.97	6.11
1893	1907	2.93	3.48	3.71	4.00	-----	1923	1940	4.12	5.34	5.78	6.31	6.50
1894	1908	3.01	3.56	3.78	4.07	-----	1924	1941	4.26	5.63	6.04	6.65	6.92
1895	1909	3.06	3.63	3.85	4.16	-----	1925	1942	4.40	5.77	6.22	6.85	7.16
1896	1910	3.15	3.73	3.95	4.24	-----	1926	1943	4.58	5.96	6.42	7.03	7.40
1897	1911	3.19	3.76	4.00	4.33	-----	1927	1944	4.49	5.83	6.33	7.03	-----
1898	1912	3.19	3.76	3.99	4.28	-----	1928	1945	4.43	5.64	6.11	6.82	-----
1899	1913	3.16	3.74	3.95	4.24	-----	1929	1946	4.34	5.55	6.07	6.92	-----
1900	1914	3.13	3.70	3.92	4.23	-----	1930	1947	4.36	5.68	6.28	-----	-----
1891-1900	1905-1914	3.06	3.62	3.84	4.14	-----	1921-1930	1938-1947	4.28	5.52	5.99	6.64	6.70
							1931	1948	4.36	5.34	6.00	-----	-----
							1932	1949	4.46	6.08	6.83	-----	-----
1901	1915	3.14	3.73	3.97	4.31	-----	1933	1950	4.57	6.37	7.22	-----	-----
1902	1916	3.20	3.82	4.06	4.41	-----	1934	1951	3.21	4.34	4.91	-----	-----
1903	1917	3.33	4.00	4.26	4.61	-----	1935	1952	4.71	6.72	-----	-----	-----
1904	1918	3.37	4.04	4.31	4.62	-----	1936	1953	4.80	7.04	-----	-----	-----
1905	1922	3.29	3.92	4.16	4.47	4.57	1937	1954	4.86	-----	-----	-----	-----
1906	1923	3.21	3.82	4.03	4.35	4.45	1938	1955	4.90	-----	-----	-----	-----
1907	1924	3.24	3.89	4.12	4.55	4.66	1939	1956	4.93	-----	-----	-----	-----
1908	1925	3.30	3.94	4.22	4.66	4.72	1940	1957	-----	-----	-----	-----	-----
1909	1926	3.37	4.04	4.37	4.73	4.75							
1910	1927	3.36	4.04	4.42	4.90	4.99	1931-	1948-					

1901-1910	1915-1927	3.28	3.92	4.19	4.56	4.69	1940	1957	4.43	5.82	6.08[2]	-----	-----
									4.67	6.25	6.62[3]	-----	-----
							1948	1965	4.88	6.83	7.63	-----	-----
							1949	1966	4.72	6.45	7.18	-----	-----
1911	1928	3.22	4.08	4.49	4.89	4.96	1950	1967	4.64	6.41	7.19	-----	-----
1912	1929	3.21	4.26	4.65	4.96	-----							
1913	1930	3.50	4.82	5.25	5.72	5.85	1948-1950	1965-1967	4.73	6.51	7.28	-----	-----
1914	1931	4.06	5.55	6.04	6.65	6.87							
1915	1932	4.34	5.72	6.15	6.70	6.87	1951	1968	4.66	6.40	7.15	-----	-----
1916	1933	4.44	5.64	5.99	6.42	-----	1952	1969	4.86	7.02	8.01	-----	-----
1917	1934	4.20	5.08	5.31	5.52	-----	1953	1970	4.88	7.08	-----	-----	-----
1918	1935	4.53	5.66	5.95	6.32	6.39	1954	1971	4.87	7.07	-----	-----	-----
1919	1936	4.28	5.27	5.57	5.94	6.02	1955	1972	4.87	-----	-----	-----	-----
1920	1937	4.19	5.17	5.60	6.15	6.28	1956	1973	4.87	-----	-----	-----	-----
1920	1934	3.94	5.04	5.46	5.85	6.09	1957	1974	4.87	-----	-----	-----	-----
1911-1925-							1951-1957	1968-1974	4.82	6.83	7.49	-----	-----

[1]See footnote 1, Table 9.
[2]Inclusive of 1934 patents.
[3]1931-1940 exclusive of 1934.

The annual renewal fee payments increase progressively from the second year on, they are as follows:

Year after Filing	Amount (Swiss-francs)	Year after Filing	Amount (Swiss-francs)
2	30	11	160
3	40	12	180
4	50	13	200
5	60	14	220
6	70	15	240
7	80	16	260
8	100	17	280
9	120	18	300
10	140		
		Total	2,530

2,590 Swiss francs, equivalent in terms of current exchange to $603.47. The present fees were put into effect in 1956.

Switzerland like Great Britain and Germany allows patents of addition. These are improvements over the principal patent. In Switzerland patents of addition are relatively more numerous than in Great Britain or Germany.[66]

In our analysis of patent renewal rates we have for most countries excluded patents of addition and have confined our analysis to principal patents. This is true of Switzerland as well, we have followed this practice in most instances where it seemed to matter and where a separation was possible for all the years since we found that patents of addition are associated with the more valuable patents which on the average are kept in force the longest. Therefore, patents of addition have a longer average life. For instance, of German patents applied for in 1926 the mean life up to 15 and 18 years was 7.03 and 7.40 years, respectively, for principal patents. The comparable mean life for patents of addition applied for in that year was 8.72 and 9.32 years, respectively.

The inclusion of patents of addition in our analysis for most countries would have increased somewhat the longevity of patents, partly depending on the proportion of such patents for a given country and partly on their comparative longevity.

The annual number of patent applications resulting in patents has had more than a three fold increase from about 1903 to 1953. This probably is greater than the population increase of the country. At

[66]According to Federico for the five-year period 1952-56 the patents of addition for selected countries in Europe considered in this report constituted the following percentages of all patents granted in these years: Great Britain 3.4, Germany 8.1, Switzerland 13.0, and Netherlands 1.9. See *supra*, note 35, p. 7.

TABLE 11

SURVIVAL PERCENTAGES OF ALL SWISS PATENTS AND PATENTS ALL OF WHICH SURVIVED THROUGH THEIR SECOND YEAR IN GROUPS OF TEN YEARS OR LESS, 1888-1957.[1]

Year of Application	Percentage of Survival at Specified Years after Application														Terminal Year
	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1888-1897	70.4	44.8	28.7	22.3	17.4	13.9	11.6	9.6	8.1	6.8	5.6	4.5	3.7	2.7	1902-11
1888-1897	100.0	63.6	40.7	31.7	24.8	19.8	16.4	13.7	11.5	9.7	8.0	6.5	5.2	3.8	1902-11
1898-1907	76.4	53.4	34.2	26.6	21.0	17.0	13.7	11.3	9.4	7.9	6.7	5.6	4.4	3.2	1912-21
1898-1907	100.0	70.0	44.7	34.8	27.5	22.2	18.0	14.8	12.3	10.4	8.8	7.3	5.8	4.2	1912-21
1908-17	76.0	57.0	43.2	34.4	28.2	23.4	19.6	16.4	13.6	11.0	9.0	7.3	5.8	4.4	1922-31
1908-17	100.0	75.0	56.8	45.3	37.1	30.7	25.8	21.6	17.9	14.5	11.9	9.6	7.6	5.7	1922-31
1918-27	81.6	63.7	48.9	38.6	30.5	24.4	19.7	16.1	13.2	11.0	9.3	7.9	6.8	4.6	1932-41
1918-27	100.0	78.1	59.9	47.3	37.3	29.9	24.1	19.7	16.2	13.5	11.4	9.7	8.3	5.6	1932-41
1928-37	87.7	72.2	59.4	47.9	39.8	34.1	28.1	23.8	20.0	16.9	14.5	11.8	9.2	7.4	1942-51
1928-37	100.0	82.4	67.7	54.6	45.5	38.9	32.2	27.3	22.9	19.3	16.3	13.2	10.2	8.3	1942-51
1938-47	94.2	82.1	67.4	58.2	48.9	40.9	35.0	30.5	26.8	23.2	19.7	16.6	13.2	10.2	1952-61
1938--47	100.0	87.1	71.2	61.9	52.4	44.3	37.9	33.1	29.0	25.3	21.3	17.8	14.0	10.8	1952-61
1948-57	98.2	93.4	84.6	75.1	64.6	55.4	46.8	39.7	33.2	28.2	22.7	-----	-----	-----	1962-71
1948-57	100.0	95.1	86.2	76.5	66.0	56.8	48.2	41.2	34.8	29.9	24.2	-----	-----	-----	1962-71

[1]Compiled from the appropriate annual issues of *Catalogue Annuel des Brevets d'Invention, et des Dépôts de Dessin et Modèles;* edité par le bureau fédéral de la propriété intellectuelle, Berne, Confédération Swisse.

TABLE 12

MEAN YEARS OF LIFE OF SWISS PRINCIPAL PATENTS THROUGH THE 5TH, 8TH, 10TH, 12TH, 15TH, AND 18TH YEAR FROM THE TIME OF APPLICATION, 1888-1957.[1]

Application Year of	Year Terminal	5 Yr.	8 Yr.	10 Yr.	12 Yr.	15 Yr.
			All Patents Maximum			
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1888	1902	3.16	3.79	4.03	4.22	4.41
1889	1903	2.70	3.15	3.35	3.49	3.62
1890	1904	2.62	3.00	3.18	3.31	3.42
1891	1905	2.62	3.03	3.22	3.33	3.43
1892	1906	2.66	3.13	3.34	3.49	3.62
1893	1907	2.59	3.02	3.20	3.32	3.44
1894	1908	2.66	3.10	3.25	3.35	3.43
1895	1909	2.63	3.04	3.20	3.31	3.42
1896	1910	2.67	3.08	3.23	3.34	3.44
1897	1911	2.69	3.12	3.30	3.43	3.53
1888-1897	1902-1911	2.66	3.09	3.26	3.39	3.50
1898	1912	2.73	3.16	3.34	3.46	3.60
1899	1913	2.88	3.35	3.54	3.67	3.78
1900	1914	2.85	3.31	3.50	3.64	3.78
1901	1915	2.90	3.41	3.61	3.77	3.91
1902	1916	2.95	3.52	3.74	3.90	4.03
1903	1917	2.90	3.42	3.62	3.75	3.86
1904	1918	2.97	3.54	3.79	3.94	4.08
1905	1919	2.95	3.50	3.71	3.84	3.97
1906	1920	2.91	3.43	3.63	3.78	3.92
1907	1921	2.98	3.52	3.73	3.91	4.06
1898-1907	1912-1921	2.91	3.42	3.63	3.78	3.91
1923	1937	3.44	4.31	4.64	4.86	5.03
1924	1938	3.45	4.35	4.67	4.88	5.08
1925	1939	3.54	4.50	4.84	5.08	5.33
1926	1940	3.59	4.43	4.74	4.97	5.22
1927	1941	3.73	4.60	4.94	5.20	5.51
1918-1927	1932-1941	3.33	4.07	4.37	4.57	4.76
1928	1942	3.63	4.37	4.67	4.90	5.16
1929	1943	3.52	4.31	4.65	4.97	5.23
1930	1944	3.44	4.17	4.53	4.32	-----
1931	1945	3.51	4.40	4.89	5.21	-----
1932	1946	3.51	4.46	4.96	5.31	-----
1933	1947	3.50	4.67	5.16	-----	-----
1934	1948	3.56	4.75	5.26	-----	-----
1935	1949	3.81	5.12	-----	-----	-----
1936	1950	4.10	5.32	-----	-----	-----
1937	1951	4.16	-----	-----	-----	-----
1928-1937	1942-1951	3.68	4.61	4.87	5.04	5.20
1938	1952	4.28	-----	-----	-----	5.06
1939	1953	3.98	-----	-----	-----	4.34
1940	1954	-----	-----	-----	3.43	3.77
1941	1955	-----	-----	-----	3.10	3.54
1942	1956	3.95	4.99	5.45	5.80	6.16

1908	1922	2.98	3.57	3.83	4.03	4.20	1943	1957	3.91	5.04	5.56	5.95	6.32
1909	1923	3.07	3.66	3.95	4.17	4.36	1944	1958	4.05	5.30	5.90	6.35	6.81
1910	1924	3.04	3.63	3.95	4.16	4.32	1945	1959	3.94	5.11	5.65	6.04	6.42
1911	1925	2.98	3.62	3.93	4.13	4.28	1946	1960	4.02	5.31	5.91	6.37	-----
1912	1926	3.01	3.76	4.07	4.26	4.43	1947	1961	4.18	5.64	6.34	6.87	-----
1913	1927	3.09	3.97	4.31	4.51	4.70	1938-1947	1952-1961	4.04	5.25	5.83	5.69	5.40
1914	1928	3.40	4.39	4.76	4.99	5.21							
1915	1929	3.44	4.35	4.67	4.89	5.11	1948	1962	4.19	5.66	6.34	6.84	-----
1916	1930	3.28	3.99	4.26	4.42	4.58	1949	1963	4.27	5.78	6.49	-----	-----
1917	1931	3.01	3.54	3.75	3.89	4.03	1950	1964	4.33	5.91	6.65	-----	-----
1908-1917	1922-1931	3.11	3.82	4.12	4.32	4.49	1951	1965	4.49	6.20	-----	-----	-----
							1952	1966	4.56	6.33	-----	-----	-----
1918	1932	2.76	3.20	3.39	3.56	3.72	1953	1967	4.68	-----	-----	-----	-----
1919	1933	2.84	3.34	3.55	3.71	3.85	1954	1968	4.72	-----	-----	-----	-----
1920	1934	3.09	3.62	3.84	3.98	4.06	1955	1969	4.73	-----	-----	-----	-----
1921	1935	3.32	4.05	4.36	4.57	4.74	1948-1955	1962-1969	4.51	6.00	6.50	6.84	-----
1922	1936	3.42	4.22	4.56	4.76	4.93							

[1]See footnote to Table 11.

present more than half of Swiss patents are issued to nonresidents, but earlier in this century the percentage going to foreigners was even higher than in recent years.

With respect to survival rate of patents the proportion on which the first renewal fees were paid were in upper sixties and lower seventies at the beginning, showing a general increase marked with considerable year to year fluctuation. The latest survival rates through the second year are in upper nineties, approaching 100 percent. There has been a parallel upward shift toward greater survival for later years as well.

This progression in average survival rate can be seen from Table 11, showing ten year averages. With some exceptions for the decade 1908-1917 compared with 1918-1927 (because of World War I) there has been a general progression in the average survival rates.

The intensity and average regularity of this increase can be judged better from mean years of survival for patents up to a specified number of years, and up to the maximum of 15 years. This is shown by Table 12.

As in the previous tables, these averages are given for patents applied for in individual years as well as averages by decades. The general upward trend is unmistakable except the sharp decline which began in 1918 and reached its trough in 1921-22. This drop, in all probability was caused largely by the inability of German patentees to pay the renewal fees of their patents in Switzerland after World War I and the inflation of the German mark.

DENMARK

The Danish patent system was established in 1895. Patents are granted if they are not challenged successfully by opposition proceedings. Denmark, as most other countries, also has patents of addition. In Denmark, unlike in most other countries patents of addition can not have an independent status of their own, that is they attain no legal status as principal patent in the event of latter's revocation. The maximum legal term for a Danish patent at present is 17 years, from the time of filing. Prior to 1937 it was 15 years. Periodic renewal payments are required to maintain the patent in force for the maximum period specified by law. These renewal payments are required annually even though the amount of payment is the same for a series of years. These payments start with second anniversary and at present are as follows:

Annual Fees from Date of Filing	Amounts in Danish Kroners
2, 3, 4	50
5, 6, 7	75
8, 9, 10	150
11, 12, 13	300
14, 15, 16, 17	400
Total	3,325

In terms of official exchange this is equivalent to $482. In addition to the renewal fees, the filing fee is 100 kroners and the printing fee 75 kroners plus an extra printing fee of 25 kroners for each sheet in excess of 3. Thus a Danish patent kept in force for the maximum period allowed would cost the patentee at least 3,500 kroners, equivalent to $507.50.

Statistics giving the survival of patents issued in each year through annual payment of fees have not been published since 1937. Prior to that date annual statistics of the number of patents issued and those remaining in force from the date of filing are given in the official organ, *Densk Patenttidende.*

The annual statistics is for the period 1895-1936. The table for this can be obtained from the Foundation. Since the 1937 issue of *Densk Patenttidende* these official volumes give no statistical information regarding the number of Danish patents that are issued and are kept in force for varying periods through the payment of renewal fees.

The annual number of applications on which patents were issued show some increase in the average number over time. The increase, however, is relatively small, irregular, and much of it is realized in the second decade, i.e., 1905-1914.

Percentage of survivals for the first year show no definite trend, just fluctuations. The diminution in the first year indicates patents on which issue fees were not paid. In general one finds a rise or decline in the number of patents in one year with reference to that in prior year shows the same directional shift in the percentage of patents surviving. While this is the more common pattern, it by no means is adhered to consistently. The abandonment of patents during the first year is relatively small. On the average over 95 percent of the patents remain in force until the second anniversary of the filing, when the first renewal fee falls due.

The percentage of patents surviving through the second year show a slight upward trend. And this slight upward trend is found for most of the other years up through the 11th. One would suspect that were survival rates available for the 12th to 15th year for patents applied

for in the decade 1925-34, this slight shift might have been apparent later for these anniversaries as well, since patents issued during and immediately after World War I show a marked drop in survival rates.

These trend shifts upward or downward over time can be clearly discerned by considering mean survival rates by ten year groupings, shown in Table 13.

Table 13 shows the mean survival rate by decades for as many years as data are available for all patents granted and for those all of which survived through the fourth year from the time of publication.

The survival rates for all patents granted is somewhat higher for the latest decade 1925-34 in comparison to prior decades with slight reversal for the seventh and eighth years for which the rates are a bit higher for the decade 1905-1914, in all probability as a result of the distortions attributable to World War I with respect to patents issued in 1905-14. The first decade, 1895-1904, has the lowest survival rates, though there are a few exceptions. There is a distinct upward rise in the second decade compared with the first, but on the whole there is a drop in the third decade—perhaps, the effect of World War I, both direct and indirect in that many of the Danish patents are issued to her neighbors, particularly Germany and a postwar slump in Germany is understandable.

The survival rates of patents all of which were retained through the fourth year and, therefore, the trends are less apt to be distorted by administrative delays, indicate an increase in rates in the second decade as compared with the first, then a drop in the third decade in many instances going below the mean survival rates observed even in the first decade. In the fourth and last decade for which observations are available this downward trend is reversed, yet the rates for most years remain below the percentage survival attained in the second decade—again it is plausible that the stimulating and retarding effect of European wars could account for the inconsistencies in trends observed in Table 13.

Table 14 shows the mean years of survival of Danish patents within the initial 5th, 8th, 10th, 12th, and 15th years, respectively.

The mean survival duration within each of these periods is shown for patents applied for in specified years and averages for each decade. These averages suggest a small upward trend in the mean survival rates within the initial five years. The survival within the first eight years shows a slight dip for the decade 1915-24, otherwise the upward trend is rather distinct. This pattern becomes more pronounced for 10th, 12th, and 15th years, except for 12th and 15th years no experience is available for patents issued in decade following 1915-1924.

TABLE 13

MEAN SURVIVAL PERCENTAGES OF ALL DANISH PATENTS AND PATENTS ALL OF WHICH SURVIVED THROUGH THEIR FOURTH YEAR IN GROUPS OF TEN YEARS OR LESS, 1895-1934.[1]

Year of Application	Percentage of Survival at Specified Years after Application														Terminal Year
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	
(*1*)	(*2*)	(*3*)	(*4*)	(*5*)	(*6*)	(*7*)	(*8*)	(*9*)	(*10*)	(*11*)	(*12*)	(*13*)	(*14*)	(*15*)	(*16*)	(*17*)
1895-1904	97.9	65.2	46.9	32.2	24.4	19.8	14.8	11.8	9.7	8.1	6.5	5.3	4.4	3.6	2.7	1910-1919
1895-1904	-----	-----	-----	100.0	75.7	61.4	45.9	36.8	30.1	25.2	20.1	16.4	13.7	10.9	8.2	1910-1919
1905-1914	95.6	64.7	48.1	35.0	27.3	23.1	18.8	15.4	13.0	10.3	8.3	6.9	5.3	3.9	2.7	1920-1929
1905-1914	-----	-----	-----	100.0	78.1	65.8	53.6	44.0	37.2	29.5	23.5	19.7	15.3	10.9	7.7	1920-1929
1915-1924	94.9	66.8	49.0	34.1	26.8	20.6	15.6	12.6	10.2	7.7	6.2	5.0	3.9	2.8	2.0	1930-1939
1915-1924	-----	-----	-----	100.0	78.6	60.3	45.8	36.9	29.7	22.5	18.1	14.7	11.4	8.3	5.8	1930-1939
1925-1934	97.7	71.6	54.4	38.5	30.2	23.8	18.7	15.3	13.1	10.4	8.7	-----	-----	-----	-----	1940-1949
1925-1934	-----	-----	-----	100.0	78.7	62.0	48.9	40.0	33.9	27.1	22.5	-----	-----	-----	-----	1940-1949

[1]Derived from *Dansk Patenttidende*, Volumes 17 through 43, inclusive.

TABLE 14

MEAN YEARS OF LIFE OF DANISH PATENTS THROUGH THE 5TH, 8TH, 10TH, 12TH, AND 15TH YEARS, 1895-1931.[1]

Year of Issue	Terminal Year	From the Time of 1st Renewal — All Patents Maximum				
		5 Yr.	8 Yr.	10 Yr.	12 Yr.	15 Yr.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1895	1910	3.79	4.31	4.49	4.63	4.77
1896	1911	3.66	4.08	4.24	4.35	4.44
1897	1912	3.70	4.12	4.28	4.40	4.50
1898	1913	3.63	3.96	4.10	4.18	4.25
1899	1914	3.52	3.89	4.05	4.16	4.23
1900	1915	3.55	4.00	4.18	4.28	4.37
1901	1916	3.56	3.99	4.14	4.25	4.36
1902	1917	3.73	4.26	4.46	4.59	4.70
1903	1918	3.74	4.27	4.46	4.59	4.72
1904	1919	3.82	4.37	4.59	4.73	4.88
1895-1904	1910-1919	3.66	4.13	4.31	4.42	4.53
1905	1920	3.76	4.21	4.38	4.52	4.68
1906	1921	3.78	4.25	4.41	4.53	4.64
1907	1922	3.72	4.19	4.38	4.54	4.67
1908	1923	3.65	4.18	4.43	4.64	4.79
1909	1924	3.74	4.25	4.52	4.72	4.85
1910	1925	3.59	4.07	4.31	4.44	4.53
1911	1926	3.49	3.99	4.23	4.34	4.42
1912	1927	3.74	4.42	4.70	4.86	4.97
1913	1928	3.76	4.51	4.78	4.94	5.06
1914	1929	3.87	4.64	4.86	4.99	5.09
1905-1914	1920-1929	3.71	4.28	4.51	4.66	4.78
1915	1930	4.21	5.02	5.27	5.42	5.57
1916	1931	4.16	4.80	5.02	5.15	5.27
1917	1932	3.98	4.45	4.61	4.72	4.80
1918	1933	3.57	3.94	4.07	4.15	4.21
1919	1934	3.44	3.74	3.84	3.90	3.96
1920	1935	2.85	3.15	3.26	3.34	3.40
1921	1936	3.50	3.88	4.03	4.12	4.19
1922	1937	3.60	4.05	4.24	4.36	-----
1923	1938	3.79	4.38	4.62	4.77	-----
1924	1939	3.91	4.55	4.79	4.94	-----
1915-1924	1930-1939	3.72	4.21	4.38	4.50	4.50
1925	1940	3.87	4.47	4.69	-----	-----
1926	1941	3.96	4.53	4.77	-----	-----
1927	1942	3.93	4.54	-----	-----	-----
1928	1943	3.97	4.52	-----	-----	-----
1929	1944	3.88	-----	-----	-----	-----
1930	1945	3.94	-----	-----	-----	-----
1931	1946	3.73	-----	-----	-----	-----
1925-1931	1940-1946	3.90	4.51	4.73	-----	-----

[1]See note 1, Table 13.

One might say, therefore, that if the effect of the war were excluded, Denmark would show a slight upward increase in the survival rate of its patents—but this trend with respect to survival is very much dominated by the German economy. Of the countries for which we have statistical data on renewals, the statistics from Denmark with respect to progressive upgrading of patents is the most equivocal.

AUSTRIA

In Austria a new patent system came into force in 1899. The maximum life of the patent was to be 15 years from the date of publication. The law was further amended in 1925, at which time elaborate stipulations were incorporated in it regarding mutual claims obligations and rights of employers and employees. Under Austrian law any contract by which an employee is despoiled of an adequate indemnity for, or sharing in profits from his invention, is considered null and void. The 1925 amendments also extended the maximum duration of a patent, from 15 to 18 years.

The Austrian law requires that in assigned patents the name of the inventor should, nevertheless, appear on the patent letter.[67]

Under Austrian law a patent application is examined as to its novelty combined with opposition proceedings before a patent is granted. Generally, two months is the time allowed for opposition. Grounds for opposition, as in other countries, is to challenge the novelty of the application or to establish fraud. The Austrian Patent Office is empowered to determine that a patent which is about to be granted is a dependent patent, and that for its successful exploitation it would have to depend on one or more prior patents. When this occurs, the office has authority to require the diverse patentees to grant reciprocal licenses, and if need be, the office arbitrates the bases for such a cross licensing.

The application fee for an Austrian patent is 120 Austrian shillings plus a stamp tax of 30 shillings. In addition, there is a payment of 1.50 shillings for each two pages of specifications and 1.50 shillings for each sheet of drawing. There is also an issue fee, which might be regarded also as the first renewal fee. This amounts to 150 shillings, plus an extra printing fee of 60 shillings for each page of specification over ten pages and 70 shillings for each sheet of drawing over two. These payments must be made before the patent is granted.

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[67]Many of these elements enacted into the Austrian patent law in 1925 are analogous to those incorporated into the German patent law for the protection of inventor rights in 1936 and probably had common conceptual origins in a pre Nazi era, even though their enactments were delayed until Hitler came into power.

The annual renewal fees after the issue fee and following the granting of the patent are as follows:

Year after Publication	Amount in Shillings	Year after Publication	Amount in Shillings	Year after Publication	Amount in Shillings
2nd	180	8th	500	14th	1,600
3rd	220	9th	600	15th	2,000
4th	260	10th	750	16th	2,400
5th	300	11th	900	17th	2,900
6th	350	12th	1,100	18th	3,500
7th	400	13th	1,300		

Thus a patent kept in force for the maximum period of 18 years would require annual payments of 19,260 shillings, which until recently was equivalent to $743.[68] The total payment for a patent kept in force for 18 years, including application and other required fees would be apt to exceed 19,560 or $755—depending on the length of specifications and the number of drawings.

Austria also allows patents of addition and the statistics which we shall present include both principal patents and patents of addition. This course was followed since there were periods for which the number of patents kept in force from each year's issue could not be limited to primary patents. Indications are that in recent years patents of addition represent about 10 percent of the total.

Both in Austria and in Denmark a patent which has not been put to commercial use three years after being granted is subject to compulsory licensing and a harsher penalty for non-use could be the outright revocation of the patent.[69]

Table 15 gives statistics on annual number of patents granted each year for which published information is available and the percentage of these surviving specified years after publication. These statistics are compiled from the official sources, *Osterreichisches Patent Blatt.* It should be observed that the Austrian Patent Office ceased to operate for processing new applications in 1938 with the "Anschluss." It continued to act on old applications, however, as a branch of the German Patent Office. Thus, no statistics are available for new issues after 1937 and no renewal statistics after 1939. The Patent Office was reopened in 1945 as the Austrian Patent Office, first for receipt of applications only, and gradually resuming its full functions. Official statis-

[68]All the monetary conversions into dollars adopted in this report are based on Federico's recent work, *supra,* note 35.

[69]Jan Vojáček in his *Survey of Principal National Patent Systems* regards the Austrian patent system as the most enlightened, *supra,* note 41, p. 150. The legal provision for revocation of an unused patent in a number of countries strengthens further our inference that by and large patents kept in force are revenue producing patents.

tics have been published for 1951 on.

Consideration of annual statistics shows that the proportion of patents for which the initial renewal fee is paid is close to 100 all along prior to 1939. In 1950 and after, the statistics show anomalies especially in 1950-1953, in all probability because special provisions were made for patents filed before full activities of testing validity and going through opposition proceedings were reinstated and enforced by the reconstituted Austrian Patent Office.

Inspection of the proportion of patents surviving through the second anniversary shows a progressive increase, accelerated by World War I, but there is no marked continuation of this upward trend after 1917. In 1938, the last year for which survival information is published one observes up and down fluctuations in survival rates but no definite trend. This general pattern characterizes survival rates to subsequent anniversaries after the second.

Patents granted since 1950 show markedly higher survival rates than the comparable rates attained in pre-World War II decades. In fact there is some indication of an upward trend which has been continuing since 1950, though, of course, the interval is too brief to warrant any broad generalization, and the statistics are markedly distorted for 1950-1953. One might conclude, however, that there was some upgrading of Austrian patents from 1899 until World War I, a general stagnation after World War I, and the break up of the Austro-Hungarian empire, and an upgrading after World War II compared with prewar benchmarks, and a probable continuation of the upward trend in survival rates since 1950.

These general trends can be discerned from the mean survival rates by decades shown in Table 15.

Table 15 shows higher survival rates for patents issued in 1909-1918 compared with the preceding decade at least through the 13th anniversary. The decline in rates beyond the 13th anniversary is in all probability attributable to the effect of World War I after the initial favorable effects characteristic of a war.

In the third decade, beginning with 1919 the survival rates after the second anniversary were markedly lower than those of the preceding decade, and lower than they had been in the first decade beyond the 8th anniversary of the granting of these patents. There was a weak reversal of this trend in the fourth decade, no data are available for the fifth decade. For 1950 and subsequent years, all the available mean survival rates are consistently much higher than rates attained in pre-World War II periods.

This general pattern of increasing survival rate until the adverse effects of World War I, then a weak tendency to reverse these de-

TABLE 15

MEAN PERCENTAGE OF PATENTS IN AUSTRIA PUBLISHED IN A GIVEN YEAR AND PERCENTAGE OF THOSE SURVIVING THROUGH THE FOURTH YEAR SURVIVING SPECIFIED YEARS BEYOND THE FIFTH, 1899-1938 AND 1950-1959.[1]

Year of Publication	Percentage of Survival at Specified Years after Publication																	Terminal Year
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
1899-1908	97.6	69.6	50.3	37.3	29.3	23.8	19.6	16.0	13.4	9.8	9.8	8.4	6.8	5.6	3.8	----	----	----	1917-26
1899-1908	-----	-----	-----	100.0	78.5	63.9	52.6	42.9	35.9	30.4	26.2	22.5	18.3	14.9	10.2	----	----	----	1917-26
1909-1918	99.6	79.2	62.1	50.1	41.5	35.3	29.9	25.4	20.9	17.0	12.9	9.8	7.4	5.3	3.7	2.5	1.8	1.1	1927-36
1909-1918	-----	-----	-----	100.0	82.5	70.2	59.5	50.6	41.7	33.7	25.8	19.4	14.7	10.7	7.3	4.7	3.5	2.0	1927-36
1919-1928	99.8	83.8	61.5	46.2	35.3	26.9	20.8	16.0	12.4	9.5	7.7	5.9	4.0	2.6	1.6	1.0	0.6	0.7	1937-46
1919-1928	-----	-----	-----	100.0	76.5	58.3	44.9	34.8	27.0	20.7	16.6	12.7	8.8	6.0	3.7	2.4	1.5	1.8	1937-46
1929-1938	99.4	81.2	63.0	48.7	38.1	30.5	24.9	19.9	16.2	13.6	11.6	----	----	----	----	----	----	----	1947-56
1929-1938	-----	-----	-----	100.0	80.1	65.6	54.9	45.0	36.7	29.6	23.3	----	----	----	----	----	----	----	1947-56
1950-1959	87.4	89.9	80.8	72.5	62.9	54.6	46.7	39.3	33.1	26.7	22.1	18.0	----	----	----	----	----	----	1968-77
1950-1959	-----	-----	-----	100.0	87.5	77.0	67.2	58.4	49.7	40.9	33.9	28.3	----	----	----	----	----	----	1968-77

[1]Compiled from annual issues of *Osterreichisches Patent Blatt*, no data from official sources are available for the period 1939-1949 inclusive, and information on patents first published in the years 1923-38 lack complete survival information.

TABLE 16

MEAN YEARS OF LIFE OF AUSTRIAN PATENTS THROUGH THE 5TH, 8TH, 10TH, 12TH, 15TH, AND 18TH YEAR FROM THE TIME OF PUBLICATION, 1899-1938 AND 1950-61.

Year of Issue	Terminal Year	All Patents Maximum					
		5 Yr.	8 Yr.	10 Yr.	12 Yr.	15 Yr.	18 Yr.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1899	1917	3.05	3.34	3.46	3.53	3.58	.....
1900	1918	3.50	3.93	4.09	4.21	4.32	.....
1901	1919	3.55	4.02	4.21	4.34	4.43	.....
1902	1920	3.64	4.15	4.36	4.50	4.61	.....
1903	1921	3.81	4.41	4.67	4.85	4.98	.....
1904	1922	3.91	4.52	4.77	4.95	5.10	.....
1905	1923	4.03	4.68	4.95	5.13	5.30	.....
1906	1924	4.04	4.71	4.99	5.18	5.39	.....
1907	1925	3.99	4.64	4.91	5.13	5.35	.....
1908	1926	4.06	4.78	5.11	5.37	5.63	.....
1899-1908	1917-1926	3.84	4.44	4.68	4.87	5.03	.....
1909	1927	4.04	4.72	5.03	5.29	5.52	.....
1910	1928	4.12	4.83	5.19	5.48	5.69	.....
1911	1929	4.06	4.78	5.16	5.42	5.58	5.63
1912	1930	4.13	4.99	5.44	5.70	5.83	5.88
1913	1931	4.27	5.30	5.75	5.96	6.09	6.15
1914	1932	4.43	5.66	6.07	6.26	6.41	6.46
1915	1933	4.94	6.29	6.71	6.91	7.08	7.15
1916	1934	5.02	6.14	6.43	6.57	6.70	6.76
1917	1935	4.90	5.79	6.05	6.22	6.37	6.42
1918	1936	4.57	5.17	5.39	5.54	5.66	5.70
1909-1918	1927-1936	4.32	5.23	5.61	5.84	6.00	6.19
1919	1937	4.35	4.80	4.93	5.01	5.06	5.07
1920	1938	4.07	4.48	4.62	4.72	4.77	4.79
1921	1939	4.07	4.57	4.77	4.90	4.98	5.00
1922	1940	4.06	4.63	4.87	5.00	5.07	5.09
1923	1941	4.18	4.79	4.99	5.12	5.21	.....
1924	1942	4.23	5.05	5.31	5.45	5.54	.....
1925	1943	4.32	5.18	5.40	5.52	5.60	.....
1926	1944	4.46	5.24	5.49	5.64	.....	.....
1927	1945	4.58	5.33	5.59	5.77	.....	.....
1928	1946	4.51	5.21	5.51	5.73	.....	.....
1919-1928	1937-1946	4.27	4.90	5.12	5.26	5.16	4.99
1929	1947	4.41	5.11	5.40	.....	.....	.....
1930	1948	4.18	4.82	5.12	.....	.....	.....
1931	1949	4.05	4.74	.....	.....	.....	.....
1932	1950	4.12	4.91	.....	.....	.....	.....
1933	1951	4.31	.....	.....	.....	.....	.....
1934	1952	4.44	.....	.....	.....	.....	.....
1935	1953	4.48	.....	.....	.....	.....	.....
1929-1935	1947-1953	4.27	4.89	5.25	.....	.....	.....
1950	1968	4.45	5.69	6.26	6.65	.....	.....
1951	1969	4.62	5.87	6.44	.....	.....	.....
1952	1970	4.45	5.78	6.38	.....	.....	.....
1953	1971	4.89	6.35	.....	.....	.....	.....
1954	1972	4.87	6.32	.....	.....	.....	.....
1955	1973	5.18	.....	.....	.....	.....	.....
1956	1974	5.12	.....	.....	.....	.....	.....
1957	1975	5.13	.....	.....	.....	.....	.....
1950-1957	1968-1975	4.90	6.03	6.37	6.65	.....	

[1]See note 1, Table 15.

pressant effects of World War I, followed finally by much higher survival rate evident since 1950 for all patents is also apparent for patents all of which survived through the fourth year. We took a four-year period, assuming this would eliminate distortions caused by administrative delays in the granting of patents and other external disturbances affecting survival rates in the initial years, shortly after the patent is published and the time starts running on it.

Table 16 shows the mean life of Austrian patents by year of application and average mean life by decades.

The mean duration shows an upward trend in the first and second decade reaching a peak for patents issued in 1915 and 1916. From then on the mean duration declines until patents issued in 1921 and 1922 are reached when the trend is reversed once again but the momentum does not carry it very far. The level of survival is higher in the fifties, however, following World War II with some upward trend through much of that decade.

Compared with Germany, Great Britain and Switzerland the upgrading of Austrian patented inventions, as measured by increasing survival rates, is much less pronounced, but there has been some upgrading, nevertheless, particularly when survival rates prior to World War II are compared with those experienced since the fifties.

NETHERLANDS

Another country for which we have found some published statistics on patent survival is Netherlands. The statistics of this country prior to 1951 are given in a volume which has been lost from the Patent Office Library. Our statistics are, therefore, restricted to the period 1951 to 1960, plus some statistics showing survival of patents during the years 1930-39 analyzed by Federico.

The present patent law of Netherlands was enacted in 1912. Applications for patents are subjected to a rigorous examination, with search through prior domestic and foreign patents. If the application meets these requirements of novelty then it is submitted for opposition and if successful a patent is issued which can be kept in force from the time of granting to 18 years by the annual payment of renewal fees. Starting with the first year, the fees are as follows in guilders:

Year after Issue	Amount in Guilders	Year after Issue	Amount in Guilders	Year after Issue	Amount in Guilders
1	80	7	145	13	240
2	90	8	160	14	260
3	100	9	175	15	280
4	110	10	190	16	300
5	120	11	205	17	320
6	130	12	220	18	340

The total renewal fee payment for the maximum period is 3,465 guilders or about $915 (10 guilders is equivalent to $2.64).

In addition to the renewal fee the filing fee is 75 guilders and an additional publication fee of 100 guilders at the time of issue. Thus the maximum payment to obtain a patent and keep it in force for the entire period allowed by law would at least amount to 3,640 guilders, equivalent to $961.

As is shown, the first renewal fee in Netherlands is required for the first year. This fee becomes due two months after the granting of the patent and if it is not paid the patent would have no effective life at all. With respect to grace period, when renewal payments become due, the International Convention for the Protection of Industrial Property requires the member countries to provide a minimum period of three months, and it also requires provision for reinstatement of patents lapsed through inadvertance, if the grace period is less than six months. Many countries having three months grace period follow this recommendation. But Netherlands and a number of other countries have a six months grace period. Denmark is one of the other countries which we have included in this report that provides a six months grace period, and besides that it has provisions for restoration of lapsed patents as does Netherlands.

Netherlands is one of the countries that has patents of addition and the statistics which are given in this report include these patents of addition. In Netherlands, however, the patents of addition are numerically quite small—less than 2 percent of the total. We deemed it preferable to follow this course and include these since we compare our statistics for the postwar years with survival statistics compiled by Federico for the years 1930-39 in summary fashion, Federico's figures include patents of addition.

Table 17 shows the extent of annual survival rate data that we have been able to compile for Netherlands and also a comparison of survival rates in the fifties with pre-World War II rates.

There is some suggestion of an upward trend in the annual data from 1951 to 1960, but the time span is too limited to permit any definitive conclusion. The picture is markedly different, however, when we compare the recent survival rates with those shown for 1930 to 1939 compiled by Federico.[70] In comparison to the survival rates shown for 1930-39 there has been a marked increase, suggesting progressive upgrading of patented inventions in Netherlands.[71] That this

[70] *Op. cit., supra,* note 35.

[71] The average mean life of the post World War II patents is 4.18, 5.64 and 6.42 for 1951-57 for the first 5, 8, and 10 years, respectively. The corresponding mean

upgrading is not restricted to the post World War II period is suggested by some supplementary information on survival rates of patents prior to World War II. These bits of information are supplied by Maarschalk.[72]

Maarschalk shows the proportion of patents grouped according to their longevity for each year 1914 through 1941. After we allow 18 years to elapse following 1913, so that the longest surviving patents will reach expiration date, the proportionate distribution of patents lasting specified years on the basis of Maarschalk's data become as follows:

Patents in Force by Years	Percentage of Patents in Force for Specified Years				
		(0-3)	(4-5)	(6-10)	(11-18)
1933-36	100.0	55.8	18.0	18.4	7.8
1937-41	100.0	46.7	20.0	24.2	9.1

In the above comparison between duration that patents have remained in force in 1933-36 and 37-41 respectively, it is noted that the proportion of patents with higher longevity is greater in the period 1937-41, this is evident, notwithstanding the adverse effects of World War II on survival rates (see footnote 79). There is definite indication, therefore, that in Netherlands there has been a progressive increase in the proportion of patents kept in force longer since the adoption of its patent system.

Maarschalk presents other statistics from which one may derive further indication of trends in survival rate of Netherlands' patents. These statistics are in terms of (*a*) the number of patents issued each year, from 1913 to 1941 inclusive, to Netherlanders and to residents of selected countries, i.e., Germany, Great Britain, United States of America, and France separately, and all crossed with industry in which the patented invention would be used.[73] (*b*) Maarschalk also gives the number of patents issued to each of these groups by industry that are in force in each year, 1913-1941 inclusive. (*c*) Finally, he gives the total number of patents issued to these industry-nationality

life of patents in force during 1930-39, derived from Federico's work are 3.36, 3.95 and 4.30 years, respectively, emphasizing the sharp upgrading of patented inventions particularly for inventions the patents for which are kept in force through the tenth year.

[72]Maarschalk, C. G. D., *The Role of Patents in Technological Progress with Special Attention to Patent Activity in Netherlands,* p. 73. (Processed)

[73]Statistics of the same nature and scope are supplied for mining patents issued to residents of Belgium and for ship and coachbuilding patents issued to residents of Switzerland. In our analysis of these data by residence of the patentee and industry we have excluded these patents.

TABLE 17

ANNUAL NUMBER OF PATENTS ISSUED IN NETHERLANDS AND THE PERCENTAGE OF THESE SURVIVING SPECIFIED YEARS AFTER THE YEAR OF ISSUE BY PAYMENT OF ANNUAL FEES.[1]

Year of Issue	Number[2] Issued	Percentage of Patents Surviving Through 2nd and Subsequent Years										Terminal Year
		2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1951	2,078	91.4	80.9	71.7	62.9	56.9	51.3	44.8	37.3	33.3	29.8	1968
1952	2,184	92.6	82.6	74.6	68.1	60.3	52.5	45.9	40.3	36.4	.....	1969
1953	2,360	92.4	83.7	75.5	67.9	60.6	53.1	47.1	42.5	.....	.....	1970
1954	3,103	93.0	84.2	75.7	66.6	58.8	52.5	48.2	.....	.....	.....	1971
1955	3,255	93.5	84.5	74.8	65.7	59.0	52.7	.....	.....	.....	.....	1972
1956	3.553	94.1	83.7	74.3	67.2	61.6	.....	.....	.....	.....	.....	1973
1957	3,284	92.3	83.4	74.5	67.5	.....	.....	.....	.....	.....	.....	1974
1958	2,680	92.5	83.6	76.5	.....	.....	.....	.....	.....	.....	.....	1975
1959	3,163	93.2	84.9	.....	.....	.....	.....	.....	.....	.....	.....	1976
1960	3,493	94.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	1977
1951-60[3]	.....	93.1	83.6	74.8	66.6	59.7	52.5	46.7	40.2	34.9	29.8	1968-77
1930-39[4]	.....	78.9	63.6	51.2	41.8	33.8	27.8	22.7	19.1	16.0	13.4	.....

[1]Annual figures are obtained from the annual Issues of the Official Publication Bureau Voor de Industriele Eigendon; 1952 to 1962 volumes.
[2]Limited to only those patents on which the 1st renewal fee was paid. Series B in the Federico publication as given in note 4, *infra*.
[3]Weighted average percentages for as many years as survival data were available.
[4]Mean survival rate for patents in force 1930-39 inclusive on which renewal fees were paid in those years by year of survival. Taken from: *Renewal Fees and Other Patent Fees in Foreign Countries*, Study of the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, United States Senate, 85th Congress, 2nd Session; Pursuant to S. Res. 236, Study No. 17, 1958, prepared by P. J. Federico, p. 30.

groups for these same years (cumulative annual total of patents issued). In a parallel set of tables these statistics are given for each industry-nationality group limited to assigned patents only.[74] It is possible, therefore, to obtain the relationship of percentage of patents issued to patents in force as a measure of changing longevity of patents over time. These relationships are given in Table 18.

TABLE 18

MOVING AVERAGES OF RATIO OF PATENTS IN FORCE TO PATENTS ISSUED IN SPECIFIED YEARS, NETHERLANDS, 1913-1941.[1]

Moving Average for[2]					
5 Yrs.	8 Yrs.	10 Yrs.	12 Yrs.	15 Yrs.	18 Yrs.
(*1*)	(*2*)	(*3*)	(*4*)	(*5*)	(*6*)
1.83	2.27	2.39	2.45	2.81	3.12
2.15	2.45	2.37	2.59	2.94	3.23
2.10	2.46	2.50	2.76	3.10	3.31
2.48	2.47	2.67	2.91	3.19	3.37
2.80	2.62	2.87	3.08	3.35	3.49
2.58	2.72	2.96	3.19	3.40	3.56
2.44	2.84	3.07	3.25	3.41	3.65
2.71	3.10	3.34	3.48	3.59	3.85
2.78	3.19	3.37	3.51	3.66	3.98
2.91	3.33	3.49	3.53	3.77	4.10
3.23	3.53	3.65	3.71	3.98	4.38
3.65	3.83	3.78	3.90	4.22	4.62
3.93	3.91	3.92	4.05	4.38	-----
3.92	3.88	3.99	4.20	4.61	-----
4.01	3.95	4.09	4.34	4.78	-----
3.99	4.02	4.25	4.48	-----	-----
3.87	4.12	4.41	4.73	-----	-----
3.91	4.26	3.97	4.91	-----	-----
4.05	4.50	4.26	-----	-----	-----
4.15	4.65	4.46	-----	-----	-----
4.46	5.06	-----	-----	-----	-----
4.94	5.52	-----	-----	-----	-----
5.14	-----	-----	-----	-----	-----
5.73	-----	-----	-----	-----	-----
6.17	-----	-----	-----	-----	-----

[1]Derived from Maarschalk, C. G. D., *The Role of Patents in Technological Progress with Special Attention to Patents Activity in the Netherlands.*

[2]These moving averages were obtained by summing the number of patents in force for let us say, 1913-1917—5 years, and dividing the sum by the number of patents issued in these years—giving the average 1.83. The next figure is obtained by dropping the number of patents in force in 1913 and adding the number in force in 1918, and similarly dropping the patents issued in 1913 and adding those issued in 1918 and again dividing the number in force by the number issued and so on. They are limited to patents issued to the residents of Netherlands, Great Britain, Germany, United States and France.

[74]Similar statistics are presented for patents issued to certain large corporations, Philips, R. C. A., Standard Electric, Siemens and A. E. G. Telefunken & P. T. C. These statistics include 1942 and 1943 data but we have not analyzed these, nor have we tried to do much with the graphic material found in Maarschalk's publication.

Table 18 was obtained by using a moving average ratio of patents in force during specified years (1913-1941 inclusive) divided by patents issued in those same years. These moving averages were obtained for 5th, 8th, 10th, 12th, 15th, and 18th years, respectively.[75] They all show a marked increase in the mean longevity of patents with time within the period of observation, 1913 through 1941. Thus demonstrating a distinct upgrading of patents issued by Netherlands over this period of years. This trend would have been even sharper had the number of patents issued in each year remained constant instead of showing a general upward trend as demonstrated by the averages given in footnote 75. Therefore, considering all the available evidence there is clear cut indication of a progressive upgrading of Netherlands' patents since its patent system was established in 1912.

As indicated, Maarschalk's publication gives patents issued by residence of the patentee and by industry. Therefore, despite the limitation of the data and numerous obvious inconsistencies in the tables given[76] we have deemed the data are of sufficient interest to analyze them with respect to relative longevity of patents issued to residents of different countries and according to industry to which the patented invention belongs.

To avoid extensive tables and high printing costs we have limited this comparison to the summary statistics given in Table 19.

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[75]The method of analysis used to determine trends in the longevity of patents from Maarschalk's statistics as described would give completely consistent results if the number of patents issued each year were to remain constant. On the other hand, if the number of patents issued each year were falling but the survival rate remains constant this method would nevertheless show an apparent rise in survival rates since we would be comparing patents issued in one year to surviving patents from prior years. The converse would be true if there was a progressive increase in the number of patents issued. On the average in Netherlands the number of patents issued each year have increased over time. Thus for patents issued to the patentees of the five countries which we are using for our analysis the average annual number of patents issued for respective five years starting with 1913 are as follows: 327, 937, 1320, 1679, 1999, 1785. The last figure is for the four years 1938-1941 and it also reflects the adverse effect of World War II.

[76]For instance in a number of tables by country and by industry the number of patents shown in force in a specific year is less than the patents issued. This could occur only if the number issued includes those on which the issuance fee was not paid and if so it is inconsistent statistics, but in some instances the difference is such as to suggest an outright error. In some cells, for instance, a frequency is shown for assigned patents, while none is given for the combined tables of assigned and unassigned patents, which could not be true. There are numerous other inconsistencies in specific cells of the tables given on pages 83-115 which can not be reconciled.

TABLE 19

VARIATION IN LENGTH OF TIME THAT PATENTS REMAIN IN FORCE FOR ASSIGNED AND UNASSIGNED PATENTS ACCORDING TO INDUSTRY AND COUNTRY OF ORIGIN OF PATENTEE, NETHERLANDS 1913-1941.[1]

Types	Assigned and Unassigned				Assigned				Unassigned			
	Mean	Min.	Max.	Range	Mean	Min.	Max.	Range	Mean	Min.	Max.	Range
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Aggregate	3.79	3.12	4.62	1.50	4.01	3.46	4.72	1.26	3.48	2.42	4.44	2.02
COUNTRY OF ORIGIN												
United States	4.58	3.70	5.69	1.99	4.43	3.84	5.22	1.38	4.26	3.41	8.09	4.68
France	3.84	3.17	4.70	1.53	4.06	3.27	4.96	1.69	3.65	3.09	4.45	1.36
Germany	3.68	2.98	4.54	1.56	3.89	3.37	4.62	1.25	3.19	2.42	4.32	1.90
Great Britain	3.65	3.02	4.57	1.55	3.99	3.31	4.88	1.57	3.34	2.82	4.20	1.38
Netherlands	3.58	3.03	4.16	1.13	3.88	3.42	4.35	.93	3.31	2.89	3.94	1.05
INDUSTRIAL CLASS												
Glass, Lime, etc.	4.68	3.75	5.85	2.10	5.18	4.26	6.15	1.89	3.97	3.16	5.24	2.08
Graphic Arts	4.36	3.09	5.40	2.31	5.44	4.27	6.66	2.39	2.47	1.53	3.75	2.22
Chemical	4.15	3.33	4.89	1.56	4.20	3.47	4.84	1.37	4.00	3.11	5.16	2.05
Electrical	3.97	3.36	4.79	1.43	3.85	3.50	4.45	.95	4.49	3.00	6.75	3.75
Textile	3.86	3.30	4.63	1.33	4.24	3.76	4.97	1.21	3.40	2.78	4.11	1.33
Timber (logging)	3.71	3.20	4.34	1.14	3.49	2.73	4.48	1.75	3.84	3.47	4.24	.77
Metal	3.68	2.99	4.67	1.68	3.98	3.31	4.88	1.57	3.37	2.73	4.41	1.68
Food	3.66	2.96	4.43	1.47	3.73	2.97	4.57	1.60	3.61	2.95	4.30	1.35
Transportation[2]	3.62	3.06	4.41	1.35	3.91	3.50	4.60	1.10	3.35	2.72	4.20	1.48
Mining	3.60	3.19	4.10	.91	3.67	3.28	4.17	.89	3.53	3.10	4.02	.92
Construction[3]	3.59	2.84	4.16	1.32	3.90	3.02	4.53	1.51	1.86	1.51	2.40	.89
Paper	3.50	2.92	4.14	1.22	3.67	2.84	4.50	1.76	3.36	2.96	3.86	.90
Leather	3.34	3.00	3.92	.92	4.14	3.71	4.77	1.06	2.79	2.50	3.29	.77
Photography	3.32	2.74	4.00	1.26	3.53	2.92	4.17	1.25	3.03	2.57	3.66	.90
Instruments	3.01	2.65	3.69	1.04	3.73	3.66	4.34	.68	3.41	2.77	3.94	1.17

[1]Derived from Maarschalk, C. G. D., *The Role of Patents in Technological Progress with Special Attention to Patents Activity in the Netherlands.*
[2]"Traffic," the wording in the original.
[3]"Building," the wording in the original.

The mean duration was obtained for each year by summing all patents in force from 1913-1930 (18 years) and dividing this sum by the number of patents issued in these 18 years. This was repeated for patents issued to residents of the five nations, and also these same patents grouped by industry, disregarding the residence of the inventor. Similarly means were obtained for 18 year periods for patents issued in 1914-1931, 1915-1932 and so on, terminating with patents issued in 1924-1941. But instead of presenting the averages for each year, we have shown in Table 19 the weighted average for all the 12 years labeled as mean. In addition, we have shown the smallest mean, which invariably turns out to be the mean for the period 1913-1930, and the largest mean, which invariably turns out to be the mean for the last year, 1924-1941. This consistency is a further indication of the progressive upgrading of Danish patents over these years. Since the minimum and the maximum are at the two ends of our time span under observation the range or the difference between the minimum and the maximum for all patents and for each subgroup provides a crude measure of the increased longevity of these different groups of patents considered in our analysis.[77] These four items of summary statistics are given for the patents issued to the residents of the five countries, and separately to each of these groups, ordering the countries according to average mean life of patents issued to its residents. These statistics are given also for each industry ranked by the average mean duration of the patents for each. Separate statistics are given for assigned and unassigned patents and for the two combined.

For assigned and unassigned patents combined the average mean life of the patent on the basis used here for computation is longest for patents issued to residents of the United States,[78] followed by France,

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[77]Crude, since as it was explained in footnote 75, the method which we are using would not give changes in longevity of patents independent of changes in the number of patents issued over time. To the extent that the rate of change of patents over time differ for different categories for which comparisons are shown to that extent differences in patent longevity might be apparent and not real. One could take this into consideration but we did not feel that the effort required would justify the refinement, particularly since as we have said there are inconsistencies in the numerical data that we are unable to explain, and some of the anomalies that we might turn up could be the result of errors in the basic numbers given.

[78]Since the rate of increase of patents with United States patentees in Netherlands, has been greater than for any other country patenting in Netherlands this higher longevity could not be regarded as an artifact it must be considered genuine. One probable explanation of this is the higher selectivity of the United States patents patented in Netherlands. This is borne out by the fact that a much smaller proportion of all U. S. patents are patented in Netherlands than patents of the other countries with which the U. S. patent longevity is compared.

Germany, Great Britain and Netherlands, Netherlands being the last shows the shortest relative longevity for patents issued to its residents. This is consistent with our general finding that inventions patented outside of one's country are on the average more rigorously selected as to their economic significance than those patented at home, and inventions kept in force longest are on the average economically the most significant.

In terms of industry, the highest average mean is for patented inventions in glass followed by graphic arts industry and chemicals, the lowest is for photography and instruments, in that order.

Table 19 gives not only longevity of patents by country of residence of the patentee and by industry but also these same comparisons separately for assigned and unassigned patents in spite of our awareness that the increment rate over time of patents issued to corporations has been much higher than patents issued to individuals.[79]

	Mean Annual Number of Patents for Specified Years					
	(1913-17)	(1918-22)	(1923-26)	(1927-31)	(1932-36)	(1937-41)
Assigned	148	427	695	1,061	1,370	1,336
Unassigned	180	510	625	618	629	449
Percentage Ratios of Assigned to Unassigned	82.2	83.7	111.2	171.7	217.8	297.6

Inspite of the bias favoring unassigned patents the mean longevity obtained by dividing patents in force in a given year by patents issued in that year yields in general a higher average longevity for assigned patents. Thus the aggregate average for all the years is 4.01 for assigned patents and 3.48 for the unassigned. The true differential, had we removed the offsetting influence of the sharper rise in assigned patents over time as compared with unassigned would have enhanced still further the observed difference. The differential is in the same direction, i.e., favoring assigned patents for the minimum, that is for patents issued 1913-30, as well as for the maximum, for patents issued 1924-41. However, the slope between the minimum and the maximum is higher for the unassigned, it is believed this is entirely the result of the limitation of our data and not real, that is as a result of sharper increase in the number of assigned patents over time. Nevertheless, these range differences for different industries might be suggestive in the rate of change reflecting the relative progression of patents in a given industry. We have, therefore, given these differences despite

[79]This contrast in increment is shown by the summary figures showing the mean number of patents issued to corporations and individuals to patentees of the five countries included in our analysis.

the confounding effect of the number of patents issued in different years to any group with longevity of these patents.

Considering assigned patents issued to patentees from different countries the rankings are somewhat modified. The order becomes U. S., France, Great Britain, instead of Germany, followed by Germany and Netherlands. That is Great Britain and Germany change their rank positions, otherwise the ranks are the same for assigned and unassigned patents. The gradient for the assigned patents of different nationals is somewhat less than the gradient for assigned and unassigned patents in combination. The minimum and the maximum averages show the same shifts in rank as that for all assigned patents. For unassigned patents the rank is again the highest for United States residents, followed by France, Great Britain, and Netherlands with Germany the lowest. As we have indicated, some of these variations could result from a sharper increase in one group of patents compared with others. Another important contributory factor could be what we might call the patent mix by industry for the nationals of different countries (considering differences in a given country, between assigned and unassigned patents as well) in view of the marked variation of the longevity of patents shown in Table 19 by industry. But we have not taken time to try to adjust for these different factors, partly since they represent only a few of the many factors that could account for the differences observed, and partly because of our uncertainty about the quality of the statistics given by Maarschalk, but most important of all, because of the limited body of information of this type available for analysis.

Considering industries the ranks of mean duration for assigned patents are somewhat different from that of patents where the assigned and unassigned are considered jointly as could be seen by inspection of Table 19.

Considering the mean duration of unassigned patents in comparison to assigned by industry with two exceptions the mean longevity is higher for the assigned patents as compared with the unassigned. This again corroborates our findings from the Patent Utilization Study showing a higher proportion of patents issued to corporations being put to commercial use compared with unassigned patents. Inter-industry comparisons for unassigned patents according to longevity show some differences in comparative patent longevity when compared with the ranks shown by column 2. Thus, the highest mean is for electrical industry which in column 2 has a rank of 4 and second highest for chemicals, which has a rank of 3 in column 2. The lowest rank is for construction industry which is 11th according to column 2,

and the second lowest is graphic arts, which ranks 2nd in column 2 and 1st in column 6, the mean longevity for assigned patents.

In general one may say that these internal comparisons for assigned and unassigned patents for Netherlands are consistent with insights with regards to patent utilization gained from the Foundation's Study of United States patents. They also tend to confirm that by and large patents taken outside one's country of residence are more favorably selected. That other things being equal, the smaller the proportion of patents taken in a foreign country greater would be the qualitative selectivity of such patents. They also confirm our findings of a higher economic significance on the average of assigned patents in comparison to unassigned.[80]

As far as our main interest is concerned this entire analysis shows consistently an upgrading of patented inventions issued in Netherlands in the period 1913-1941 inclusive, regardless of the residence of the patentee, or the nature of the industry to which the patents belong, or the assignment status of these patents. Moreover, this analysis indicates that the upgrading of patents is at least as much true for patents taken outside of the country of residence as that of patents within the country, as we have demonstrated for countries like Germany and Great Britain. It also shows such an upgrading for French patents and particularly for patents of the United States for which this sort of evidence is not available for domestic patents.[81]

Other Countries

With three minor exceptions we are not aware of other bodies of patent renewal statistics than those which we have considered in this interim report. In his paper for the Senate Subcommittee,[82] on which this author has already drawn frequently and heavily, Federico gives some estimates of percentage of patents kept in force for patents of Sweden and France based on renewal fee collections.

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[80]In part, at least, this differential might not be a measure of the inherent worth of the inventions of individuals working for themselves as compared with inventors employed by corporations, but merely reflect lack of economic resources for individuals to exploit their inventions as corporations are able to do the inventions assigned to them. However, in our economic setting it is not possible to separate these two elements and evaluate the value of individual invention independent of opportunities for effective exploitation.

[81]Data given for Belgium and Switzerland show similar upgrading of patents of these countries in mining and ship and coach building respectively as for those which we have included in the present analysis.

[82]*Op. cit., supra,* note 35.

With respect to France, Federico observes:

> "The figures for France were calculated from a sampling taken in 1937. At that time the term of French patents was 15 years and the remaining 5 years in the table are merely extrapolations. . . The regularity of the French figures is not significant since this was assumed in making the estimates."[83]

Recently Federico advised this writer that he had come across some official French patent statistics. A search in the annual volumes of *Propriété Industrièle* for 1914 through 1919 revealed data on annual patent applications for the period 1897 to 1918. Renewal statistics, however, by year of issue were limited to the years 1897 to 1910, giving the survival of patents issued in 1897 for 15 years, those of 1898 for 14 years and so on for patents issued in 1910 the survival given for two years. Other annual issues of this official publication fail to give useful patent survival statistics.

If the estimates given by Federico for 1937 approximate the reality as of that time, then we could compare them with a summary of this earlier limited data. The comparison is as follows:

Year since Issue	Years of Survival														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1897-1910	100.0	63.0	42.2	30.2	22.9	18.2	15.0	12.4	10.4	8.8	7.5	6.6	5.8	5.2	4.7
1937	100.0	75.5	58.6	46.3	36.8	30.0	25.8	21.8	18.5	15.6	13.1	11.2	9.4	8.0	6.8

These figures suggest that there has been sharp increase in the longevity of French patents despite the slenderness of our evidence. This conclusion is corroborated by the French patents taken in Netherlands showing a sharper increase in mean duration than that for patents issued to Britishers, Germans, or Netherlanders.

In his publication, Federico gives also some data on patent survival for Sweden for the period 1930-39.[84] These statistics were supplied to him by an official of Swedish Patent Office and to use them the annual number of patents issued had to be estimated. However, since these are not shown separately for individual years we have no way of inferring any increase or decrease in the longevity of Swedish patents.

Finally, Federico has called attention of this writer to recent publications of Italian patent statistics for the years 1957, 58, and 59 giving the annual renewal payments for patents in force within each of these years according to the year of application. These comparisons suggest an increase in survival rates from 1957 to 58 but not from

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[83] *Op. cit., supra,* note 35, p. 29.
[84] *Op. cit., supra,* note 35, p. 47.

1958 to 1959. There are, however, what would appear inconsistencies in the survival statistics, and besides, the time span is too restricted to justify any generalization based on three years' observations.

Implications of These Findings

Our analysis of known sources of patent survival statistics has revealed with almost no exception a progressive increase in the longevity of patents kept in force through the payment of annual renewal fees.

This evidence runs counter to the generalization by Machlup without any evidence about the decreasing economic significance of patents because of rapid obsolescence.[85]

The apparent universality and persistence of this phenomenon, both for assigned and unassigned patents could be interpreted most simply one way, the growing significance of patented inventions in the national and international economy, we see no other simple way to account for the fact that more and more corporate and individual patentees are ready to continue annual payment of renewal fees to keep their patents in force longer now than ever before and the apparent indifference of retention of patents to the magnitude of these renewal fees. We attribute this indifference to the progressive upgrading of inventions that are being patented and to increased exploitation of patented inventions and increased economic returns from such exploitation.

The question of particular interest to us and to our readers is with respect to the United States patents. Has there been in the United States a similar upgrading of patented invention? It is believed all the available evidence leads to an affirmative answer to this question. Perhaps none of this evidence would be conclusive by itself, but collectively there seems little doubt that in the United States perhaps more than in most other countries there has been a progressive upgrading of patented inventions.

Evidence in support of this conclusion are as follows:

(1) There has been a progressive shift in the United States from patents of individual inventors to patents by inventors working for corporations. Patent Utilization Study indicates a higher utilization level of assigned patents in comparison to unassigned.[86]

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[85]*Op. cit., supra,* note 30.

[86]*Historical Statistics of the United States, Colonial Times to 1957,* a Statistical Abstract Supplement prepared by the Bureau of the Census with the cooperation of the Social Science Research Council, U. S. Dept. of Commerce, p. 607. For later patent data see the annual issues of the *Statistical Abstracts* of the United States

(*2*) Increasing costs of patenting. In the United States even though the patent fees are much more modest compared with such fees in addition to renewal fees required by most other countries, the cost of professional services necessary for patenting have made patenting progressively costly.[87] Other things being equal, as patenting costs increase inconsequential inventions are less likely to be patented.

(*3*) A priori consideration, as well as available evidence indicate that patents which are repatented outside of the country of residence are on the average economically the more significant patents. Over time there has been a progressive increase in the proportion of the United States patents patented in one or more foreign countries.

(*4*) The analysis of comparative longevity of patents in Netherlands shows the preeminence in the mean longevity of U. S. patents, despite the fact that the rate of increase in U. S. patents in Netherlands in the years compared was highest of all, rising from an annual average number of 28 for the first five years (1913-17) to 254 in the last four years (1938-41). These averages for assigned patents were 14 to 225 (16 fold increase), and for unassigned patents 14 to 28. What is even more striking is that despite this extremely sharp increase in the number of assigned patents over time, the range in mean duration as obtained in Table 19 (column 9) compares rather favorably with that for other nationals. On the other hand for unassigned patents for which the annual increase was slower this range is extraordinarily high 4.68 compared with the next highest of 1.90 (see column 13).

(*5*) The Patent Utilization figures which are annual samples with varying biases are at least not inconsistent with the hypothesis of progressive upgrading of inventions patented in the United States. The percentage utilized is highest for patented inventions issued in 1952, and lowest for those issued in 1938. These differences are not statistically significant, however.

(*6*) Much more significant in this respect is the utilization ratio of all patents issued to each inventor in the Patent Utilization Study who returned a questionnaire compared with the utilization level for the sampled patents reported by these same inventors. For as-

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prepared annually by the Bureau of the Census, as to the true significance of this differential see footnote 80.

[87]Available evidence appears to indicate that intensive search prior to filing a patent application is carried on in the United States more extensively than anywhere else in the world. This increases the comparative costs of U. S. patents so that counting the costs of professional services the average U. S. patent in all probability costs about as much as the average foreign patent, notwithstanding the absence of renewal fees in the United States.

signed patents, other than the sampled, the utilization level was about 42 percent as compared with 62 percent for the sampled patents. For unassigned patents there was a similar differential between all patents and the sampled patent, 30 and 43 percent, respectively. By and large the sampled patents represented the more recent patents of these inventors, thus suggesting a progressive increase in the percentage of patented inventions put to commercial use in recent years as compared with earlier years.

(7) In an earlier interim report this author presented extensive evidence that nearly 40 percent of all assigned patents which are put to commercial use, such use began prior to the date of patent application.[88] From this evidence it was inferred:

"Increasing commercial use of inventions prior to application would tend to raise the proportion of patented inventions in commercial use. Since many inventions which prove commercially a flop are eliminated from the universe of patents completely . . ."[89]

(8) Finally, in the same interim report as referred to in paragraph 7, we refer to correspondence received from certain corporations commenting on Frank Howard's paper[90] to the effect that many corporations file a progressively smaller number of possible patent applications than they could file and did file in prior years. That, while the number of disclosures per R&D employee has remained about the same the number of patent application filed per such employee has declined very sharply in the last 15 to 20 years.[91] The Foundation has more recent communications from a corporation with very large patent portfolio stressing this point.

These bits of evidence would lead this writer to infer that there has been a progressive upgrading of the inventions patented in the United States at least since the latter part of the 19th century. A more solid case of such changes in recent years could be made if resources could be found to make an empirical study of the comparative economic significance of United States patents patented here and abroad especially in countries with renewal fee requirement to obtain more precise comparative norms of the economic importance of inventions patented abroad compared with domestic patents of the United States and inventions of other nationals patented abroad and here. It is only through such comparative studies of empirical patent experiences

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[88]Sanders, B. S., "Speedy Entry of Patented Inventions into Commercial Use," *PTC J. Res. & Ed.*, Vol. 6, No. 1 (Spring 1962), pp. 87-116.

[89]*Ibid.*, p. 115.

[90]Frank A. Howard, "Patents and Technical Progress," *PTC J. Res. & Ed.*, Vol. 4, Conference No. 1960, pp. 57-66, and 109-110.

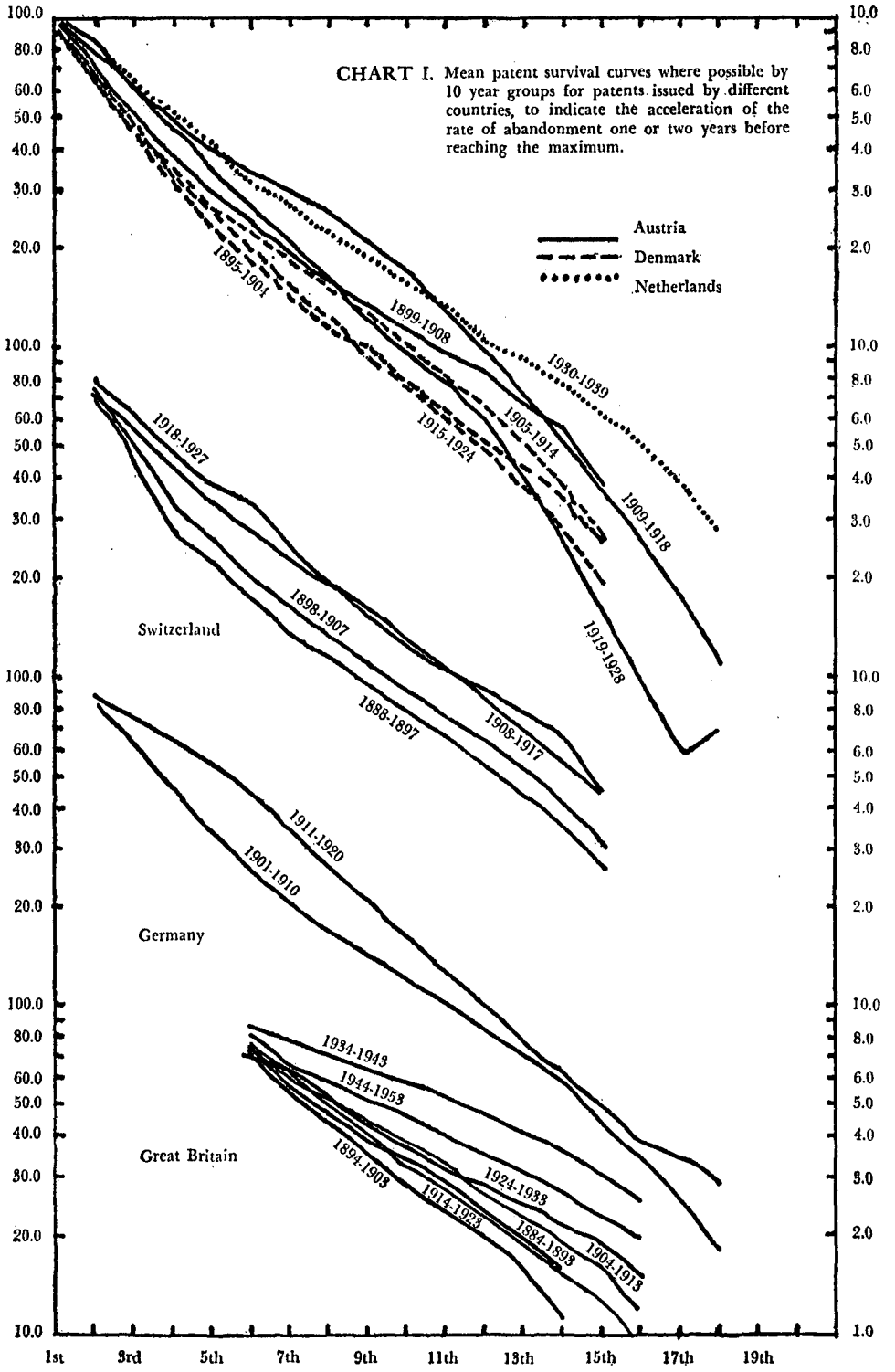
[91]*Op. cit., supra,* note 88, p. 115.

that we can hope to appraise ultimately the economic importance of patents in national and international economic life—and not by speculation from general economic assumptions, or review of what this or that economist has said, sans a bit of empirical evidence about the economic role of patented inventions in the world economy today. Admittedly getting these facts requires much more effort, cost, and certain skills not requisite for speculation along stereotyped paths which has characterized much of the past economic thought on patents and patented inventions.[92]

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[92]Thus, *An Economic Review of the Patent System,* Study of the Subcommittee on Patents, Trademarks, and Copyrights, of the Committee on the Judiciary United States Senate, 85th Congress, 2nd Session, Pursuant to S. Res. 236, Study No. 15, fails to cite a single study analysis where the author had attempted to appraise by a direct study of the economic consequences of patents first hand. The whole document is a summary of speculation without any significant verifiable fact. Thus, on page 76 under the heading "Evaluation of the Patent System as a Whole" it is theorized:

"A comparison, even though *speculative,* of the incremental benefits and costs associated with a little more or a little less patent protection, is more feasible than is an attempt to assess the 'total effects' of the system. An economic evaluation of the patent system as a whole implies an analysis of the differences between its existence and nonexistence—*perhaps a hopeless task,*" p. 76. Hopeless indeed, if it is left to speculation without first hand acquaintance with empirical facts. To get at these facts, however, researchers need financial support.


CHART I. Mean patent survival curves where possible by 10 year groups for patents issued by different countries, to indicate the acceleration of the rate of abandonment one or two years before reaching the maximum.
Austria
Denmark
Netherlands
1895-1901
1899-1908
1930-1939
1905-1914
1915-1924
1900-1918
1919-1928
1918-1927
1898-1907
1888-1897
1908-1917
Switzerland
1911-1920
1901-1910
Germany
1934-1943
1944-1953
1924-1933
1894-1903
1914-1923
1884-1893
1904-1913
Great Britain
100.0
80.0
60.0
50.0
40.0
30.0
20.0
10.0
10.0
8.0
6.0
5.0
4.0
3.0
2.0
1.0
1st
3rd
5th
7th
9th
11th
13th
15th
17th
19th

FORUM

Although the primary purpose of this *Journal* is to communicate the research work of the Foundation, it also serves as a vehicle for educational activities designed to exchange informed opinion and stimulate additional study. This section provides a medium for the presentation of papers and notes which do not necessarily rest as yet on a firm basis of empirical research. It is hoped that the material published in this section will stimulate researchers to undertake factual study of the issues.

Increasing the Production of Inventions

James W. Colvin*

THE PROBLEM OF INCREASING THE PRODUCTION of inventions by research personnel is not simple but involves consideration and exploration of a number of controlling factors which may be grouped for convenience of discussion under three main headings, viz:

1. The nature of patentable inventions.
2. The selection of individuals having the creative ability necessary for making worthwhile inventions.
3. The environment in which the selected individuals are required to function.

So much has been written about patentability and patentable inventions that it would seem to be a waste of time to go into a detailed discussion of the subject here yet, since this is the basic subject of the discussion, it becomes necessary to at least define the material we are talking about. A patentable invention is basically a physical embodiment of an improvement, or occasionally a new idea, in a structure, machine, apparatus, composition of matter or industrial process. This definition omits plant patents which are not pertinent to the discussion. While almost any new and sound improvement or idea may be inventive, in fact if we accept the broad dictionary definition for invention,

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Mr. Colvin has had 15 years experience as a patent attorney for industrial companies and 10 years in private practice. The comments in this paper originally were made by the author in response to the inventor questionnaire card sent him by his former employer in the Foundation's study of rewards and incentives to employee-inventors. Mr. Colvin has made certain additions and changes in his remarks prior to publication.

—Editor.

the ideas do not even have to be sound as long as they are imaginative or ingenious, the designation of *patentable* introduces other criteria. To be patentable, the idea must not only be embodied in a physical existence, such as a structure, for example, a hand tool, fish lure or container, machine such as a machine tool, vehicle or power plant, apparatus, such as a radio, instrument or communication system, composition of matter, such as a metallic alloy, therapeutic drug or plastic composition, or industrial process, such as heat treating and tempering metal, mixing, molding and vulcanizing rubber or the conversion of wood fiber into paper, but must also respond to requirements of novelty, ingenuity, operativeness and utility.

If a new machine comprises an assembly of known components in producing its intended result, the old components of the machine must react on each other and so modify the action of the several components that the result obtained is more than the expected sum of the result of the operation of the several components by an ingredient of ingenuity obtaining a result which could not have been anticipated from an analysis of the accumulative operation of the components. If the results produced by the machine are only the summation of the actions of the several components, we have only an unpatentable aggregation no matter how useful the assembly may be. On the other hand, if the result of the operation of the machine could not have been foretold from a knowledge of its components by standard or conventional engineering analysis, we have a potentially patentable invention. To the evaluation we must then apply the criteria of operativeness and utility.

The Patent Office attitude on operativeness is liberal. If the Office questions the operativeness of an invention, the inventor has only to demonstrate by model or sample that the device or composition will operate at least a few times. The Patent Office will accept this demonstration if it appears that routine engineering could make it practically operative, omitting consideration of the requirement for clinical testing of new drugs. It must also be shown that the invention produces results that are either materially better than the results obtained from prior devices or materials used for the same purpose or that it produces an entirely new result having sufficient utility.

Having, more or less, defined the subject matter in which patentable inventions may occur, we can now turn to a consideration of the kinds of activity in which patentable inventions would likely occur and from that consideration identify the class or group of inventors to which the application of some form of stimulation might be effective to improve the alleged relative lag in the technological development of the country. Having identified the particular class or group of inventors,

it then becomes appropriate to consider what form of stimulation would have the greatest appeal to the type of inventor with which we are particularly concerned.

That kind of research referred to as basic or scientific research, that is research having as its primary purpose the production of information or increase of knowledge, produces a negligible number of inventions. One reason is that this type of research is directed toward learning more about the laws of nature or the principles of life, which material is not patentable subject matter. If the millions spent on medical research in such fields as cancer, polio, tuberculosis, etc., have produced any important patents, this writer is not aware of them. The Salk Vaccine, for example, is not patented and probably could not be. Basic research in the field of astronomy, etymology, microbiology, radiation, sanitation, electricity, and cryogenics, to mention only a few, is not known to have produced much in the way of patentable invention, although, as mentioned above, chemical researchers may occasionally discover a new and useful substance. It is said that during a Congressional investigation of government research, one senator made the remark that, in his opinion, the only result from billions of dollars spent by the government on basic or informational research was millions of pages of uncatalogued, uncollated, and unassimulated information. Perhaps consideration should be given to the question as to whether, under the present economical and political conditions, some of the money and effort now being fed into basic or informational research should be diverted into applied research. This could be in line with a remark the Secretary of Defense is reported to have made at the time of the Cuban crisis. "I don't need exotic aircraft and rockets seven years from now, I need guns now."

A review of a recent issue of the *Official Gazette* of the U.S. Patent Office reveals that of 900 patents issued, 660 were assigned to manufacturing companies or the government and, in the case of 240, assignments had not been recorded. Acknowledging that in some cases there were two or more patents by the same inventor and that in some of the unrecorded cases, assignments will be recorded later, the percentage of organization or captive inventors is approximately 73 percent of the total, and of independent inventors 27 percent. It can probably be safely assumed that on the average, three-fourths of the patents are issued to employers of captive inventors and one-fourth to independent inventors. It is further noted that nearly all of the patents in the chemical and electrical arts were issued to employers and that many of the patents issued to independent inventors were for such subject

matter as games and game pieces, toys, household implements, fish lures, and other gadgets.

In defining the field where stimulation of the production of inventions would be desirable, it seems reasonable to ignore the group of independent inventors. Fishing seems to be particularly inducive to invention while golfing, cooking, and yard work also seem to be helpful and it is not thought that recommendation for greater indulgence in these activities would add materially to the technological status of the country.

Turning now to the captive inventors, the nature of the patents indicates that most of these are working in the field of applied research, including product development and improvement. A few patents, particularly in the chemical and electrical arts may derive from basic or informational research. It is conceivable that a chemist with an inquiring mind wondering what would happen if he added this to that and stirred vigorously, might occasionally produce a new substance and be curious as to what it might be good for. Many such new substances have been found to be useful only as intermediates in a subsequent process and this has brought on a major controversy as to whether utility as an intermediate is sufficient to warrant the granting of a patent monopoly.

While the field of basic or informational research cannot be entirely ignored since it furnishes much of the background knowledge utilized by the worker in applied research, it produces so little in the way of patentable inventions that any attempt to stimulate the production of invention in this field would not pay off.

This then leaves only the workers in applied research who are already producing between 600 and 700 inventions per week. This leads to the question as to whether the lagging technological status of the country may be incidental to the quality rather than the quantity of our inventions. While it is true that the number of patents issued per year has remained fairly constant over the past 30 or 40 years and has not kept pace with the increase in population, it must be remembered that many, if not most, of the simple contrivances needed by the relatively primitive economy of 100 years ago have been provided and the requirement has now moved to more sophisticated ideas as evidenced by the fact that three-fourths of todays patents are issued on inventions of trained technologists working in organized applied research. While it might be argued that the production of more inventions would inherently increase the number of important or far advanced inventions, it is believed that this is not necessarily true. It seems rather that the question should be restated to inquire how we can increase the number

of inventions of a quality that will restore our leadership in the fields of advanced technology.

It is believed that the answer to the restated question is in two parts. The first part involves the selection of individuals capable of producing inventions in the quantity and of the quality required, and the second part involves the creation of an atmosphere in the field of applied research that will be conducive to superior and sustained effort on the part of these individuals.

Selection requires at least two facilities, a place or condition where inventive qualities can be demonstrated and a management personnel capable of making selections without personal or professional jealousies or personal prejudices. Many industrial organizations already have experimental laboratories or experimental shops in which research engineers and scientists work. With some improvement most of these could be used as test grounds to demonstrate the creative ability of research and development personnel.

Some companies do subject incoming engineers and technicians to a test period in such laboratories or shops but usually the test periods are too short, averaging about six months, to provide opportunity for the deliberate or the late bloomers, and do not provide anything near the proper environment for creative effort, as will be discussed later. Also, these laboratories and shops are usually open to incoming employees only and little effort is made to uncover hidden talent in the ranks of employees holding routine or stabilized jobs. Just because an engineer is an excellent production cost analyst does not mean that he is not also a potential innovator but it seems that the premium on production cost analysts is such that it would not be profitable to have such an employee devote even a part of his time to innovation and invention.

In the government, the test ground situation is much worse than in industry. In the first place, it seems to be arbitrarily assumed that Civil Service does not attract technological personnel who really have "anything on the ball." The tendency, therefore, is to contract all experimental and research work to industrial organizations with the result that the government, and particularly the military establishments, have little or no facility for in-house research or experimentation. Thus, the government engineers quickly find that they are not expected to originate anything but are really contract administrators burdened with such a load of clerical and administrative detail that initiative is sapped and such creative or innovative ideas as occur are put off to some indefinite future time when there may be sufficient leisure and freedom to indulge in the almost forgotten delight of un-

regulated thinking. Two of the necessities for increasing the occurrence of inventions among government employed technologists are better facilities for testing inventive ideas through models and application of innovations to existing equipment, and job assignments that will provide the necessary freedom for creative thinking. If these requirements could be met, there would be at least a chance of recognizing some of the few creative thinkers among the host of administrative and clerical personnel composing the multitude of government employees.

Even with the existence of an adequate proving ground, the selection of inventors is not always easy. Granted that there are a few outstanding individuals, men like Firestone, Kettering, and Steinmetz, whose inventive enthusiasm cannot be suppressed, many potentially good or even great inventors require, at first, reasonable encouragement and a sympathetic reception of their offerings. This requires in those members of management charged with this responsibility, an enthusiasm for invention and innovation, a policy of dissatisfaction with present products and a desire for improvement, a willingness to sacrifice a part of current profits for dominance in future competition, and an ability to give credit where credit is due without personal jealousy or connivance for personal aggrandizement. For example, there have been cases where nearly all patents on inventions of a company engineering department have been taken out in the name of the chief engineer regardless of who originated the idea. Probably one of the best current examples of selection and encouragement of inventors is provided by the International Business Machines Corporation although other companies including General Electric, Minnesota Mining and Manufacturing, and Bell Telephone Laboratories are doing an excellent job of selecting competent inventors and obtaining a high production of worthwhile inventions.

While it is true that the majority of engineers probationally placed in the research laboratory or experimental shop to prove their ability to make improvements and innovations must ultimately be removed from the list of potential inventors and assigned to other duties or separated, discovery and development of the few creative thinkers in each group has proved to be well worthwhile to some manufacturers.

Even though a group of the highest capacity for constructive thinking and invention were selected and established in an industrial or government organization, the result of their efforts could be completely disappointing unless they were able to work in an environment conducive to original and constructive thinking. The basic areas of such an environment can be estimated from a consideration of the

characteristics of the typical inventor. Since by the very nature of the requirement the inventor is an original and free thinker endowed, like the true artist, with an ability to see what others overlook, with a singular imagination that can transform what he sees, whether abstract theory, concrete experimental data or factors of experience, into physical concepts of matter, form, and dynamics, with an analytical competence that can discard the husk and proceed directly to the heart of the matter, with a sense of logic that enables him to break down the most complex problem and find a solution in the relatively simple, concrete embodiments which form the subject matter of patentable inventions and last, but not least, with a power of concentration and faculty of determination that will see him through failure after failure to an ultimate success, it follows that he is, in many ways, a unique individual. The typical inventor may be said to be a rebel, a nonconformist and a rank individualist. He is jealous of his ideas, his time and his prestige, he may be asocial and frequently cantankerous. He is dissatisfied with things as they exist and believes that most things can be improved and some should be eliminated.

Although the patent law states that the evaluation of novelty shall not be based on the manner in which an invention is made, all inventions require ingredients of inspiration, imagination, and ingenuity, in some cases perhaps even genius, and every invention has at least its inception in the mind of a single individual. To advance the development from the inceptional or germ stage to a practical or useful product requires further ingredients of observation, concentration, determination, rationalization and technical competence, frequently also including contributions from others, particularly from experts in disciplines other than that in which the originator is specialized.

Assuming then that the group of inventors selected for special incentive is the group of inventive individuals in the class of trained technologists or engineers working in the field of applied research, what then is a suitable environment to encourage such an individual to exert his best efforts? First he cannot be burdened with the details of routine and administrative duties. There are cook book technicians, many of whom hold engineering degrees, accountants, clerks, and expediters who can handle such details much more expeditiously and efficiently than the inventor. In fact, the inventor should have a personal assistant to relieve him of such details in his own work. His position and his work must be given their due importance in the organization routine and his prestige should be at least in proportion to his contribution to the organization which, in many cases, is its continued existence.

The established inventor should have not only his own private office and security of his privacy until he is ready to disclose his results, but also his own shop or laboratory, his own reference material, his own tools, including computers if he needs to use them, and any materials he needs for his approved projects. He must have adequate time and opportunity for maintaining his notebooks and diaries, for reading to keep abreast of new technology and for discussion of technical subjects with others in his field. At times, he should even take refresher courses in subjects on which he may have become rusty and to take educational courses in new subjects.

While there are certain outstanding exceptions, it is felt that the attitude of management is typified to far too great an extent by the following extract from a management statement of a large organization engaged in extensive research and development work.

> "In recent years there has developed a pronounced belief that major breakthroughs can be achieved only by taking unconventional approaches to engineering problems. Technical history demonstrates that this belief is not always valid. Lack of major progress along conventional approaches may not be due to the exhaustion of inherent growth potentials. Instead, it may be attributed to such factors as:
>
> "*1*) lack of creative research engineering effort, or incentive therefore;
>
> "2) lack of a published base in experience and research data broad enough to indicate the problem areas hindering growth.
>
> "We believe, therefore, in the advantage of a design breakthrough along conventional engineering lines. It is coming to be realized that new approaches bring new problems. In the main, this is because a new approach does not build on a solid base of proven empirical experience, but must establish a new base. Such an establishment takes time and money, especially when reliability and life factors are prominent.
>
> "In contrast, advances along conventional approaches built upon reliability/life bases already established. It is exploitation of accumulated engineering research capital. It is making past experience pay off."

This attitude can lead to substantial loss of business to competitors, including small business and foreign organizations, having new ideas, new methods and new products. The fact that applied research organizations of the more progressive European countries have created an atmosphere favorable to inventions is believed to be evidenced by the following statistics from a recent issue of the *Official Gazette* of the U.S. Patent Office.

Of a total number of 866 patents listed in this issue of the Gazette, 673 were issued to U.S. citizens or residents, including U.S. corporations, and 193, or 22 percent, of the total were issued to foreign citizens or residents. The total number of European patents issued in all countries for the same period is not known but was probably greater than the number of U.S. if enough foreign patentees or assignees

thought it worthwhile to seek U.S. patent protection to make up over one-fifth of the number of U.S. patents issued. This trend may be back of news items such as the following excerpt from a recent newspaper:

> "France and Britain jubilantly hailed on Wednesday an American order for their jointly built "Concorde" supersonic airliner as a major victory in the struggle for world commercial dominance in the air."
>
> * * * *
>
> "The British-French consortium has promised delivery in 1968 and 1969 of the slim delta-winged "Concorde" which will cross the Atlantic in two and one-half hours at about 1,450 miles per hour.
>
> "Experts here believe the earliest date an American matcher could reach the airlines would be in 1971 or 1972."

In addition to adequate facilities, proper recognition and a more sympathetic attitude on the part of management, the inventor should also have efficient and expeditious patent service, both in providing him with digests of the prior art and in obtaining patents on his inventions. The delays in the Patent Office are already too long, and if to these are added long delays by the organizational patent personnel, indecision, and in some cases opposition, on the part of management toward filing applications and a demand for an unreasonably large margin of patentability, the inventor becomes discouraged and his work depreciates.

In any case, it is believed that the provision of a favorable environment or climate is perhaps the most important answer to the question as to how the production of patentable inventions of suitable quality can be increased.

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"Another direction in which aid to performing the examination might lie is to modify the search itself, that is, search for novelty, utility and non-obviousness, and leave the question of scope and the doctrine of equivalents to the Courts. Probably less than five percent of issued patents reach the Courts.

"The examination might also be simplified by adopting a fixed date as a date for priority or a limit upon a claim to priority. A fixed date of priority would make possible a public opposition system that would transfer at least a part of the examination from the shoulders of the Examining Corps

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". . . While it is clear that the lawfulness of a defined field license could be tested by the government in a suit under the antitrust laws, or by a competitor who brings a private treble damage action, it is much more likely that such questions will arise in a suit between the parties to the license. For this reason, the legality of such licenses will be examined in the context of a possible misuse defense to an action brought by one of the parties. This is not to assume, however, that antitrust violation and misuse are always equivalent."

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"The report is notable also for its recognition that the only justifiable objective for a design law is to protect what it refers to as 'the actual work of the author of the design.' But this proposition is true only if the work of the designer is understood to include whatever the *manufacturer* who hires the designer (or, occasionally, who is himself also the designer) achieves through his investment in the new design. . . .

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"The courts have even gone so far as to regard the effect of expiration of the term of copyright as fully equivalent to the dedication of the invention to the public that necessarily must take place, as the consideation for the enjoyment of the monopoly, when a patent expires. Because these tendencies, if they should be applied to the expanding field of copyright design protection, may have the effect of whittling away the important right of the trader to protect himself against unfair competition through deliberate product simulation, the profession should be alert to minimize the danger by taking advantage of every opportunity to clarify the true theoretical nature of each of the fields of law that overlap on the area of product simulation and to emphasize the significant differences between them."

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6. The Plight of the Common Assignee of Different Inventors
7. Conclusion

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"Amend Sec. 112, 2nd paragraph, to read:

" 'The specification shall conclude with one or more claims in the form of a simple, concise, and direct statement, pointing out the novel features of the invention which the applicant believes to be

his contribution to the advancement of the useful arts.'

"Amend Sec. 284 by adding the following additional paragraph:

" 'In determining questions of infringement and validity of the patent the court shall construe the claims of the patent to have such scope, consistent with the disclosure, as to adequately compensate the inventor for his contribution to the advancement of the useful arts and to the extent which the infringer has used same to his advantage.' "

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NOTES

On Japanese Patent Literature

KEY K. KOBAYASHI*

English language literature on Japanese patent laws and procedures is generally still scarce. The references cited in Mr. Kotaro Otani's article** neatly sum up what English language sources there are that are readily available to the Western reader. As evident from the titles, these sources serve mainly as introduction to Japanese patent laws and procedures by offering full English translations of the laws or brief, succinct explanation of the patent procedures specified by the laws. For anyone interested in searching Japanese patents by classes, the *Derwent* article by H. Odajima and M. Hyams contains a translation of 135 classes and over 800 groups of subclasses. To date, it seems that a full translation of the 15,000 subclasses of Japanese classification system is not available.

As for Japanese language patent literature, the current Scientific Library collection in the U.S. Patent Office is comprised of over 1,700 bound volumes (occupying some 320 linear feet of shelf space) of official Japanese patent specifications dating back to the first Japanese patent issued in August 1885 and represents a holding of over 310,000 printed specifications of patents and patent applications. Lack of Japanese language skill, however, need not be a formidable barrier that Westerners commonly associate with the popular phrase, "the inscrutable Japanese" when it comes to using Japanese specifications.

Knowledge of Japanese language is not required in most instances for anyone searching or examining the drawings of Japanese specifications of patents and patent applications. Also for certain purposes like verification of Japanese patent identification numbers, it is a simple operation for one to recognize a specification as to its identification number and date once he understands the current serialization system—using Arabic numbers—employed by the Japanese Patent Office.

Currently, the Japanese Patent Office uses a serialization system that involves three types of numbers for identifying its patent literature:

1. Six-digit patent numbers, e.g. 280,000.

* Mr. Kobayashi is the Japanese Translator at the Scientific Library of the United States Patent Office.

** "Introduction to the Japanese Patent System," *PTC J. Res. & Ed.*, Vol. 7, No. 1 (Spring 1963), p. 13.

2. Hyphenated patent application publication numbers, e.g., 35-14303. (1960-14303).
3. Hyphenated patent application numbers, e.g., 33-35032. (1958-35032).

At the same time, Japanese dates are expressed in the sequence of Year-Month-Day with the year given not as a Gregorian calendar year, but as the "Reign Year" of the emperor. Thus, under the Japanese system, a date like April 30, 1963 becomes 38-4-30 since 1963 is the 38th year of the present emperor's reign. To convert from Japanese, add 1925 to the given Japanese year since 1926 was the year in which the present emperor succeeded his father to the throne. Discussion of "Reign Years" of past emperors is omitted to keep this on a current basis.

Recognizing a Japanese patent identification number can be either a simple or a complicated task depending on whether one is confronted with a six-digit or a hyphenated patent identification number. It is a simple matter to recognize that a six-digit number like 280,000 is a current patent number or at least a patent number issued since 1933 when the number of Japanese patents issued reached 100,000. However, in the case of hyphenated numbers, it is not so simple.

There is no easy method to tell whether a given hyphenated number is a Patent Application number or a Patent Application Publication number because duplication of numbers occurs between these two series of Japanese Patent Office numbers. Duplication is the result of Japanese Patent Office practice of using the same numbering system for both series, i.e., starting with number 1 at the beginning of each year. Thus, confusion arises over a simple number like 38-1 (1963-1), in that 38-1 can be a Patent Application or a Patent Application Publication number. However, for high hyphenated numbers ranging over 20,000, such as 33-35032 (1958-35032), one can safely conclude that they are Patent Application numbers for any year since 1950 except 1961. No Patent Application Publication number exceeds 20,000 since 1950 when the current Patent Application Publication series was initiated except for 1961 when it reached 24,500. Both series of hyphenated numbers are found in English language sources. It may be useful on occasions to remember that, as a rule, *Chemical Abstracts* cites Patent Application Publication numbers while U. S. Patent Applications submitted from Japan usually refer to Patent Application numbers.

The significance of the Patent Application Publication number is appreciated once one learns that all current specifications of Patent Applications are published in the Patent Application Publication series

before a patent is granted. Under the present patent system, the Japanese Patent Office, as a rule, does not publish the specifications of the patents at the time the patents are issued. Instead, the Japanese Patent Office announces a list of newly granted patents with a list of corresponding Patent Application Publication numbers, under which the specifications were first laid open for public inspection and opposition. Thus, the simplest and most direct way to obtain a copy of Japanese specification is through its Patent Application Publication number. Copies of Japanese specifications are currently received from Japan by the Scientific Library in the U.S. Patent Office about six weeks after their publication dates.

Positive Competition and Antitrust in Foreign Transactions Involving Industrial Property

L. JAMES HARRIS* and IRVING H. SIEGEL**

I. Orientation

THIS IS THE THIRD PAPER IN A SERIES on the concept of "positive competition" and its application to transactions involving patents, trademarks, and related property. The first paper introduced the concept and discussed it against a background of history and cases.[1] The second applied the concept to tie-ins, grantbacks, and package licensing and considered the mutual adaptation of such business practices and the law.[2] The present paper extends application to international arrangements regarding industrial property. It reviews and briefly comments on relevant court decisions, takes cognizance of the changing European antitrust outlook, notes the opportunity to improve the nation's foreign trade position by informing antitrust practice with the principles of positive competition, and makes recommendations in this direction.

The challenge to our position in foreign markets has been intensified in recent years, and the need for remedial action becomes more pressing. The economic recovery of war-ravaged countries with wage standards considerably lower than ours has provided strong competition for our exports, and has also facilitated the penetration of our domestic markets. The establishment of the European Economic Community, applauded by us as a generally desirable development, is also recognized as a potential barrier to vast markets across the Atlantic. The Commerce Department and various legislators have recently taken explicit public notice of the special antitrust handicaps facing United States firms in competition with European and Japanese exporters.[3]

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[1] L. James Harris and Irving H. Siegel, "Positive Competition and the Patent System," *PTC J. Res. & Ed.*, Vol. 3, No. 1 (Spring 1959), pp. 21-32.

[2] L. James Harris and Irving H. Siegel, "Evolving Court Opinion on Patent Licensing: An Interaction of Positive Competition and the Law," *PTC J. Res. & Ed.*, Vol. 5, No. 2 (Summer 1961), pp. 103-113.

[3] See *The Wall Street Journal*, July 17, 1963 and July 22, 1963; S. 1255, 88th Congress, introduced by Senators Javits and Cooper "for the establishment of a Commission on Revision of the Antitrust Laws of the United States;" and remarks by Senator Javits in *Congressional Record*, April 2, 1963.

The need to reexamine our modes of doing business abroad is underscored by the continuing balance-of-payments deficit that threatens the value of the dollar—a problem to which the President devoted a message to the Congress in July 1963.

A. *Nature of "Positive Competition"*

Since we propose here to review certain antitrust aspects of international transactions in industrial property in the light of "positive competition," some discussion of this concept is first required. "Positive competition" may be characterized broadly as very much like the "competition" that we think we recognize in our daily economic experience and that we do not bother trying to define. Even more pertinent is its similarity to the undefined "competition" that antitrust legislation and court decisions seek to protect and to enhance.

To say what "positive competition" and what this undefined preserve of "competition" *are not* is a much simpler task than to state what they *are*. Both concepts are complex. They have the virtue of maximum relevancy, however; they derive from "free" economies that are "real" and are known "to work." They are very unlike the oversimplified, fleshless, match-stick models that may seem adequate for text-books.

Any effort to compile a complete detailed catalogue of attributes—or non-attributes—of "positive competition" is bound to prove impracticable. The list would be far from exhaustive and would soon be rendered obsolete by reinterpretations in new settings and by the operation of the dynamic forces that are so evident in our economy.

Better than enumeration is the description of "positive competition" as a concentrate of the dominant constructive features of our actual economic system—or, what amounts to the same thing, of the salient features of the archetypal "competition" that our law and our courts endeavor to guard and foster. Thus, the term refers to a distillate of attitudes, behavior, institutional arrangements, and actions "positively" contributing to:

1. *Past improvement* in our economic and social well-being, as reflected, say, in the growth of per capita wealth, national product and real income, and consumption; in the increase of life expectancy and the decline of hours of work; and in the preservation of opportunity for wide exercise of independent, private decision-making in economic and other matters.
2. The *current maintenance* of domestic well-being.
3. The promise of *future* well-being for our people.

4. Advancement of the *national posture* in peaceful transactions with other countries as well as in defense.

5. Past, current, and expected future *improvement in productive techniques*—in the balance of "man against nature"—as reflected, say, in scientific progress, significant invention, and technological innovation and diffusion.

The first three of these items refer to the advancement of personal and general welfare within the nation, and the remaining two to effective management of the international and natural environments. Achievement of these results obviously cannot depend on a fixed list of attitudes, actions, and institutions; indeed, in different contexts, any given behavior need not produce the same effects, and these effects may not all be benign.

By design, our concept of "positive competition" excludes the comparatively small fringe of exceptionable economic conduct that receives prominent attention in organs of public information. This "pathological" conduct is relatively uncommon, rather than typical, and it is widely recognized as "deviant," rather than "normal." It has already been legally interdicted, or it is likely to be, sooner or later. It tends to be repressive of others' "freedom" to make their own choices and to follow their preferences in the world of affairs.

Our concept accepts government regulation and action, according to rules commanding general assent, as part of the *framework* within which "positive competition" is manifested. This framework includes the tradition of antitrust (and the tradition of critical review, which we here exercise). It reflects the trend toward greater and more diversified participation of government in domestic and international economic affairs.

B. *Proposed Standards*

From the generalities thus far stated, on which broad agreement might be expected, an effort may be made to derive legal standards and guidelines. Such deduced principles, however, are not unequivocally yielded by the statements already made, and they may not be universally accepted as implications or rules for proper judgment and sound decision. But, in a nation like ours, disagreements on the essence and sources of observed and anticipated economic and social progress are inevitable; lawyers, judges, and scholars should not be expected to concur in advance of (or even after) the trial of specific cases involving alleged injury to "competition."

According to the authors' reading of American economic and social

history, at least eleven principles of "positive competition" are indicated as compatible with future gains in domestic well-being (including the maintenance of significant freedoms), in our international posture, and in the supply and profitable use of technical information:

1. Economic experimentation, exploration of the borders of legal experience, and pursuit of diverse private aims within the larger framework of shared values should be encouraged, rather than inhibited, by governmental authority, in the well-founded optimistic belief that (*a*) net private and social benefits will generally be derived and (*b*) existing and enactable laws could reduce or cancel any resulting net social harm.

2. Instead of diluting incentives to invest in new technology and to raise labor productivity, we should improve mechanisms for reducing incident personal hardships and cushioning the impact on established patterns, while still realizing net social gains in the long run.

3. Private initiative and enterprise should be given widest practicable scope to multiply firms, processes, products, and markets and thus to facilitate, though they do not guarantee, employment of an increasing labor force in meeting social needs.

4. The processing and application of "information" for private profit should be fostered no less than the economic exploitation of "materials" and "energy."

5. Opportunity to fail should not be foreclosed if it rests on a generally desirable and widely available freedom; for, in this circumstance, failure too contributes to progress, and, besides, it cannot be authoritatively predicted as the certain net result of myriads of economic and other interactions. (Excessive government protection also distorts resource allocation, no less than "monopoly" does.)

6. Since the boundary between legally acceptable conduct and unacceptable conduct is not clear in advance, need not be sharply defined by adjudication, and is subject to reinterpretation in changing conditions, the public interest is better served by energetic defense of challenged private actions than by routine pleading of *nolo contendere* and acquiescence in consent decrees.

7. Not only should restrictions and penalties bear a close relation to ascertainable or reasonably predictable injury in given contexts, but account should also be taken, in such determinations, of incidental and probable offsetting social benefits.

8. In reckonings that concern "giveaways" of government-financed research findings account should also be taken of correlative "takeaways" in the form of increased income taxes at progressive rates.

9. Rigid evaluation of business behavior by means of a checklist, by the mechanical application of "indicia" and "criteria" of *per se* doctrine, is far less desirable than the test of actual, or of reasonably foreseeable, consequences.

10. The constancy of economic function should not be overlooked in the changeability of form, and change in economic significance should be conceded as a possibility despite the persistence of forms. (In particular, behavior may remain competitive though it finds expression in new instruments and institutions, so that the legality of a form should not be decided or prejudged once for all. Criteria relating to size of firm, share of market, and so forth may lose their force as improvements are made in transportation and communication, as population and resources are redistributed, and as substitute and alternative processes and products become available.

11. The nation's economic fortunes are not symmetrically affected by *domestic* events and arrangements and by *external* occurrences and relationships, so laws designed for regulation of internal affairs should not be applied or extended literally to foreign transactions.

II. United States Approach to International Transactions

An examination of United States interpretation of law with respect to international transactions in industrial property provides strong evidence in support of the following propositions:

1. The notion of domestic antitrust regulation has been too literally adapted to the international sphere, with attendant disadvantage to the nation's economic posture.

2. The trend of court decisions relating to international antitrust issues is ill-defined, except to emphasize the existence of unforeseen and unmarked pitfalls of illegality almost everywhere, with inhibiting effect on business initiative.

3. Our antitrust policy has not been informed by a clear and consistent statement of national purposes that might appropriately be pursued in the realm of international transactions.

4. Our preoccupation with the narrow determination of rights and wrongs without sufficient regard for the achievement of broad constructive objectives constitutes a special handicap in dealings with other nations.

5. The economic and legal handicaps and burdens imposed on our business community are greater than the constraints imposed on major foreign competitors by their own governments.

A. *Early Experience*

The United States does not subject the exclusive control of the patent right to compulsory working provisions, as most European nations do, yet many of our laws do specifically restrict the options available to business firms. Not only are there Federal laws, but certain states also have antitrust enactments. In addition to the basic Sherman Act,[4] the Federal antitrust laws affecting foreign trade include the Wilson Tariff Act[5] (relating to imports), the Clayton Act[6] (and Robinson-Patman Act),[7] the Federal Trade Commission Act,[8] the Webb-Pomerene Act,[9] and the Tariff Act of 1930 (as amended).[10] Various acts regulating interstate and foreign commerce in such fields as air transport,[11] communications,[12] and shipping[13] contain antitrust provisions too. The major antitrust statute in the field of foreign trade remains the Sherman Act; and the Webb-Pomerene Act, which was prompted by the need "to extend greater freedom of combination to those engaged in promoting the foreign commerce of the country," never became a significant factor in our international trade.[14]

Despite the broad language of the Sherman Act, it was believed at first to relate only to domestic commerce. In *American Banana Company* v. *United Fruit Company* (213 U. S. 347), the court held "that the character of an act as lawful or unlawful must be determined wholly by the law of the country where the act is done." This opinion was promulgated in 1909. During the next 25 years, however, the Supreme Court became increasingly concerned with the application of United States antitrust laws to foreign trade, as cases like *American Tobacco Company* (1911),[15] *United States* v. *Pacific and Arctic Rail-*

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[4] 15 U.S.C. Secs. 1-7.
[5] 15 U.S.C. Secs. 8-11.
[6] 15 U.S.C. Secs. 12-27.
[7] 15 U.S.C. Sec. 13.
[8] 15 U.S.C. Secs. 41-58.
[9] 15 U.S.C. Secs. 61-65.
[10] 46 U.S.C. Sec. 1337.
[11] 49 U.S.C. Sec. 494.
[12] 47 U.S.C. Sec. 222.
[13] 49 U.S.C. Sec. 5 (11); 49 U.S.C. Sec. 5b (9); 46 U.S.C. Sec. 814.
[14] "Eugene V. Rostow and several members cannot agree with the Committee's recommendation that the Webb-Pomerene Act should be continued: 'The argument seems to be that it has not been much used, and hasn't done much harm. . . . We should recognize that the Webb-Pomerene Act is an experiment which has failed, and urge its repeal.'" *Report of The Attorney General's National Committee to Study the Antitrust Laws* (Washington: Government Printing Office, 1955), p. 114.
[15] 221 U.S. 106.

way and Navigation Company (1913),[16] *Thomsen* v. *Cayser* (1917),[17] and *United States* v. *Sisal Sales Corporation* (1927)[18] indicate.

Toward the end of the 'thirties and the beginning of the 'forties, when the country was recovering from the great depression and becoming increasingly occupied with the conflicts in the Far East and in Europe, the government filed a series of suits based on the changed philosophy of United States antitrust law as applied to foreign operations. At this time too, the number of consent decrees began to rise very steeply,[19] and many of these involved operations abroad.[20]

An oft-cited example of the jurisdictional implications of the changed philosophy is provided by *United States* v. *Aluminum Corporation of America* (1945).[21] The court in this case held illegal an agreement made *between foreigners outside the United States.* It determined, in effect, that the United States had jurisdiction over acts taking place abroad if, as a result thereof, our foreign trade was affected. This finding seems to represent a complete reversal of the stand taken in 1909 in the action between the American Banana Company and the United Fruit Company[22]—unless the latter opinion is interpreted to mean, as some writers believe, that no effect on United States foreign trade was involved.[23] In the 1952 decision of *Steele* v. *Bulova Watch Company,* the Supreme Court found that the District Court was exercising its equity powers and "may command persons properly before it to cease or perform acts outside its territorial jurisdiction.[24] It distinguished the circumstances from those of the *Banana* case, stating that in the latter the court had held "that a violation of American laws could not be grounded on a foreign nation's sovereign acts."[25]

By 1945, the United States had become the dominant world power, and our economic, political, and legal thinking was adjusting to take greater account of international trade. The situation was essentially new. For more than a century after separation from the British Em-

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[16] 228 U.S. 87.

[17] 243 U.S. 66.

[18] 274 U.S. 268.

[19] See *Staff Report of the Senate Judiciary Subcommittee* published on February 19, 1960. From August 1941 to January 9, 1959, patent relief was obtained in 107 judgments filed in civil antitrust cases brought by the United States government. In 94 of these, judgments were entered by consent.

[20] *Ibid.*

[21] 148 F. 2d 416.

[22] 213 U.S. 347.

[23] See Branch v. FTC, 141 F. 2d 31 (1944); also see Attorney General's Report, *op. cit., supra,* note 14, p. 67.

[24] 344 U.S. 280, 289.

[25] 344 U.S. 288.

pire, production for domestic consumption was the prime concern of American manufacturers. By 1890, the domestic market had become one of the largest in the world, and it was far more attractive than foreign markets to our businessmen. The smallness of our foreign trade, the preoccupation with domestic trade opportunities, and strong sentiment against "foreign entanglements" probably delayed the extensive application of United States antitrust law to foreign transactions.

When the antitrust law was more deliberately applied after World War II, enforcement paid little attention to the expanding network of international trade. It also reflected the lack of an intimate association of government with business—the absence of a tradition of cooperation such as has characterized European countries. Domestic antitrust concepts have been pressed by the executive departments and impressed by the courts on United States foreign trade, with little or no adaptation. Although it was much easier, and perhaps natural, to apply the old domestic rules than to develop a new set for international transactions, this tendency has placed our citizens at a serious economic disadvantage in dealing with other nationals.

B. *More Recent Developments*

1. REQUIREMENT FOR DIFFERENT STANDARD

Justices Jackson and Frankfurter indicated in the *Timken* case (1951)[26] that different considerations should apply to foreign trade. Justice Jackson was of the opinion that the rule of reason prompted a different standard due to special factors such as foreign trade barriers. His dissenting opinion, noted by the Attorney General's National Committee to Study the Antitrust Laws (1955),[27] observed that "the circumstances of foreign trade may alter the incidence of what in the setting of domestic commerce would be a clear case of unreasonable restraint;"[28] but the Committee tempered this reference with the statement that "an unreasonable restraint of American investment" could not be condoned by the impossibility otherwise of United States trade. The Committee was of the opinion that defendants should be able to show that, "due to foreign economic or political barriers, their conduct at bar was prerequisite to trade or investment in a foreign country."[29]

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[26] 341 U.S. 593.

[27] See Attorney General's Report, *op. cit., supra,* note 14, p. 83.

[28] 341 U.S. 605-606.

[29] Attorney General's Report, *op. cit., supra,* note 27.

American Timken and the related French, German, and British Timken companies entered into agreements on trademark licensing which, it was alleged, divided territories among themselves and fixed the prices of products sold therein. Defendants contended that this was a reasonable restraint in view of international and other circumstances. For example, American Timken owned half of French Timken, British Timken owned the other half, and American Timken also had a minority interest in the British Timken. These companies and German Timken, another affiliated company, it was held by the court, had actually assigned to each other territories for the manufacture of tapered roller bearings. The defendant's contention that the agreements among the Timken companies were ancillary to the licensing of the trademark was rejected by the court,[30] which stated that: "A trademark cannot be legally used as a device for Sherman Act violation."[31]

Curiously, this case is cited as authority for the position that territorial allocations under trademarks are *per se* illegal[32] despite the District Court's finding that "the trademark provisions [in the agreements] were subsidiary and secondary to the central purpose of allocating trade territories."[33] Furthermore, the Report of the Attorney General's Committee cautioned that certain dicta in the case, taken out of context, "should not develop into a mercantilist policy of discouraging American investment abroad in the name of protecting American manufacturing."[34] It considered language in the Timken opinion, in answer to the defense argument, to be unnecessary because of a possible implication that any American investment for production abroad involves a restraint on American exports. The objectionable passage reads as follows: "These provisions of the Act are wholly inconsistent with appellant's argument that American business must be left free to participate in international cartels, that the free foreign

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[30] The court also rejected the contention that the restraints were ancillary to a joint venture between American Timken and Dewar, an official of British Timken.

[31] 341 U.S. 599.

[32] See Robert E. Le Blanc, "Antitrust Ramifications of Trademark Licensing and Franchising," *The Trademark Reporter,* Vol. 53, No. 5 (May 1963), pp. 519-520.

[33] 341 U.S. 598. The Supreme Court specifically relied on the District Court's finding with respect to the subsidiary nature of the trademark contracts. The Attorney General's Report, *op. cit., supra,* note 14, at page 87 states: "The Timken case, therefore, does not cast any cloud upon restrictions in trade-mark licenses as such. This Committee believes that as in the case of patents, valid trade-mark rights may provide a lawful main purpose to which reasonable restrictions on competition may be properly ancillary and therefore legal."

[34] Attorney General's Report, *op. cit., supra,* note 14, pp. 78-79.

commerce in goods must be sacrificed in order to foster export of American dollars for investment in foreign factories which sell abroad."[35] The court's holding well illustrates the danger of decision making beyond the explicit circumstances and which at the same time cannot address itself fully to the national considerations involved.[36]

In *United States* v. *Imperial Chemical Industries Ltd.* (1951),[37] Du Pont and Imperial Chemical Industries entered into a patent licensing agreement involving the formation of joint companies conducting business in foreign countries. The court went so far as to enjoin Imperial Chemical Industries from disposing of any foreign nylon patents unless certain limitations were accepted by the grantee as a condition of the grant. The British court in *British Nylon Spinners Ltd.* v. *Imperial Chemical Industries, Ltd.*[38] subsequently enjoined Imperial Chemical Industries from complying with the portion of the American court's judgment that affected "the plaintiff in this case [, which] is neither a subject nor a national of the United States, nor (unlike the defendant company, [Imperial Chemical Industries,]) . . . a party to the proceedings before the district judge, nor . . . otherwise subject

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[35] 341 U.S. 599.

[36] Justice Jackson, in his dissenting opinion, appears to be very concerned about the possibility that the mere establishment of subsidiaries would amount to conspiracy under the majority Timken opinion. He states: "The fundamental issue here concerns a severely technical application to foreign commerce of the concept of conspiracy. It is admitted that if Timken had, within its own corporate organization, set up separate departments to operate plants in France and Great Britain, as well as in the United States, 'that would not be conspiracy. You must have two entities to have a conspiracy.' Thus, although a single American producer, of course, would not compete with itself, either abroad or at home, and could determine prices and allot territories with the same effect as here, that would not be a violation of the Act, because a corporation cannot conspire with itself. Government counsel answered affirmatively the question of the Chief Justice: 'Your theory is that if you have a separate corporation that makes a difference?' Thus, the Court applies the well-established conspiracy doctrine that what it would not be illegal for Timken to do alone may be illegal as a conspiracy when done by two legally separate persons. The doctrine now applied to foreign commerce is that foreign subsidiaries organized by an American corporation are 'separate persons,' and any arrangement between them and the parent corporation to do that which is legal for the parent alone is an unlawful conspiracy. I think that result places too much weight on labels." Timken Roller Bearing Co. v. United States, 341 U.S. 593, 606-607.

[37] 100 F. Supp. 504 (1951); 105 F. Supp. 215 (1952).

[38] In 2 All E.R. 780 (1952) British Nylon Spinners obtained an interlocutory injunction against Imperial Chemical Industries to restrain the defendant from parting with any patent rights it had obtained from Du Pont, an American company. Specific performance of the contract between British Nylon Spinners and Imperial Chemical Industries was subsequently granted plaintiff by Judge Danckwerts of the Chancery Division. 3 All E.R. 88 (1954).

to his jurisdiction."[39] It is clear that our courts in these cases were applying United States antitrust law, as derived from interstate commerce, to foreign commerce without appropriate adjustment. It is also clear that foreign courts prefer to do their own adjudicating.[40]

The extent to which our courts have relied on interstate commerce precedents is very evident. In *United States* v. *General Dyestuff Corporation* (1944),[41] the court incorporated the interstate commerce rule that defendants will be restrained in foreign commerce even when no previous competition existed between the companies which had agreed not to compete.[42] It also appears that the rule of reason is applied to restraints of our foreign trade in the same manner as to those of interstate commerce, and *per se* violations abroad of our antitrust laws are as vigorously enjoined. Price-fixing,[43] division of territories,[44] and certain boycotts[45] are among the practices that have specifically been enjoined as violations *per se*. The *Holophane* case[46] is a good example of a decision in which the circumstances of foreign trade did not seem to deter the court in the formulation of a rather extensive enforcement procedure.

Among the allegations of the government in the *Holophane* case, involving an American defendant and British and French co-conspirators, were that foreign commerce of the United States (both exports

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[39] 2 All E.R. 782-783.

[40] ". . . an English contract made between English nationals and to be performed in England, the right which the plaintiff company has may be described as its right under the contract to have it performed and, if necessary, to have an order made by the courts of this country for its specific performance." 2 All E.R. 783.

[41] 57 F. Supp. 642.

[42] "The defendants in *United States* v. *General Dyestuff Corporation* contended that, since the indictment disclosed no pre-existing competition between the corporations which agreed not to compete, the suppression, if any, was of nonexistent competition, which was not violative of law. Judge Rifkind, in rejecting this argument, quoted the statement of the Supreme Court in the interstate commerce case *United States* v. *United Shoe Machinery Company* to the effect that 'Neither the letter of the law nor its purpose distinguishes between strangling a commerce which has been born and preventing the birth of a commerce which does not exist.'" Wilbur L. Fugate, *Foreign Commerce and the Antitrust Laws* (Boston: Little, Brown and Company, 1958), p. 146.

[43] Timken Roller Bearing Co. v. United States, 341 U.S. 593; United States v. General Electric Company, 80 F. Supp. 989.

[44] Timken Roller Bearing Co. v. United States, 341 U.S. 593; United States v. National Lead Co., 332 U.S. 319; United States v. Imperial Chemical Industries, Ltd., 100 F. Supp. 504; United States v. Minnesota Mining and Manufacturing Co., 92 F. Supp. 947.

[45] Thomsen v. Cayser, 243 U.S. 66; United States v. Bausch and Lomb Optical Co., 34 F. Supp. 267; United States v. Timken Roller Bearing Co., 83 F. Supp. 284.

[46] United States v. Holophane Co., Inc., 119 F. Supp. 114, affirmed 352 U.S. 903.

and imports) was unreasonably restricted and that "the markets of the world have been divided and allocated among the defendants and co-conspirators." The decree of the District Court (1954), affirmed by the Supreme Court (1956), directed the defendant to use "reasonable efforts" in promoting the sale and distribution of its "products in foreign markets;" and it also set forth specific actions to be undertaken, such as contacting distributors through the mail in the territory of the British and French co-conspirators, advertising in those territories over a period of five years, and informing persons who have sought information after a certain date and who seek information in the future that Holophane products are available in the territories of the co-conspirators. The court found that the Holophane trademark had been used in violation of the antitrust laws and required the defendant to utilize different trademarks in its foreign trade.[47]

2. WEIGHTING THE SCALE AGAINST UNITED STATES INTERESTS

The curious traditional attitude of the Federal government to the business community may unduly handicap our international dealings. American businessmen are generally identified in our country with individual initiative and opposition to government "interference," while government officials are usually cast in the role of reluctant protagonists, if not outright antagonists, of business. The opposition of these images tends to be exaggerated by the rigors of our political life—by the requirement, in a pluralistic society, for energetic debate of alternatives.

In European countries, on the other hand, the partnership of goernment and business has been explicit. Even in democracies, foreign governments have appeared solicitous and paternalistic in international affairs. A major reason is the clear and historical dependence of the economic fortunes of those countries on foreign trade. Business and diplomacy have skillfully been blended, and trade has been pursued as a deliberate instrument of national policy. American business has thus always been faced with governmentally supported European competitors who were free, or even encouraged, to cartelize. Progressively, during recent decades, American firms have also been forced to bear the additional burden of vigorous attack by our government authorities on alleged violations, in their foreign transactions, of our domestic antitrust laws.

An example of the court's uninspired response to defendants' con-

[47] United States v. Holophane Co., Inc., Civ. 2659, S.D. Ohio (1954, amended 1955), CCH 1954 Trade Cases ¶ 67, 679 Sec. XI, opinion 119 F. Supp. 114 (1954).

tention that Americans could not compete with international cartels unless they cartelized too is evident in *United States* v. *National Lead* (1945).[48] In this case, in which most of the co-conspirators were foreign, the court rejected this contention with the observation that it was a matter for Congressional consideration. The court held that: "The system of territorial allocation and suppression of trans-Atlantic traffic in titanium compounds and pigments cannot be justified as ancillary to the grant of a license under a patent."[49] The court found that the agreements related to patents not yet issued, to inventions not yet imagined, to a time beyond the duration of any then existing patents, to commerce beyond the scope of patents, even to China where no patents exist, and to products after sale by licensees.[50] The court based its jurisdiction on "a conspiracy . . . entered into, in the United States, to restrain and control the commerce of the world, including the foreign commerce of the United States. . . . The object of the Government's attack is a conspiracy in the United States affecting American commerce, by acts done in the United States as well as abroad."[51]

In 1947 one of our Federal courts[52] went so far as to enter judgment against a foreign firm (the Phillips Company of the Netherlands) which had entered into a contract valid where the agreement had taken place. The reason was that the firm had made a "substantial contribution to the scheme whereby the domination of General Electric over the United States market of incandescent electric lamps would be perpetuated and competition thwarted."[53] This decision aroused the government of the Netherlands to protest.

The arrogation by our courts of prerogatives that foreign governments consider their own can, of course, lead to embarrassment[54] and

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[48] United States v. National Lead Co., 63 F. Supp. 513 (1945), affirmed 332 U.S. 319 (1947).

[49] 63 F. Supp. 523.

[50] *Ibid.*, 523-524.

[51] *Ibid.*, 524-525.

[52] United States v. General Electric Co., 82 F. Supp. 753.

[53] 82 F. Supp. 891.

[54] Judge Evershed perceptively observes: "I certainly should be the last to indicate any lack of respect for any decision of the district courts of the United States, but I think that in this case there is raised a somewhat serious question whether the order, in the form that it takes, does not assert an extraterritorial jurisdiction which the courts of this country cannot recognize, notwithstanding any such comity. Applied conversely, I conceive that the American courts would likewise be slow (to say the least) to recognize an assertion on the part of the British courts of jurisdiction extending in effect to the business affairs of persons and corporations in the United States." 2 All E.R. 782 (1952).

reciprocation. Other countries, including Great Britain,[55] France,[56] Switzerland,[57] Brazil,[58] and Chile[59] have made representations with respect to antitrust cases in our courts.

The unalertness of our courts to opportunities to advance the national interest in international transactions was demonstrated two years after the *G.E.* case, in 1950, when several abrasive companies were held to be restraining export trade by means of an agreement to form joint ventures abroad and to sell to areas not serviced by their foreign factories (*United States* v. *Minnesota Mining and Manufacturing Company*).[60] Judge Wyzanski held that:

> "The restraint has consisted in the effect of defendant's jointly owned foreign factories' precluding their American competitors from receiving business they might otherwise have received from the markets served by these jointly owned foreign factories."[61]

When the defendants argued that supplying foreign customers from foreign factories is more profitable and in the interest of American enterprise, the court responded:

> "It is irrelevant where the action is taken by a combination and the effect, while it may redound to the advantage of American finance, restricts American commerce. For Congress in the Sherman Act has condemned whatever unreasonably restrains American commerce regardless of how it fattens profits of certain stockholders. Congress has preferred to protect American competitors, consumers, and workmen."[62]

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[55] *In re* Investigation of World Arrangements 13 F.R.D. 280 (1952).

[56] U.S. v. Deutsches Kalisyndikat Gesellschaft, 31 F. 2d 199 (1929).

[57] United States v. Watchmakers of Switzerland Information Center, 168 F. Supp. 904 (1958), 25 F.R.D. 197 (1959), 25 F.R.D. 347 (1960), 27 F.R.D. 513 (1961).

[58] United States v. Herman Sielcken, CCH Federal Antitrust Laws (1890-1951). Case No. 117.

[59] United States v. the Chilean Nitrate Sales Corporation, CCH Federal Antitrust Laws (1890-1951). Case No. 457.

[60] 92 F. Supp. 947.

[61] 92 F. Supp. 961.

[62] 92 F. Supp. 962. The Attorney General's Report, *op. cit., supra,* note 14, p. 79, explores precisely this statement in Judge Wyzanski's opinion and adds: "At another point, the Court said that any factory established abroad by a single American company would 'be a restraint upon American commerce with foreign nations,' although not accomplished by combination or conspiracy, and hence not in violation of Section 1." The report pursues this subject in the following words: "The Sherman Act is not, of course, intended to protect foreign consumers against monopoly in their home markets. Instead its operative hypothesis should be to

Defendant exporters have consistently been rebuffed in their contentions that American businessmen must be free to join international cartels as they expand into foreign markets if investment abroad is to be encouraged.[63] In the words of Justice Black, "If such a drastic change is to be made in the statute Congress is the one to do it."[64]

But other prohibitions are more subtle. It would seem that simply not including other exporters in a scheme to restrict trade in a foreign market has been considered substantially to affect the foreign trade of the United States.[65] Including the United States market only by implication has been held an antitrust violation.[66] However, it is understood that the court will not apply our antitrust laws to acts required by foreign law on the part of United States companies abroad. In the *Minnesota Mining* case, the court held that the fact that trade could be conducted more profitably in a particular manner was not enough; it was necessary to show that the foreign government's actions or other trade impediments would completely preclude foreign transactions.[67]

Although American courts are reluctant to interfere with the requirements of a foreign sovereign, they pay little attention to custom[68] and scrutinize sovereign requests carefully to make certain that the governments have not joined at the defendant's request or insistence.[69] If the acts or agreements are legal in the foreign country where they take place, but substantially affect United States foreign trade, they might (as in the case of *United States* v. *American Tobacco Company*) [70] be held, nevertheless, to violate our antitrust law.

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encourage the competitive allocation of American resources to investment either at home or abroad, depending on the usual indicia of profit, in the interest of maximizing the long-run economic welfare of the United States. This may involve the export and import of goods or the receipt of dividends, interest, and profits on foreign investments. Both types of transactions have a place in the balance of payments of the United States and may affect the well being of the American people. It would be a paradox indeed to interpret the Sherman Act as preventing the advantages of an economic international division of labor and other resources. Now, the United States devotes a major diplomatic effort, backed by unprecedented grants and loans, to restoring a flexible world economy sustainable once more by private capital movements. Today a restrictive construction of the Act could seriously limit its effectiveness as a factor in economic policy."

[63] See opinions of Judges Wyzanski (Minnesota Mining and Manufacturing Co.), Rifkind (National Lead), and Black (Timken Roller Bearing Co.).

[64] 341 U.S. 599.

[65] See Timken Roller Bearing Company v. United States, 341 U.S. 593.

[66] See United States v. United States Alkali Export Association, 86 F. Supp. 59.

[67] *Op. cit., supra,* note 65.

[68] United States v. National Lead Co., 63 F. Supp. 513 (1945), affirmed 332 U.S. 319 (1947).

[69] United States v. Sisal Sales Corporation, 274 U.S. 268 (1927).

[70] 221 U.S. 106 (1911).

When the *National Lead* case was before Judge Rifkind in the District Court, he wrote: "The absence of NL's [National Lead's] foreign associates will, of course, place a practical limitation upon the scope of the court's decree; it does not prevent the court from finding a violation as the facts warrant, and from restraining those within the reach of its mandate from continuing a conspiracy in defiance of the Sherman Act."[71] In the *General Aniline and Film* v. *Bayer Company* case, which grew out of a consent decree[72] involving General Aniline's absent assignor, the assignee (General Aniline) was enjoined[73] (1955) from prosecuting a suit in the New York State Court. However, American court decrees are not binding on foreign courts,[74] and there is always the possibility that the foreign company, which was not before the United States court, will bring an action in its own courts against an American company, its affiliates, or its subsidiaries.

Where jurisdiction over the alien corporation is not possible, our courts have sometimes resorted simply to naming the absent co-conspirator.[75] The trend is toward establishing the legal presence of the foreign corporation in the jurisdiction.[76] Even where this is not possible, the defendants within the jurisdiction have been compelled to cancel agreements with the absent co-conspirators.[77]

Generally, where a United States corporation has had a controlling interest in the foreign corporation, both have been considered by the courts as a single enterprise with respect to antitrust conspiracy.[78] However, for the purpose of liability for conspiracy between the United States corporation and its foreign subsidiary, both are *not* likely to be considered a single enterprise unless (*a*) the subsidiary is wholly owned (except shares required for foreign nationals by foreign government) or (*b*) the American corporation controls more than 50 percent of voting stock and the minority interest is not in the hands of competitors.[79] In 1961, in the case of *United States* v. *Pan American*

[71] 63 F. Supp. 525.

[72] United States v. Bayer Co., Inc., Civ. 15-364, S.C. N.Y. (1941), Trade Reg. Rep. (1940-1943) Trade Cas. ¶ 56, 151.

[73] 135 F. Supp. 65.

[74] *Op. cit., supra,* notes 38, 39, 40 and 54.

[75] United States v. Holophane Co., Inc., 119 F. Supp. 114.

[76] See United States v. Scophony Corporation of America, 333 U.S. 795; also see *op. cit., supra,* note 42, pp. 69-70.

[77] *Op. cit., supra,* note 72.

[78] United States v. Aluminum Company of America, 148 F. 2d 416 (1945); United States v. Aluminum Company of America, 91 F. Supp. 333 (1950); United States v. General Electric Company, F. Supp. 753 (1949).

[79] See Timken Roller Bearing Co. v. United States, 341 U.S. 598. "The fact that there is common ownership or control of the contracting corporations does not liberate them from the impact of the antitrust laws." Also see Fugate, *op cit., supra,* note 42, p. 241.

World Airways, Inc.,[80] New York District Judge Murphy held that suppression by Pan American of a subsidiary's effort to extend its South American service to a United States terminal constituted a monopolization of commerce in contravention of the Sherman Act.[81] In one case[82] the court refused to allow the United States company to exercise its option to become the majority stockholder of a foreign corporation.

III. European Approach to International Transactions

As previously observed, European nations, even those embracing laissez-faire, have deliberately pursued national purposes in international dealings. Historically, they have taken a more tolerant view of the type of business behavior condemned under our antitrust laws. This difference apparently reflects the greater traditional dependence on foreign trade, which in turn may be explained by the smallness of European countries, their proximity to each other, and their more limited and complementary natural resource supplies. In any case, the citizens of these countries have been able to enter with less inhibition than United States businessmen into foreign commerce.

The greater flexibility of our European trading partners has been especially apparent since the rehabilitation that followed World War II. Never lacking in inventiveness, and now also equipped with new, technologically advanced productive facilities, they have become formidable competitors in the world's markets. Furthermore, the prospect of eliminating trade barriers within Europe and of adopting uniform trade policies *vis-a-vis* the rest of the world intensifies the danger to our economic position. Our policy options, indeed, may become more severely limited at home as well as in international dealings because of a continual adverse balance of payments and the steady drain on our gold reserves.

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[80] See United States v. Pan American World Airways, Inc., 193 F. Supp. 18.

[81] This was a joint venture in which Pan American and Grace each owned 50 percent of the stock. Gerard J. Weiser in discussing the impact of American antitrust laws upon joint ventures abroad ("Antitrust Aspects of the Joint Venture in The European Economic Community," reprinted from *University of Pennsylvania Law Review*, Philadelphia, Pa., Vol. 111, No. 4 [February 1963], p. 443) states that: "The law in this field is far from clear, but absent a purpose or effect to restrain trade or to monopolize, 'there is nothing per se unlawful in the association or combination of a single American enterprise with a single foreign concern in a jointly owned manufacturing or commercial company to develop a foreign local market.' On the other hand, 'the fact that there is common ownership or control of the contracting corporations does not liberate them [the partners] from the impact of the antitrust laws.' In addition, a joint venture may become unlawful if it unreasonably, directly, and substantially restrains the trade and commerce of the United States."

[82] Timken Roller Bearing Company v. United States, 341 U.S. 593.

A. *Antitrust: European Style*

Since the end of World War II many European countries have adopted antitrust legislation.[83] The European concept of antitrust, however, is generally based on the registration principle rather than illegality *per se*,[84] a uniquely American doctrine. Moreover, European laws are concerned primarily with domestic transactions and exclude export cartels from their purview.[85] The administrative bodies play the major role in the registration and examination processes, and the courts accordingly are less frequently involved than the American courts.[86] In fact, when Commissions in certain countries conduct investigations, they deem antitrust laws to be applicable, if at all, only in so far as the public interest is actually threatened or adversely affected.[87] In the subsequent paragraphs, some highlights of European antitrust provisions are briefly noted. With the implementation of the antitrust provisions of the Rome Treaty, the members of the E. E. C. will be obliged to harmonize their national laws with the supranational standard.

In Belgium and Luxembourg, which are members of the International Convention for the Protection of Industrial Property, patents must be worked within three years. Belgium currently also has laws limiting prices and production when monopolistic abuse has been shown.[88] Luxembourg, however, has not enacted antitrust laws as yet.

The Netherlands patent must be worked within five years from grant, and the present position of the government appears to be neutral toward cartels. In fact, an approved cartel is effective with respect to all members of the industry, even those which do not actually sign the agreement.[89]

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[83] Although Americans generally date antitrust legislation from the Sherman Act in 1890, England's Statute of Monopolies (21 Jac. 1, Ch. 3) goes back to 1623 and Canada passed antitrust legislation in 1889.

[84] See Lawrence J. Eckstrom, *Licensing in Foreign Operations* (Essex, Connecticut: Foreign Operations Service, Inc., 1959), Chap. IX, "Antitrust, Monopoly, and Cartels," Sec. A "History and Objectives."

[85] Stephen A. Riesenfeld, "The Protection of Competition," in Vol. II, *American Enterprise in the European Economic Community—A Legal Profile* (Stein and Nicholson ed. 1960), p. 207-294.

[86] *Ibid.*

[87] *Op. cit., supra,* note 85, pp. 197-342.

[88] *Op. cit., supra,* note 85, pp. 269-281.

[89] *Op. cit., supra,* note 85, pp. 254-269. The Dutch law does not attempt to prevent or control excessive concentration of economic power as does the American law or the European Coal and Steel Community Treaty. *Op. cit., supra,* note 85, p. 268. In fact, it was in large part on the insistence of the Allied Occupation authorities in Germany that limitations, strange to European cartel legislation, on economic concentration by integration were included in the European Coal and Steel Community Treaty. *Op. cit., supra,* note 85, p. 314.

In France, a patent must be worked within three years. A special advisory administrative tribunal, Commission Technique des Ententes, reviews cartels and seeks to determine whether a prohibited practice, such as price fixing, is present. Where it is determined that the cartel concerns only export trade or is in the public interest, the agreement is generally upheld.[90]

There are provisions in the Italian Civil Code limiting restrictive business practices. However, "cartels and similar arrangements are legal and enforceable as long as they do not engage in practices proscribed by the Penal Code or have particularly aggravated effects."[91] A change in the direction of Italian antitrust law for greater conformity with E. E. C. standards is being considered by the Parliament. Italian patents have to be worked within three years from the date of grant.

German patents must also be worked within a fixed period. The German antitrust law of 1958[92] prohibits cartels, but makes numerous exceptions, particularly where the public interest, industrial efficiency, changed demand conditions, and certain quasi-public enterprises or industries are involved. Export agreements are not prohibited.[93]

Thus, although there has been an increase in the number of countries since World War II which have enacted legislation against restrictive business practices, none of the countries of the Common Market has adopted the vigorous antitrust attitude of the United States with respect to foreign trade. The same is true of the Common Market itself.[94] Furthermore, there appears to be no categorical *per se* condemnation in the laws of the Market. Instead, circumstances are considered on a case by case basis, and a very broad rule of reason is spelled out in the statutes.[95] Another feature is the pragmatic attitude of the E. E. C. toward dominance of a company. In the United States, dominance tends to be considered objectionable *per se.* In the Com-

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[90] Also see *op. cit., supra,* note 85, pp. 251-253.

[91] *Op. cit., supra,* note 85, p. 282.

[92] *Guide to Legislation on Restrictive Business Practices* European Productivity Agency of the Organization for European Economic Cooperation, 1 (1960); Peter D. Shapiro, "The German Law Against Restraints of Competition," 62 *Columbia Law Review* (1962), p. 201.

[93] *Op. cit., supra,* note 85, pp. 197, 207-235.

[94] *Op. cit., supra,* note 85, pp. 197-342.

[95] Stephen P. Ladas, "Antitrust Law in the Common Market with Special Reference to Industrial Property Agreements," *Ohio State Law Journal,* Vol. 23, No. 4 (1962), pp. 709, 713. Also see Pieter VerLoren van Themaat, "Current Antitrust Developments in the European Common Market and the Relation Thereto of Industrial Property Rights," *PTC J. Res. & Ed.,* Vol. 6, No. 4 (Winter 1962-1963), pp. 429-450.

mon Market, however, dominance is not discouraged unless it is abusive.[96] Moreover, the organic purpose of the whole is given more explicit weight in the antitrust laws of the Common Market than it is afforded in the United States.[97] Another major difference is the E. E. C.'s concern with its total domestic market, so that cartels involving external trade of the six constituent countries are not considered objectionable.

B. *Antitrust: Rome Treaty*

Article 85 of the Treaty of Rome interdicts agreements between enterprises which are apt to affect trade *between the member states* and have as their object the prevention, restriction, or distortion of competition *within* the Common Market. Thus, like the Federal law of the United States, Article 85 does not replace the national laws of the individual nations; but, unlike the law of the United States, it is confined to the boundaries of the Common Market. Also, there is no explicit reference in this Article to a rule of reason. After illustrating the types of agreements forbidden, Article 85 (2) states that, where no exemption is granted under Article 85 (3), the agreement is void. A broad rule of reason is implicit in Article 85 (3), which exempts agreements from Article 85 (1) if certain criteria are met. These are:

> "(*a*) That the agreements contribute to the improvement of the production or distribution of goods or to the promotion of technical or economic progress; and
>
> (*b*) that they reserve to users an equitable share in the profits resulting from such improvement of production or distribution or from the promotion of technical or economic progress;
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> (*c*) that they do not impose on the enterprises concerned any restrictions not indispensable to the attainment of the above objectives; and
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> (*d*) that they do not enable such enterprises to eliminate competition in respect of a substantial proportion of the goods concerned."[98]

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[96] *Op. cit., supra,* note 85, p. 201; also see Ladas, *op. cit., supra,* note 95, p. 714; and Gerard J. Weiser and J. N. Behrman, "The Convention for European Industrial Property Rights," *PTC J. Res. & Ed.,* Vol. 5, No. 3 (Fall 1961), p. 249. Administrative control of misuses of dominant market power is referred to in Article 66 of the European Coal and Steel Community Treaty, the German Cartel Ordinance of 1923 and the Dutch Cartel Ordinance of 1941, as amended in 1942. *Op cit., supra,* note 85, p. 314.

[97] *Op. cit., supra,* note 94.

[98] Ladas, *op. cit., supra,* note 95, p. 713; also see note 85, p. 200; and Weiser and Behrman, *op. cit., supra,* note 96.

Patents, by their nature, will generally meet criteria (*a*) and (*b*).[99] In connection with (*b*), "an equitable share in the profits" may be expressed in other than monetary terms.[100] Except for the word "indispensable" in (*c*), both (*c*) and (*d*) appear to have been derived from the German law in which the cartel authority may approve a patent license agreement "if the freedom of economic action of the licensee or any other enterprise is not unfairly restricted, and if competition is not substantially restrained through the restrictions involved."[101]

Article 86 forbids the abuse of a dominant position by an enterprise or enterprises. In order for the interdiction to apply, the following circumstances must be present:

> "(*a*) the enterprise or enterprises concerned must occupy a dominant position within the Common Market or within a substantial part thereof;
> (*b*) the enterprise or enterprises must make an abusive use of such position;
> (*c*) such abusive use must have an effect on trade between Member States."[102]

Under the German law an enterprise is dominating if it is "without competitors or not subject to substantial competition in a certain type of goods or services."[103] Questions of monopoly or of merger resulting in monopoly are not covered by Article 86 unless they lead to abuse. Illustrations of the scope of Article 86 are cited therein.

It may also be true that the system of notification of agreements keeps restrictive practices in check at a smaller economic cost than is required by the usually protracted antitrust proceedings in the United States. If so, Americans might still be reluctant to adopt the administrative procedures of the Europeans, who appear to place greater faith in the ability of their civil servants and proportionately less strain on their courts.

The Common Market appears to be groping toward a concept of positive competition. The striving to achieve a freer exchange of goods and the elimination of barriers under the rules established by the Treaty of Rome is in the spirit of such competition.[104] This spirit

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[99] Ladas, *op. cit., supra,* note 95, p. 732.
[100] *Ibid.*
[101] *Ibid.,* p. 733.
[102] *Ibid.,* 713; also see *op. cit., supra,* note 85, p. 201; Weiser and Behrman, *op. cit., supra,* note 96.
[103] Ladas, *op. cit., supra,* note 95, p. 714.
[104] VerLoren van Themaat, *op. cit., supra,* note 95, p. 435.

is also suggested by the broad terms in which the rule of reason is stated in Article 85 (3) of the Treaty.[105] It is reflected in the emphasis on abuse in Article 86, rather than dominance, which is compatible with a strong trade posture for E. E. C. *vis-a-vis* the rest of the world.

Another aspect of the Common Market treaty which favors business initiative is the embodiment of the principle of the predictability of law in areas under restrictive trade surveillance.[106] Such a principle was sought by the Council of Ministers' Regulation #17, which went into effect on March 13, 1962.[107] A system of "prior notification for retroactive validation of reasonable restrictions"[108] was introduced, and "exclusive jurisdiction" to apply Article 85 (3) was placed in the Commission.[109] Also, a system of "negative clearance"[110] was added. Of particular interest to patentees is the announcement in the official gazette that the Commission has excluded certain patent license agreements from Article 85 (1) because the rights restrained were those which the patentees were authorized to exploit.[111]

IV. Remedial United States Action

The foregoing discussion suggests the need for changes in United States policy to strengthen our own international trade position. We should alter our approach explicitly to enhance our competitiveness, to permit our dealing on more even terms with other nations. Specifically, we should attenuate the connection, since complete divorce would not be practicable, between domestic and foreign antitrust economic and legal policies. Toward this end, we should estab-

105 Pieter VerLoren van Themaat refers to it as "a legislated rule of reason" on page 436, *Ibid.*

106 *Ibid.*, p. 437.

107 *Ibid.*

108 For a brief English explanation of the case of De Geus v. Van Rijn and Bosch, particularly the decision rendered by the Court of Justice on April 6, 1962 (published in the Official Journal of the European Economic Community of May 4, 1962) see *Information Bulletin* No. 4 entitled "Notification of Agreements to the E.E.C Commission," published by G. Beau De Loménie, André Armengaud, and G. Houssard, Paris (July-August 1962). "The Court of Justice . . . laid down the principle of the applicability of the Rome Treaty from the date of its coming into force, which is January 1, 1958." Also see *Information Bulletin* No. 4 for an English translation of Regulation No. 27, the first regulation issued by the E.E.C. Commission on the application of Regulation No. 17. This *Bulletin* includes English copies of the application questionnaires to the Commission of the E.E.C. for a negative clearance (A) and for the notification of an agreement (B) and two explanatory notes drafted by the Commission to facilitate the completion of the questionnaires.

109 VerLoren van Themaat, *op. cit., supra,* note 95, p. 437 and 438.

110 *Op. cit., supra,* note 108.

111 VerLoren van Themaat, *op. cit., supra,* note 95, pp. 432-450.

lish a Presidentially appointed Committee of Experts representing pertinent disciplines, to recommend the needed revisions in law and procedure.

Whatever the future evolution of the Common Market, its concept and appearance have had a great impact on nations like our own that generally are averse to "planning" in domestic economic affairs. The European grand design compels us to react as a national entity to a new and peaceful challenge from friendly nations rather than to react as a large collection of individuals and firms. It behooves us to adopt policies that advance our total standing in international markets in which strong and purposeful competitors confront us.

Since we cannot and should not reject our antitrust tradition, we ought to respond within this framework in ways that do not leave the advantage and the initiative to nations that do not share our attitudes toward restrictive trade practices. We should achieve more flexibility in the interpretation of our own laws in our own behalf in the international theatre than we have been willing to allow ourselves at home.[112] This flexibility, which sets great value on the advancement of the nation's economic and social welfare (as reflected, for example, in national output and the maintenance of opportunity for enterprise) is of the essence of positive competition. This flexible approach is more constructive in the long run than adherence to doctrinaire and rigid principles which concentrate myopically on distinctions of right and wrong.

What can be done now? The profusion of conflicting and ambiguous judge-made law on restrictive practices has left the American trader in a legal morass. Doing business in the United States may seem encumbered enough, but the position of a company doing business abroad is immeasurably worsened. Clearly, this area requires immediate study. As a first step, and in accordance with the precedent set by the National Committee to Study the Antitrust Laws, a Committee of Experts should be appointed by the President to review the current situation with respect to antitrust laws and foreign trade and to make recommendations for eventual consideration by the Congress. The members of this Committee should represent such fields of

[112] The United States, although opposed to restrictive trade practices and cartels, has modified its views with respect to international commodity control agreements because of the effect of an unstable market on the economies of underdeveloped countries. The United States encouraged the New York Coffee Agreement of 1962, is a member of the Sugar Agreement and the Wheat Agreement, and accepts the program of the Tin Agreement. See Robert D. Krumme, "International Commodity Agreements: Purpose, Policy, and Procedure," *The George Washington Law Review*, Vol. 31, No. 4 (April 1963), pp. 784, 807 and 808.

activity as commerce, manufacturing, finance, labor, education, science, and the legal and other professions. This Committee should employ researchers to undertake empirical studies so that the antitrust laws and policies relating to foreign trade may be accurately evaluated in the light of the facts, including the actual operations of our legal and economic institutions.

In our country, we have created and evolved an industrial system giving to the ordinary citizen a higher standard of living and a wider range of opportunities for choice than in any other country in the world. Our antitrust laws were conceived and have been applied primarily with reference to our internal economic affairs. The time is now right for the nation to develop an antitrust program that will better serve the national economy in the modern competitive international context. This development requires a deliberate differentiation between antitrust applications at home and abroad in greater harmony with the spirit of positive competition.

FIFTH PUBLIC LECTURE AND DISCUSSION*

MAY 23, 1963

8:00 P. M.

Current Developments in Industrial Property Rights in Latin America and the Relation Thereto of Antitrust and Trade Practice Laws and Policies

WELCOME: L. JAMES HARRIS

MODERATOR: AUSTIN S. PHILLIPS

GUEST LECTURERS: CARLOS HENRIQUE FROES
CESAR SEPULVEDA
JUAN E. F. WODAK

*PUBLIC LECTURE AND DISCUSSION SERIES. "Current International Industrial Property Developments and the Relation Thereto of Antitrust and Trade Practice Laws and Policies" is the theme of a public lecture and discussion series presented under the auspices of the Foundation. The object of this series is to provide an opportunity to exchange views with officials and other foreign experts who are in a decision-making or recommending capacity with respect to new international developments and who, being located abroad, would not ordinarily be available to people in this country. This program is made possible as a result of support from the Alfred P. Sloan Foundation and other industrial firms. Held in Lisner Auditorium on the campus of The George Washington University, the meetings are so organized as to encourage participation from the audience. They are free of charge and open to the public. The first three lectures concerning Great Britain and the Common Market were published as Vol. 6, No. 4 of this *Journal*. The fourth lecture on Japan appeared in Vol. 7, No. 1.

Current Developments in Industrial Property Rights in Latin America and the Relation Thereto of Antitrust and Trade Practice Laws and Policies

PROCEEDINGS

EXECUTIVE DIRECTOR L. JAMES HARRIS: Distinguished guests, Ladies and Gentlemen, it is my privilege to welcome you to The George Washington University and to the Foundation, which is an integral part of the university.

This is the fifth in the series of public meetings on "Current International Industrial Property Developments and the Relation thereto of Antitrust and Trade Practice Laws and Policy."

The objective of this series is to provide a domestic forum in which a cross-section of the public can participate in an informal discussion with foreign experts who, being located abroad, are normally unavailable to them.

As you know, a number of striking events are taking place in Latin America, and a number of unusual opportunities are opening up there. Historically, American entrepreneurs and American investors have played a very large part in organizing the Latin American market, and it would seem natural, therefore, that we would be most interested to join more fully with our Latin American neighbors in realizing the potential of this market.

The Patent, Trademark, and Copyright Foundation of The George Washington University has been engaged in a series of studies concerned with the industrial property and related rights of our Southern neighbors as they are in the process of realizing this potential.

Clearly, these increasing evidences of action on the part of Latin America itself, such as their Common Markets, and the action on the part of the United States within the framework of the Alliance for Progress, requires this timely consideration of the hemispheric commonalities in industrial property rights. We think that by building on these relationships, these industrial property highways that already exist, that our nations should be able to utilize and extend the contributions of these systems to economic and social development.

To shed light on these emerging opportunities and how they will

affect American interests, we have invited three distinguished experts to this country who are closely related to these developments. They have been flown to Washington to participate in this meeting.

Our guest lecturers are Dr. Carlos Henrique Fróes of Brazil, Dr. César Sepulveda of Mexico, and Mr. Juan E. F. Wodak of Argentina.

It is now my privilege to introduce the moderator for the Fifth Meeting, Mr. Austin S. Phillips, who will introduce the guest lecturers. Mr. Phillips is a member of the New York Bar, is a graduate of Harvard College and St. Lawrence University. During World War II he served as the Patent Representative of the Office of the Surgeon General, Army Service Forces, having been engaged, among other duties, in the administration of the United States-United Kingdom Patent Interchange Agreement of 1942. Since 1946 he has been on the staff of the Patents and Licenses Committee of the American Cyanamid Company with special concern in the administration of patents and licensing of technical data and patents abroad.

Mr. Phillips is a member of the New York and the American Patent Law Associations, and he has been a guest speaker of the Practicing Law Institute and the American Management Association. It is my privilege to introduce Mr. Austin Phillips.

MR. AUSTIN S. PHILLIPS: Ladies and Gentlemen, the United States community,—academic, government, and industrial,—is appreciative of the stimulating and outstanding contributions of The Patent, Trademark, and Copyright Foundation of The George Washington University, under the aegis of which we are gathered here this evening.

We here have been engaged in a kind of intellectual foreign trade, the age-old medium through which international understanding and mutual respect and progress flows and grows.

The value and importance of this technical data in world-wide economic development, the patent rights which foster inventions, encourage public disclosure of technological advances, and protect research investment, under the trademark rights through which the results are commercially used, and the appropriate employment of the lawful property rights in all of these, are currently commanding universal attention.

It is to be hoped and expected that the laws of all countries and their administration relating to these vital concerns will continue to evolve matching the explosion of modern technology.

This forum has effectively considered these aspects in the European Economic Community. This evening we turn our eyes to the South. I recall in the early 1930's, at about the time that the International Research Institute was being formed under the auspices of the Na-

tional Research Council, that Mr. Maurice Holland, who was then one of the executive directors of the Council, organized and led tours of representatives of United States industry through Latin America. They were pioneers in the recognition of the promise of the future in that area, both for its own peoples and our nation. Today such views are officially embodied in the Alliance for Progress.

We plan to be somewhat informal this evening. We have three honored and most welcome speakers. We will have each of them present his thoughts, one after the other, and we will then have a question period, and we hope that you will all participate. I think you have been given a slip of paper, as you came in, and if you wish to write your questions as the speeches are being made, we will be happy to receive them at the right time.

I should like first to present to the meeting Dr. Carlos Henrique Fróes, Attorney-at-law, and a graduate of the Catholic University of Rio de Janeiro. He is an Associate of Momsen, Leonardos & Cia. Company, Patent and Trademark Agents in Brazil, is registered at the Rio de Janeiro Bar, and attorney before the Supreme Federal Court, the Federal Court of Appeals, and the Guanabara Courts. Dr. Fróes.

(Applause.)

DR. CARLOS HENRIQUE FROES: Ladies and Gentlemen, It is actually a privilege to be here and to speak to this distinguished audience. I came here to speak, to shed some light on the Brazilian legislation, but I also came here to learn because I am participating in a discussion, and I can see that very illustrious people are present.

Before getting to our subject, I wish to recollect that 50 years ago, as a matter of fact, 51 years ago, a young man called Richard P. Momsen, who is the senior partner of my firm, graduated from this same university. He went to Brazil, and settled down there. He became a half-Brazilian, half-American citizen. He is now one of the very few foreign attorneys registered at the Brazilian bar and devoted so much of his life to my country, particularly to the City of Rio de Janeiro, that he has now become an honorary citizen of Rio de Janeiro. I thought I could not help saying a few words about him at this moment as a public acknowledgement of my appreciation for all he has done for me, all the encouragement, all the opportunities he has given to me up to now.

Perhaps many of you ignore and even in Brazil it is rather an unknown fact that the Brazilian legislation on patents is the first one, the first specific legislation on patents and trademarks in Latin America. It is the fourth in the whole world. The first one was that of England with the Statute of Monopolies in 1623. The second was the one issued

by the United States of America, the third the one from France, and the fourth that from Brazil in 1808, one century and a half ago.

This was due to the fact that the King of Portugal—Brazil was then a colony—was obliged to flee from Portugal to my country on account of Napoleon's invasion. He went to Brazil, and realizing down there the problems we had, he issued an ordinance according to which it became necessary to award prizes to those who in the field of industry would bring some progress by building or presenting any new machine which might reduce human effort or any invention useful to arts, agriculture and navigation.

So you see, one century and a half ago, our people already had some thoughts on the need of protecting inventions. At the same time, another ordinance was issued according to which inventors of any new machinery should have an exclusive privilege for a certain time. For that purpose, they should submit the plans of their invention to the Royal Board of Trade which would examine whether the invention was really worthy, in which case it would give an exclusive right thereon to the inventor for a period of 14 years, after which the invention would be published so that all nations might have the right to share its benefits.

It is interesting to speak about the beginning of the Brazilian patent legislation because its general principles are substantially the same till now, when we have the Code of Industrial Property which was enacted in 1945 and has been considered in the overall aspects one of the best in the whole world. The only real problem in regard to it is the enforcement of all its provisions, because some of them, up to now, have not been enforced, and sometimes people complain of the fact that we do not have the laws when we do have them. What we must do is to find them out and to apply them to the particular cases.

Nevertheless, contrarily to what happens in many other industrial property laws in the civilized world, the Brazilian Code of Industrial Property was rather vague on patent and trademark license agreements. These ageements practically did not have to abide by any legal requirements: the parties were entitled to make the covenants they deemed fit and the Patent Office, before which such agreements had and still have to be recorded, limited itself to checking the formal aspects of the deed, such as whether the names of the licensors actually corresponded to those of the Patents and Trademark owners, whether the Stamp Tax due had been paid, and also, in case of a sub-license agreement, whether the license one contained the necessary authorization for that purpose.

There was no restriction whatsoever as to the amount of royalties to

be agreed upon by the parties nor to their remittance to any country abroad.

So, you will realize that many abuses have been committed because of the lack of legislation in this particular field. Just to give you a rough idea, I can tell you that sometimes royalties were fixed in the amount of 20 percent, a most unusual one, just for the purpose of making a legal tax evasion, inasmuch as the law permitted the deduction of any royalties credited or paid, as expenses.

I have here some statistics I would like to refer to. In 1955, the amount of U.S.$196 million was remitted to foreign countries as royalties corresponding to the use of marks, patents and know-how. In 1956, U.S.$275 million and in 1957 U.S.$350 million. These data have been given by a Brazilian magazine called *Visão* and though they are not official ones, I would venture to say they are reliable. The Rio newspaper *Correio Da Manhã,* reported, too, that the pharmaceutical industry had paid U.S.$30 million to foreign laboratories as royalties per year.

All this situation led the Brazilian Congress to approve a draft which matured into Law No. 3,470 of November 28, 1958, limiting the amounts which royalty licensees might deduct as business expenses, for income tax purposes.

So, from then on, we began to make some restrictions to patent and trademark license agreements, because the maximum royalty permissible was 5 percent.

Later, Ordinance 436 of December 30, 1958 was issued by the Minister of Finance, giving the royalties quotas deriving from use of trademarks, know-how and patents. The quotas were established, taking into account the types of production or activity in accordance with the degree of essentiality.

In September 1962, the Brazilian Congress enacted a new law, the law on Foreign Capital also called the law of Remittance of Profits. Some of the provisions contained in this law are quite important and have considerably affected the patent and trademark field. I wish to refer particularly to Articles XI and XIV of this law. I just mention these two provisions and I am sure that some questions will be raised about them afterwards.

According to the translation prepared by the American Chamber of Commerce of Rio de Janeiro, Article XI, reads as follows:

> "Transfers in payment of royalties due on patents, trademarks and similar rights in industrial property shall depend upon proof from the interested party that the same have not expired in the country of origin."

So you see that the possibility of sending royalties to a foreign country has been subordinated to the existence of the corresponding patent or trademark in the country of origin, that is, the country where the patentee or the registrant is domiciled. This is a very important restriction on patent and trademark license agreements. There is, however, a more important one which is contained in Article XIV, according to which:

> "No remittance will be permitted in payment of royalties for the use of patents and trademarks between branches or subsidiaries of an enterprise established in Brazil and its head office abroad, nor when the major part of the capital of the Brazilian establishment belongs to the recipients abroad of such royalties."

This means practically that when the licensor and the licensee are closely connected one with the other in such a way that the licensor controls the capital of the licensee, no royalties can be paid or remitted to a foreign country.

This is obviously a very serious restriction to patent and trademark license agreements, and as the law only came into force by the end of last year, we still ignore what will be the interpretation to be given to these particular provisions by the Courts.

Finally, we had the antitrust law. This law was enacted also in September 1962, but it brought about so much unrest in political, economic and social fields, that its publication was delayed for quite some time, just to give the possibility of making some amendments therein. It was published only in November, coming into force in February 1963.

Its regulation was issued exactly on Saturday last week, so you will understand that I am not in a position to explain to you what such regulations provide. I only know that they have been issued, because I read this news a few days ago in *The New York Times* (laughter).

Nevertheless, I can refer now to the most interesting provision of the new law affecting industrial property matters which is Article IV.

Pursuant to this provision, patents issued by the Brazilian Patent Office will be automatically cancelled once it is proven that another country with which Brazil has an agreement covering the subject, has granted this patent, and that such patent has expired in the same country.

This is, to a certain extent, a further development of Article XI of the Foreign Capital law which, as you will recall, subordinated the possibility of sending royalties abroad to the existence of the corresponding patent or trademark in the country of origin.

Here the scope of the law goes still farther because the patent itself

will be considered as automatically cancelled, if the corresponding one in another country has already lapsed.

It is a little bit difficult to say also what will be the interpretation of this provision, especially because the regulations were only issued on Saturday and I am still unaware of them, as already pointed out.

On the other hand, the antitrust law also affects licenses of patents and trademarks just as in Germany, in the Scandinavian countries, and in all countries belonging to the Common Market. The fields of patent and trademark law on one hand, and of the antitrust law on the other, are not independent, but they have some relation between them. In some cases, patents and trademarks may be used as tools of monopolistic designs, as once was said, if I remember right, by Mr. Peter H. Behrendt. So we are trying to cope with the abuses that may be committed through patents and trademarks which can be used as a disguise of an act aiming at dominating or controlling the market and hindering competition.

For that purpose, an administrative agency called CADE (Administrative Council for the Economic Defense) has been set up to enforce the antitrust law provisions. According to Article XVII, this Agency will be entitled to carry out all measures with a view of preventing the abuses of economic power such as, for instance, to request government control of the accused company, to establish fines, to apply for the expropriation of assets of companies, as well as to request the judicial liquidation of the company which is considered guilty of an abuse of economic power.

In this connection, I also wish to draw your attention to the fact that all agreements aiming at putting production on a par with consumption, controlling markets, standardizing production, stabilizing prices, dividing markets between companies, whether of production of distribution and at restricting distribution in such a way as to harm equivalent or substitute goods, must be approved and registered by the Government Agency called CADE, otherwise they will be held as null and void.

This is just an outline of the Brazilian legislation, and I do not want to go any farther, but I will be ready afterwards to answer all the questions you will be kind enough to raise. Besides bringing this matter to a close, I wish to say that this is the law, perhaps with some imperfections, but much more important than the law is the man who applies the law. We will depend on our judges, and in this regard I can say that they will do, as usual, their duty.

(Applause.)

MR. PHILLIPS: Thank you, Dr. Fróes.

It is now our great privilege to hear Professor César Sepulveda, the former Commissioner of Patents of the Mexican Republic, former Director of the Institute of Comparative Law in the National University, Dean of the Law School of the National University of Mexico, and a member of the law firm of Salazon and Sepulveda. He is also a professor of international law. Dr. Sepulveda.

DR. CESAR SEPULVEDA: Ambassador of Mexico, Ladies and Gentlemen. It is indeed a great honor for me to appear before such an audience, and I thank Mr. Harris and the members of the Foundation very much for their invitation, and I must congratulate the Foundation for the fine work undertaken for the benefit of our discipline: the law of Industrial Property. But at the same time I must confess boldness. I disclaim being an expert. I have very little to say and my proficiency in English is almost nil. I beg your patience and your kindness.

I

In Mexico and in several other Latin American countries a most interesting social and economic development is taking place. We are witnessing change and transformation every day, a change in institutions, of legal norms, changes of methods, rearrangements of the social strata.

The situation reflects naturally in the field of legislation and practices concerning antitrust policies and is being felt also in lesser scale in the law and practices of industrial property.

The fundamental questions these days concerning our subject matter are: if our countries are to undergo accelerated development in order to save them—and perhaps the international community—from some visible perils, how far must we go in limiting competition or in altering the substance of the traditional privileges conceded by the patent and trademark laws?

Are we Latin Americans prepared for the traditional policy of open and free competition, and would it be convenient to preserve full freedom up to the point of abuse, or does the want of development compel our countries to restrict in some way the exercise of the legal monopoly right of patent holders? The future can only say what the outcome is going to be.

So far the field has been relatively quiet. During the recent decade we have had no major development in the area of industrial property, and, concerning antitrust law I may report that only some recent changes that could have importance in the matter have occurred, but

on the other hand we have very definite trends, the net result of which only the future can attest.

I propose to examine first and on very broad lines the current system of industrial property in my country. Secondly, the trends that are being observed in this field. Then we may subsequently revise the possible connections between patent law and monopoly law, and at the end I intend to review briefly the regional arrangements and its bearing upon these matters.

II

The Mexican patent system is, with slight differences closely similar to that of the United States, and it is inspired by the same principles of rewarding inventors and permitting in that way industrial and technological development.[1]

The first major difference apparently lies in the spirit with which our respective Patent laws are vested, because it is my understanding—and I beg to be excused if I am wrong, for I am not fully familiar with your system—that the basic objective of the American law is to protect and stimulate isolated, individual inventors, whereas the main objective of the Mexican law is to propitiate our growing industry without thereby failing to encourage the inventor. The theory and the social and political foundation of our patent system, although not as yet fully developed, are those corresponding to a nation of limited economic resources which seeks to open for itself an honorable way in a world weighed down by highly aggressive competitive forces. This explains some of the characteristics and aims of the Mexican system.

The second difference of a general nature may lie in the uses or traditions governing prosecution of applications as well as in the conception of what may or may not be patentable. In fact, the idea of invention in the Republic of Mexico adheres almost entirely to French doctrine, and it is mainly because of this reason that there are differences between your conception of patentability and ours. On the other hand, the system under which letters patent are issued is also different. The procedure followed in applying therefore differs in some aspects from yours, although in general terms it is possible to affirm that, with the exception of chemical products, what is patentable in the United States may likewise be protected by letters patent in Mexico. As many of you may have undoubtedly found out, the same elements on the basis of which a patent may be obtained in your country are useful for

[1] See generally César Sepulveda, *El Sistema Mexicano de Propiedad Industrial*, Mexico, 1955; and "Ley de la Propiedad Industrial y su Reglamento," *Diario Oficial*, Dic. 31, 1942.

the same purpose in the Republic of Mexico, and it is only in a few instances that the division of a patent is required, due to the fact that our system prefers unitarian privileges.

The owner of a patent must pay the annuities established by law in order to preserve its validity and keep it from falling within public domain. Annuities must be paid precisely upon termination of the first three years following the legal date of the patent, which in Mexico is the filing date. There is a period of grace. We have seen, in practice, that the majority of annuities are paid on the very last day of the period of grace, although we have also seen that a great number of patents are lost in an endeavor to delay payment until the last minute.

Inactivity on the part of a patent holder in not effecting industrial exploitation within the national territory may lead, in accordance with the laws of Mexico, to reduction of the life term from 15 to 12 years, and furthermore exposes the holder to the possibility of obligatory licenses being granted. However, the somewhat deficient wording of the applicable legal provisions enables exploitation, in the first instance, to be effected in a nominal way.

Whosoever works a patent must, in order to safeguard his own interests, furnish timely and legal notice thereof. In this way the possibility of a reduction in the life term of the patent is eliminated and the danger of compulsory licenses, although remote in these days, is removed. Notification of exploitation creates the presumption that the patent has been worked throughout its term in the event an interested party should consult the corresponding official file in the Patent Office. At any rate, under lawful procedure, the burden of proof of non-exploitation will rest with the party seeking license.

On the other hand, whosoever fails to exploit his invention within the first twelve years, reckoned as of the date of application, may obtain potential recognition for the remainder of the patent's life term if proper evidence can be furnished proving the impossibility or absolute material difficulty of effecting exploitation. At first sight, evidence of this circumstance would appear rather complicated inasmuch as it would be of an essentially negative nature and therefore difficult to obtain and, also, because it would refer to circumstances that took place in the past. However, it has been established under our practice that if publication is made in the *Official Gazette* and in one or more newspapers of the fact that the owner is willing to grant licenses or to permit exploitation, the impossibility or difficulty of effecting same will be considered as having been conjecturally proved. Of course, if a third interested party should prove his interest and his capacity to carry into effect the patent in question, it is then to be considered that

the owner would, in turn, have the obligation of satisfactorily proving his inactivity.

The pattern to be adopted in deciding whether a given Mexican patent is to continue in effect by proving non-exploitation thereof is to determine success of the corresponding invention in the United States. If the patent is exploited there would still be, upon completion of the twelve years in Mexico, about four or five more years of useful life in this country and it would therefore seem imprudent to permit a competitor in my country to take advantage to its expiration.

Obligatory licenses are in order when exploitation of an invention has been improperly or insufficiently effected, or if it is not exploited after three years as of its legal date (or of the date of issuance in accordance with the Paris Convention) or if exploitation has been suspended for more than six months. There are also other reasons on the basis of which a license will be granted, in which the facts to be considered are different, i.e., when an improvement is effected on the invention of another party and the latter fails to exploit it or, an opposite example, when there is an improvement on the patent of somebody else and the holder of the primitive patent desires to exploit said improvement.

But there are in our system so many requirements surrounding compulsory licenses and the system of surveillance of exploitation and the rules governing profits are so complicated that ever since the present law became effective on January 1st, 1943 there has been no instance in which a license has been granted. It is, therefore, that in the proposed amendment to the Commercial Code provision is being made for a more flexible solution that will be in accordance with reality.[2]

The owner or the licensee of the patent can sue against infringers not only for manufacture of the patented object, or for the use of the process but also for importation. The most notable difference with your system is that, as we said before, in Mexico patents for chemicals and for pharmaceutical products are excluded, but even so, insofar as my country has recently become a party of the Lisbon Revision to the Paris Convention, relief may be obtained in some way against importation of chemical or pharmaceutical products,[3] and in this way, although not *directly* protected in Mexico by a patent, might *indirectly* find still some protection.

I must add that patents and patent applications can be transferred or assigned freely. Concerning trademarks and trade names, their re-

[2]See César Sepulveda, *Exploitation of Patents and Compulsory Licenses under Mexican Law*, 1957.

[3]Article 5.

gime in Mexico has still more resemblance to the U.S. system than the patent system.

III

Now, in view of time, perhaps it would be better if I confine myself to some brief remarks as to the current trends that may eventually alter the international pattern of industrial property rights in Mexico.

There has been some talk that the patent laws in my country should be reformed or amended to properly meet the present circumstances and the actual interplay of economic and sociological factors.

It is concretely in the sector of process patents for pharmaceutical products where the pressure is being felt. For instance, among other things, Mexico has now a huge social security program, and its goal is to provide medical assistance and hospital relief to almost all the population. The results obtained up to now are impressive. The medical center of Mexico City, for instance, and some other projects, are testimony of the efforts and achievements up to date.

The Social Security is by far the single largest consumer of pharmaceuticals in Mexico. But by and large the major part of the suppliers are from foreign countries and most of the materials employed in the local conditioning of medicines come from abroad. The Health Department on the other hand, that administers government hospitals, is also an important consumer of these products.

In any country in which, like in Mexico, a profound social and economic revolution is taking place, the nationalistic feeling is, apart from being justified, very strong, and it directs the want of a self-sufficient national pharmaceutical industry. These things alone have moved people to propose changes with respect to patents for processes for obtaining drugs and medicines, and has had the tendency to limit the life of a privilege of patents of this kind only to five years if it is not industrially exploited in our country. This can lead to some developments in the near future because it is a situation that calls for adjustment.

IV

Coming now briefly to the scope of antimonopolistic legislation in Mexico, it may be that it is out dated and archaic; perhaps, the practical application is impaired by the absence of special agencies which administer it.[4] It may be further argued that the antitrust provisions

[4]The relevant laws, in chronological order are: 1. Political Constitution of the Republic (5 Feb. 1917) Art. 28. 2. Regulation under Art. 28 (above). *Official Gazette* 19 Dec. 1931. 3. Organic law of Art. 28 (above) on the subject of Monopo-

are loosejointed, and they are mainly concerned with the regulation of prices or imports than with the other capital aspects of the monopolies and restrictive trade practices, but amazingly, these laws and regulations serve their purpose very well.

Some useful control exists, for instance, concerning prices. The Mexican Government is empowered by law to regulate ceiling prices in several kinds of merchandise. In that way, a scheme to fix the price of patented goods in defiance of the public interest can be avoided. Again, utilizing the same example, prices in medicinal products are tightly controlled by the government, more than any other commodity.

Another antitrust control related to the patent field, is constituted by controls of importation.

Still another is represented by what is called "mexicanization of industry." Through certain measures and practices, our government can convince inventors from abroad, to divest themselves of the majority of the stock capital in favor of majority of Mexican stock, and then antitrust policies may be pursued with less hindrance.

Finally, we may look into some other practices that may be reflected in the antitrust area, and that may affect eventually industrial property rights. There is, for instance, the matter of the so called *integration* of Mexican industry, and that means that the government can require that a product, patented or not, has to be manufactured with a determined percentage of Mexican materials.

It is unquestionable that all these loosely knit antitrust provisions, if wisely employed, may constitute a sound weapon against monopolistic practices, including those where patents can be utilized to restrict competition, as in the cases of abuse of licensing, pools of patents, undue consolidation of patents, "tie in" clauses in licensing, cartels of patents, non-exploitation for suppressing competition, and some other subtle forms of utilizing the patent rights for eliminating competition, or for creating an artificially high price.

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lies (*Official Gazette* 31 Aug. 1934). 4. Decree under Article 4 of the Organic Law —*Official Gazette* 1 Feb. 1936 (referring to exemptions in favour of producers with a view to increasing production, rationalization or exports). 5. Regulation under Art. 5 of the Organic Law—*Official Gazette* 12 Aug. 1938. 6. Decree regulating the export of essential goods and raw materials—*Official Gazette* 4 Nov. 1939. 7. Law setting up the National Distribution and Regulation Agency—*Official Gazette* 18 June 1941. This set up a public corporation with power to regulate prices and trading in essential goods. 8. New regulation about essential consumption goods—*Official Gazette* 23 Dec. 1941 and 2 March 1942. 9. Regulation under Article 15 of the Organic Law—*Official Gazette* 7 Jan. 1942. 10. Law concerning the powers of the Federal Executive in Economic Matters—*Official Gazette* 30 Dec. 1950. 11. Decree amending Articles 1, 2, 3, 13 and 18 and adding Article 21 to the Law No. 10 (above)—*Official Gazette* 6 Mar. 1959. Fixing of prices must be "sobre la base de una utilidad razonable."

Of course, it may be argued, and I agree fully, that our antitrust laws and regulations, instead of being antitrust, create, in fact, some cartels or quasi monopolistic situations, but you may perhaps agree that competition is not an end in itself and not all monopolies are bad per se. Monopolistic practices are perverse when they are contrary to the "rule of reason," that is, when they collide with the public interest, with the interest of the collectivity.

V

Now, we may inquire into another development that may also bear on the matters we are discussing. This is the Asociacion Latinoamericana de Libre Comercio (ALALC, or LAFTA). As in the case of the European Economic Community, there is some purpose in going in the direction of unification of patent legislation, because differences in this area create a barrier against the free flow of goods from one member of the Association to the others.

But the unification of legislation seems a very distant goal, because of all the factors involved. How is it going to be achieved? By treaty? By a type law? Through harmonization of the different laws, in order to get a more or less uniform pattern? The technical obstacles seem formidable, and are increased by the lack of a sufficient number of experts in Latin America. Besides, there is the question of whether universalism, and not regionalism would be better in the sector of industrial property.

VI

If there must be some conclusion, I finish stating that in spite of the pressures, political and otherwise, the tensions of economic and social development, we in Mexico are determined to preserve the values that inspire the patent laws, and at the same time, the antitrust provisions, because they have proven already their merits for more than a century, as a factor of industrial and technological development.

Ladies and Gentlemen, please accept my thanks for your kind attention!

(Applause.)

MR. PHILLIPS: We do appreciate this very effective presentation of the current situation in Mexico.

We now turn our eyes a little further south, and we will have the pleasure of hearing presently from Mr. Juan E. F. Wodak, Civil Engineer, Supervisor of Examiners of the Argentine Patent Office. Mr. Wodak.

(Applause.)

MR. JUAN E. F. WODAK: I wish to state that the two gentlemen who preceded me are lawyers who are used to talking to big audiences. I am an engineer. We don't talk to the public very often.

(Laughter.)

So I have to do this thing the best I can, and I hope something comes out.

You heard the gentleman from Mexico speak about the northernmost of Latin American countries, and you heard the gentleman from Brazil, which is the central part of South America. And now you will hear about Argentina, which is the southernmost. You will see that practically the patent law, the trademark law, the antitrust laws, everything, is more or less the same as it is in this country. But as the United States' patent law is quite similar to the Canadian patent law and is still different, and the patents in the United States are not completely similar to those in Canada, this is also true in South America, and the Latin American countries, too.

We pride ourselves in having a great literacy amongst the people. We have 90 percent of the people who know how to read and write. We also have Nobel prize winners, but I think that is all we can pride ourselves on. Our low currency exchange has made the best people of our country come to this country, to the United States, where they get more money, more facilities than in Argentina. Hence, our country is wide open to industrial development, to the importation of capital and, therefore, interesting, too, would be the opportunities to the people of this country.

Our antitrust law is an exact copy of the Sherman Act, which was enforced in 1946, but we make practically no use of it because of the difficulties in financing the enforcement of it, so that it is practically nonexistent. But on the other side there is such a wide field open to industry that the antitrust inconveniences that are liable to happen in this country will not happen there.

One interesting provision of the antitrust law is that it says, specifically, that patents and trademarks are out of it, so that there is no question about figuring if patents would be considered as included in the law. This we do, trying to force the importation of inventions. In the American P.O. instruction book it is specifically said that an American patent is valid only in the United States, which seems to be necessary because there are people who think it is valid elsewhere.

Argentina never adhered to patent conventions, not even to the Buenos Aires one. But we have importation of patents. In other words, a patent that has been granted in the States might be imported in Argentina, even if it is not new, and it doesn't matter that it is one

year or ten years of age. Of course, the imported patent has only ten years of life or the life that the foreign patent has still left.

As you know, this cable coming out from the telephone has a spiral form. It has been manufactured in Argentina three years ago. It is already eight years old in Switzerland. In other words, had this company who developed that cable imported the invention three years ago she would still be sole owner of the invention for two more years. The only handicap in this is that no other people have manufactured the object in Argentina before the filing of the importation patent. If you manufactured the product before and you ask later for an import patent for it to come under this statute, that is not possible.

So the whole thing comes back to the same provisions that are necessary for common practice. In commerce, you get your protection. Don't rely on the fact that you have one patent in one country, and the other countries will, based on that patent, continue to protect your rights. These international agreements say you have one year. Past one year you can't patent, you cannot get a patent in the States or in other countries, and in Argentina they say you have it for about ten years more.

The patent is not taken just for keeping somebody from doing it. We want that if you get a patent in Argentina, you put up an industry. Therefore, we have the working conditions which say that if a patent isn't working inside a two years' period, the patent is nil. Anyhow, if you get a patent in Argentina, you are supposed to work it.

There is no compulsory licenses in Argentina, and there are no restrictions at all for the free inflow and outflow of foreign capital or for the withdrawal of income royalties and anything concerned with money matters.

We go even farther. If somebody like Gillette, for example, which has a big factory over there, wants to increase their factory's bringing in new machinery or so, we have provisions in a special law which say that they come in duty free and with a lot of advantages which normally wouldn't be given.

The whole idea is that we get more industrialized. There is no control of prices in Argentina, in other words. Antitrust practices which can be used to make possible the control of prices are forbidden over there.

There is another law which is called the drawback law. It states that you can bring to Argentina half-manufactured products or part of them. Use Argentine labor and facilities to finish it and export it, and then you get back the duties you paid for bringing this half-manufactured product in.

I do not know how much interest you have in other topics, so since the time has passed, I will conclude, and you can ask questions if you are interested in other material. Thank you.

(Applause.)

MR. PHILLIPS: We have heard of the antiquity of the Brazilian system, and details regarding the Mexican one, and of that of the Argentine. I think, since we are exchanging views, we might suggest that many times the universality of the patent system should apply within the country as well as without, the purpose being to attract new things into a country, to encourage the citizens of a country itself to produce, and so we would do well to remember that patents are and may be more and more owned by local citizens as well as those abroad.

Will the ushers please bring forward the signed written questions from the audience? Also as we accept questions from the floor, will you please give your name?

While the questions are being collected, I should like to ask one of Dr. Fróes, being very much interested in his statement of the newest provisions of Article XIV of the new Act. Do you believe that the provisions will be enforceable in Brazil?

DR. FROES: I do believe they will be enforced. These provisions do not clash with the Constitution nor any treaty that Brazil has signed, so I do firmly think that they will be applied. It is just a matter of time.

MR. PHILLIPS: We have a question here for Mr. Fróes from Mr. N. A. Vonneuman:

"As a result of registration requirements to which foreign agreements have now been retroactively subject, delays are being experienced by Brazilian licensees in remitting royalties to licensors. Do these delays have a deeper implication, such as shortage of funds, and what is the status of agreements calling for royalties for mixed patent and know-how rights?"

DR. FROES: I would like to read the question again, as it is a long one.

Let me deal first of all with the initial part of the question.

"Delays are being experienced by Brazilian licensees in remitting royalties to the U.S. licensors."

It is a fact, and not only with regard to American licensors, you may be sure of that, but also with regard to foreign licensors, generally. The reason for this is that the Brazilian Government is still unprepared to face the new provisions. The Governmental agency which has been charged with applying them, a Department of the Bank of

Brazil, is getting used to the new provisions, and I think that in the near future it will be possible to expedite remittances.

Now, for the question:

"Do these delays have a deeper (underlined) implication such as shortage of funds?" I don't think it's because of a shortage of funds. As a matter of fact, Brazil has been facing great exchange restrictions, and—I would like to know the gentleman who asked the question so that I can address him.

Thank you very much. As I was saying, we have been facing exchange restrictions, but I don't think these restrictions are the real ground of the delays. I think they are due to the fact that the law is a quite recent one. I will now repeat the third part of the question so that you will fully understand the answer:

"What is the status of the agreements calling for royalties for mixed patents and know-how rights?"

The maximum royalties concerning patent licensing and know-how agreements are of 5 percent in each case. If the know-how agreement has a different purpose than the patent one, another 5 percent may be remitted, actually, unless in the case of Article XIV of the Foreign Capital Law, which Mr. Phillips has just referred to. In case two companies are linked one to the other to the extent that the licensor controls or has the majority of the capital of the licensee, no remittance is possible.

MR. PHILLIPS: I think that answers Mr. Robert Bangs' question which was in regard to the limitation on royalties in Brazil, namely, "Are they imposed solely and primarily for tax reasons?"

We have a rather easier question, I think, Dr. Fróes. They seem to be coming to you for the moment.

"Are there patent working provisions in Brazil?"

DR. FROES: Yes, there are, just as in other countries, and we have two penalties against non-working. The first one is the cancellation of a patent, in case the invention is not actually worked in the country for more than three consecutive years. We also have the compulsory license if the invention has not been actually worked in the country for more than two years, but there is a problem regarding the second penalty, because the Brazilian legislation has set a time limit of two years for the grant of the compulsory license whereas there is a provision in the Paris Convention to the effect that no restrictive measures can be assessed against patents unless after three years counted from the date of their issuance.

So far, despite the fact that the Brazilian Industrial Property Code was enacted in 1945, we have not had a single case in the Courts where

it has been decided which law should prevail, the national one or the treaty. A few years ago, we had a case concerning the matter and we were quite hopeful that it would be clarified, but unfortunately the party which applied for the compulsory license decided to withdraw the request, so we still do not know what will be the Courts' reaction to this contention.

On the other hand, I would like to call your attention to the fact that working must be done in the country. The mere importation of the goods manufactured abroad in accordance with the same process is not enough to meet with the Brazilian requirements. The law requires local manufacture. It must be constant, it must be real, it must be permanent. This is the purpose of the law: we don't want to keep patents which are not good for the country, which do not contribute to the general welfare.

MR. PHILLIPS: We have a question from Mr. H. Olsner for Dr. Sepulveda:

"Under the Mexican Industrial Property Act, is it still possible to assess the expropriation of a company for patent infringement under certain circumstances?"

DR. SEPULVEDA: Not at all. We have an expropriation law, but it is founded only in public utility, and it is used only for social purposes, and in every expropriation, compensation is paid according to the Constitution and law. You may have only compensation for damages in that case, and in a civil action you may attach assets of the infringing company, but that is a different matter from expropriation.

MR. PHILLIPS: And while you are speaking, Professor, here is a question from Mr. Francis Browne which I will ask you first to discuss:

"What does each of the members of the panel consider to be the greatest obstacle to a workable inter-American treaty on patents and trademarks?"

DR. SEPULVEDA: Well, perhaps the difference in legislation and sometimes the lack of common interest between our countries, and finally the lack of a number of experts to work out the differences and to propose workable solutions.

In the past we have had representatives from the Government with different Interamerican Conferences, but no experts in the field of industrial property. You may remember that every time there has been a proposal for an inter-American Convention, the representatives that discuss it are from the consular branch or members of the diplomatic corps, but not the interested parties. You would expect to have experts in the different fields to reach a satisfactory outcome.

MR. PHILLIPS: Thank you.

Mr. Wodak, here is a question:

"Does the owner of a patent in Argentina have a right to send abroad the total of his royalties, or is he limited by monetary restrictions?"

MR. WODAK: No limitations at all.

MR. PHILLIPS: Perhaps, though, that question might mean, is there any difficulty in converting to United States funds, or German currency, or whatever, at the present time?

MR. WODAK: It depends on the exchange rate which is not controlled by the Government. He might send out whatever money he makes, but there is no control over currency movements in Argentina.

MR. PHILLIPS: Is that the sense of the unsigned question I just read? The same question was addressed also to Dr. Fróes of Brazil.

DR. FROES: The answer is exactly contrary. Please, who asked the question?

No, the patent licensee can only remit to the licensor abroad up to 5 percent of the royalties even if the agreement has been entered into a long time ago, much before the date the new provisions came into force. We hold that these new provisions are of public interest, so they can be enforced even in case the license agreement is prior thereto. Consequently, the patentee abroad, the licensor, cannot receive more than 5 percent of the invoiced value of the product. Depending on the degree of essentiality of the activity concerned, he perhaps will receive less because the Minister of Finance has been empowered to set down a schedule of royalties which are permitted to be sent abroad, and the maximum is 5, but there are royalties of 4, of 3, of 2 and of 1 percent.

Therefore, in the best possible hypothesis, the Licensor would receive 5 percent but nothing more than that. Of course, again I have to repeat, if the licensor wholly owns or controls the capital of the licensee, he will not receive a single cent.

MR. PHILLIPS: Dr. Sepulveda, you stated, as Mr. Gomez writes, that a patent can be infringed upon in Mexico by importation. Now, will you kindly advise us who must stand the burden of proof in such an infringement action?

DR. SEPULVEDA: Well, according to the constitutional provisions, the burden of proof pertains to the plaintiff. But now, since ratification of the Lisbon Revision (Article 5) automatically the burden of proof reverts to the infringer. He has to prove that the process related to the imported products is different from the patented process.

MR. PHILLIPS: And this would apply to a product of any process regardless of its nature, the process claim about which you are speaking?

DR. SEPULVEDA: Yes.

MR. PHILLIPS: Dr. Fróes, we have a question from Mr. G. L. Jordan:

"Is CADE the agency mentioned in connection with enforcement of the new antitrust law equivalent to our Antitrust Division of the Justice Department?

DR. FROES: Well, I am not fully aware of the task that has been entrusted to this Division but I feel it must be more or less the same thing, because the CADE is exactly the governmental agency which will enforce all the antitrust provisions.

MR. PHILLIPS: Dr. Sepulveda, Mr. Jordan asks:

"Has the policy of government control of foreign capital which is termed 'Mexicanization' resulted in loss of that capital?"

I believe you answered that a few moments ago by stating there is a loss.

DR. SEPULVEDA: Let me see the question.

We have very good examples that this policy helps the foreign investors to get more and more in their favor.

I will say the control is not there at all. They sell 51 percent and keep the minority, the active minority, and they get some sort of a monopoly treatment from the government. They are allowed to import goods, merchandise, raw materials for the industry and some restrictions are put on importation of the goods to be manufactured locally so the capital increases every year because of the opportunities of having special treatment from the government.

So we are creating some sort of monopolies, some sort of monopolistic practice in that way, but there is also control of the practices of the enterprise.

MR. PHILLIPS: We have a question for Mr. Fróes from Mr. H. M. Saragovitz:

"Does your government obtain patents on inventions made by government employees?"

I think that means are they assigned to it.

"If your government infringes on a patent, what recourse, if any, does the patent owner have?"

DR. FROES: The first question reminds me of an interesting phrase attributed to a Brazilian thinker. He said once that the lawyer is not a man who is supposed to know everything about law, but a man who knows where to find in the law the right answer for a given question. In this particular case the answer is Article 65 of the Brazilian Code of Industrial Property, which I have right here with me.

MR. PHILLIPS: He is a good lawyer. You can see how fast his advice has become available.

(Laughter.)

DR. FROES: I will read to you the pertinent provision and you will immediately understand it:

"During the period of a contract of services, the inventions of an employee, whenever they arise from his personal contribution and from the installation or equipment provided for by the employer, shall be common property in equal parts, except if the object of the said contract is implicitly or explicitly of scientific research."

If the object of a contract is implicitly or explicitly scientific research, the patent will belong to the employer and not to the employee, because in that case it is supposed that he was hired exactly for the purpose of making these discoveries. So, he will have got his pay which is his salary but not any rights on the patent, whereas, in the other case where, perhaps, the employer gave the employee an opportunity of making the discovery, the latter will be entitled to half of the patent, the other half being owned by the employer.

MR. WODAK: May I put in the Argentine answer to that same question?

MR. PHILLIPS: Please do, we would be very interested.

MR. WODAK: We have no provisions in the law for that, but we have a case which went to the Chamber of Appellation, and the solution was that whoever makes the invention is the owner, except if there is a contract with the same invention made by the inventor to go to his boss. In other words, in Argentina anybody is the owner except if he makes it for the owner.

DR. FROES: There is a further question which I will read so that everybody can understand it:

"If your Government infringes a patent, what recourse, if any, does the patent owner have?"

Well, if the Government does infringe a patent, it will be an infringement like any other one, so the aggrieved party will be entitled to all the legal remedies just the same. There is no distinction between the Government and anybody else when a patent infringement is committed.

MR. WODAK: In our country you have to go to the Supreme Court, to sue the Government.

DR. FROES: In Brazil, we can sue the Government, and can start from the very beginning, in the Lower Court.

MR. L. H. BAER: Without permission of the Government?

DR. FROES: I beg your pardon?

MR. BAER: Without permission of the Government to be sued?

DR. FROES: Yes.

MR. BAER: Is the Government sued in the same court as the private corporation?

DR. FROES: No, it is sued in the Federal Court. That is the only distinction. If I were to sue somebody for patent infringement, I would go to the civil courts, but if the Government were the defendant, then I would have to sue it in the Federal Court.

MR. PHILLIPS: Mr. Baer presents this question in which Mr. G. Kustossy is also interested:

"If one obtains a patent in the country of origin, such as in the United States here, and we file, let's say, 15 or 20 patent applications in international convention countries, including Brazil, if we permit the patent to lapse in Iran, for example, would that cause a lapsing of the Brazilian patent or must the lapsing be only in the United States?"

DR. FROES: I was pretty sure somebody would ask such a question. (Laughter.)

As you could see from the quotation I made of Article IV, it is a very vague provision.

MR. BAER: That's right.

DR. FROES: It's really a vague provision because it refers to a country with which Brazil has an agreement and it may happen, for instance, that an American patentee has patents elsewhere and also in Brazil. Due to some reason or other, he allowed the patent to lapse in Iran, for instance, many years ago, whereas his patent is alive in Brazil, where he's very interested in working it, having a plant exactly for that purpose.

So, the question is: Will he lose the patent because in the past inadvertently he allowed the patent in Iran to lapse? That is the big problem. Now, we have to see that in detail. I have to answer the question by parts. The first one concerns the meaning of the word "caducado." You have read the translation made by the American Chamber of Commerce.

MR. BAER: Yes.

DR. FROES: And I venture to say that this translation is not quite accurate as far as industrial property matters are concerned. Perhaps the person who made the translation is not an attorney at law and is not fully familiar with the provisions of the Industrial Property Code in Brazil.

The fact is that the word "expired" contained in the translation does not correspond exactly to the Portuguese word "caducado." This word in Brazil is the equivalent to "forfeited." So you see it does not have such a broad meaning as the word "expired" because "forfeited"

pursuant to my knowledge, is the expiration of a patent, for instance, due to some fault on the patentee's part.

MR. BAER: The payment of taxes, for example.

DR. FROES: Yes, the payment of taxes, and in Brazil the lack of working, too. Therefore, in case my interpretation prevails, the provision will be applied to just an insignificant number of cases. By the way, I am pretty sure that the intention of the legislator was to use the word "expirado" ("expired") but instead—I don't know why—he used the word "caducado" ("forfeited"). Now, according to the Brazilian system, what matters is what is written, not what was intended to be written. Under these circumstances, reverting to the example given in the question raised, if the patent in Iran just lapsed due to the expiration of its normal life, this would not entail the cancellation of the Brazilian patent.

MR. BAER: I had hoped that the intrepretation would be that it would be the lapsing or the cancellation of the home country.

DR. FROES: Let me now revert to the second part of the question. I said I would answer it by parts.

The answer is this: Though the law was intended to cover all the countries, the expression used was not very clear, and why the correct interpretation is the one that considers only the country of origin. I think it is a quite reasonable interpretation and, as a matter of fact, it is the only reasonable one, especially if you compare this provision with the similar one that has been inserted in the foreign capital law according to which no royalties can be remitted unless it is proven that the corresponding registration and patent are in force in the country of origin. In that case it is clearly stated: "the country of origin." But in the further provision, a rather vague expression was used which in my opinion should be interpreted in the sense of "country of origin" because otherwise, it does not make much sense.

If you will allow me to go a little further, I would even add that the validity of this provision is debatable. I don't know whether the courts will enforce it because it clashes with the Paris Convention to which Brazil is a member. As a matter of fact, this convention provides that patents are considered independent, one from the other, in the various country-members, so what happens to the patent in Iran must not affect the life of the patent in Brazil.

I am sorry I cannot say how the courts will react to this contention because the law has just been enacted. Perhaps one year or two years later I will be in a position to give you a further explanation.

MR. PHILLIPS: Can one imagine a Brazilian manufacturer who acquires an important invention, and files it in about 40 or 50 countries,

as one often does, to start off with broad protection not knowing really whether the invention is going to be commercially successful, and then as he begins to save his foreign tax money and wants to abandon some of the foreign patents because of good management of his corporation, lo! and behold! his Brazilian patent would expire automatically with the abandonment of some corresponding patent in a less important market abroad. This is the sort of thing I had in mind when I tried to emphasize at the opening of our session that I like to think of the patent system as being universal, applying to people in a country the laws of which benefit everybody equally whether or not they are natives of the country.

I imagine, however, that these things will gradually be worked out.

Coming over to the lecture this evening, Dr. Fróes mentioned that this was one of the situations in framing the Brazilian statutes where the local bar association was not given full opportunity to comment, and these things can often happen, I think, when as has been said earlier, experts are not consulted before legislation is finalized.

We should revert to Mr. Browne's question. I would like to ask it of our friend from Mexico.

Have you any views, Dr. Sepulveda, on the question of greatest obstacles to a workable arrangement on inter-American patents and trademarks?

DR. SEPULVEDA: I have already answered that.

MR. PHILLIPS: Then let us ask Mr. Wodak of Argentina, what do you consider to be the greatest obstacle to a workable agreement on patents and trademarks for the inter-American community?

MR. WODAK: We have three countries with three completely different views on practically the same laws. Even the United States and Canada have differences in their laws, so there is, I think, very little possibility in having international law or even inter-American law.

MR. PHILLIPS: We have another inquiry for Dr. Fróes from Mr. Gomez, referring again to Article XIV of the Brazilian statutes:

"Suppose a Brazilian affiliate is owned by a foreign corporation together with Brazilian partners, can royalties be remitted to the country of the foreign owners where the foreign corporation owns more than 50 percent of the Brazilian affiliate?"

DR. FROES: No remittance is permissable. If more than 50 percent is controlled by the foreign licensor, even if 49 percent belongs to Brazilian persons, domiciled or resident in Brazil, no remittance is possible.

MR. BAER: May I ask a question?

MR. PHILLIPS: Please do.

MR. BAER: Assuming that no remittances are possible, could one remit the equivalent of royalties and call them dividends?

DR. FROES: Well, there are some other restrictions in the Foreign Capital Law. This law regulates not only the remittance of royalties but also of interest, profits, etc. The remittance of profits is limited to 10 percent, even in case they exceed that amount. The excess cannot be remitted. It must stay in Brazil, and it will be considered as additional capital of investment.

MR. PHILLIPS: Please give your name and ask your question, sir.

MR. HENRY CALDERA-PALLAIS: Yes. My name is Henry Caldera-Pallais from Nicaragua.

I am interested in the last question put, as a matter of coincidence, by my companion sitting next to me here, Mr. Brown, in connection with the international treaties and also with the information given by Dr. Sepulveda and the remarks made by Mr. Wodak on international conventions or treaties.

It seems to me that the question put by Dr. Sepulveda as to whether it would be better to change or unify the laws of the other Latin American countries in place of a convention deserves close consideration. Mr. Wodak explained to us that since all the countries have different laws and different problems, it would be impossible to unify the laws, and that according to the Argentinian point of view, it is not even convenient to ratify the convention.

Well, it seems to me that the question of changing local laws, that is to propose to a country to change these laws, is very hard and almost impossible because the legal profession will oppose it as well as the judicial authorities because through the years the lawyers have been studying these laws for making their arguments and discussions in the courts and the judges have been deciding these questions and making their decisions which through the years have resulted in well established jurisprudence based on these laws in the various countries. And therefore, when it is proposed to change the laws everyone concerned reacts against it saying: "Well, no, this is our law, this is what we have learned and what we know and what people understand what the law is."

So that is why it has been difficult to unify such laws. It was tried many years back in Cuba by the Director of the Inter-American Trade Mark Office. I forget his name now, I believe his name was Dr. Juan Luis Rodríguez.[1] I don't know if anybody recalls this office in Cuba,

[1]Director of the Interamerican Trade Mark Bureau which existed in Havana, Cuba, and published the Bulletin of the Interamerican Trade Mark Bureau from January 1934 to December 1939 which Bureau was established as a result of the

(remarks from the audience indicate that many do recall), but the fact is that he failed to do anything in making a unified inter-American law. But I find that certain unification could be and actually has been made with respect to all those parts of the laws which cause difficulties and differences, that is to say, those parts of the laws of each of these countries which have so obviously become an obstacle to good working of the patent and trademark systems. I refer to the legal systems provided by the Inter-American Conventions and it is there where I find that some of the countries, as a matter of fact, Argentina and Mexico, have not subscribed to these conventions.

We have a Convention on Patents which was signed in Buenos Aires[2] to which Argentina and Mexico did not subscribe, but yet it works amongst the signatory countries specially on the filing of the application, these countries always mention the Convention and obtain a one-year priority right which has been applied in many cases with good results. There are several other points which I cannot recall just now, about four or five points of much interest which tend to unify these antagonistic provisions.

There is also the General Inter-American Convention on Trade Mark and Commercial Protection of 1929,[3] of which neither Argentina nor Mexico are members and which also is working very nicely amongst all the countries that have subscribed to it, Panama, Guatemala, Honduras, Peru, Uruguay and several others which have conformed to the provisions for the registration of trademarks prescribed by the Convention as well as rendered judicial decisions based on such provisions.

So I think if there is a real need of this inter-American unification of the law or of the legal systems, the best way is to promote within the countries the acceptance of these Conventions and their application.

I really do not understand why it is that Argentina, even though accepting what Mr. Wodak has said now, insists on having this sort of independence through their local laws. As the international trade in the Americas becomes more a part of the Common Market for all of us, these Conventions can be generalized by acceptance by the American countries. The provisions of the Conventions in existence are good

Protocol of the Inter-American Registration of Trade Marks signed in Washington on September 20th, 1929.

[2]Buenos Aires 1910 Convention on Inventions, Patents, Designs and Industrial Models—Brazil, Costa Rica, Cuba, Dominican Republic, Ecuador, Guatemala, Haiti, Honduras, Nicaragua, Panama, Paraguay, Uruguay, United States.

[3]Washington, D. C., 1929 General Inter-American Convention for Trademark and Commercial Protection—Colombia, Cuba, Guatemala, Haiti, Honduras, Nicaragua, Panama, Paraguay, Peru, United States.

except that the Conventions have not been ratified and that makes such provisions inoperative.

MR. WODAK: Just a few remarks to these statements, the South Americans are supposed to be more hot-blooded than the Englishmen – (laughter) –but still England and the whole Commonwealth, including Canada, South Africa, Australia, New Zealand, each one have different patent laws. In other words, a patent in New Zealand is not accepted in South Africa. It has to go through the whole process, and if it goes to England, the same thing applies. The English being much more dependable and a much more cool-headed people, than we and not having a uniform patent law either, I don't think South America will ever accomplish that.

(Laughter.)

MR. PHILLIPS: Yes, Madam, may we have your name?

MISS SHUMAN: I am Miss Shuman with the National Education Association, and I would like to know whether in the by-laws or the Constitution or Charter of the Organization of the American States, whether there is any reference to matters relating to patents, trademarks or copyrights?

FROM THE FLOOR: May I answer that?

MR. PHILLIPS: Certainly.

FROM THE FLOOR: There is no reference to those aspects in the OAS Charter.

MISS SHUMAN: Do you expect it is feasible that in the future there may be?

FROM THE FLOOR: Well, I don't think so. I don't think that is to be expected in the Charter. You see, the question of patents would come under a special convention of the OAS. The OAS has a Charter like the UN Charter, and that is a different story altogether.

MISS SHUMAN: Thank you.

MR. PHILLIPS: I think that is a correct response.

Dr. Fróes, an unidentified member of the audience asks:

"Have there been recent developments in Brazil with respect to the protection of patents and trademarks against infringements?"

DR. FROES: Yes. There are, and I would like now to counterbalance some pessimistic ideas that I may have conveyed to you.

With respect to the protection of patents and trademarks, there is a quite new development, not in law but in practice. Until very recently, when there was a patent or trademark infringement, we could avail ourselves of a court action, but there was no possibility of obtaining the specific performance of the decision given by the judge. There was not on the other hand, any possibility of getting an *in limine* in-

junction. So it happened that during the whole time the court action was pending, the infringer used the trademark, worked the patented invention, though of course he would be subject to paying losses and damages in this connection. However, a few months ago, in view of a certain situation which called for immediate and drastic measures, we resorted to a new kind of action, not to the one provided for in Article 189 of the Code of Industrial Property, but to the possessory action since the institute of possession affords a very strong protection in Brazil. We contended that though patents and trademarks are incorporeal things, they are the subject of possession and consequently liable to be protected by the possessory actions which are generally used in Brazil with respect to corporeal things. In this particular case, we were happy enough to obtain an *in limine* injunction, and the judge also determined the specific performance of his decision, to the effect of obliging the Defendant to discontinue the infringement, at once, under penalty of Court contempt. So, in other words, from now on, in cases of patent or trademark infringement in Brazil, we are well equipped to obtain immediate legal remedy.

FROM THE FLOOR: What is the limit on damages? Is it also 5 percent?

DR. FROES: No, there is no limit. As far as the losses and damages have been proven, the plaintiff is entitled to receive the corresponding amount.

FROM THE FLOOR: What damages could be more than 5 percent if that is all that is remittable?

DR. FROES: No, in that case there is no restriction to it.

MR. PHILLIPS: There might be a recovery for loss of profits, perhaps, or of a reasonable royalty.

FROM THE FLOOR: Could there be?

DR. FROES: Oh, yes, there is such a possibility.

MR. PHILLIPS: But to a foreign owner you might have a limitation on such recovery, as this gentleman has just said.

DR. FROES: Oh, that's right. The limits concerning profits are 10 percent, so the foreign owner would be entitled to receive 10 percent of the losses and damages, and the other 90 percent would remain in the country being considered as an additional capital which would be registered and would give him the right to receive further profits on the basis of 10 percent of the registered capital. He wouldn't lose the money after all.

MR. PHILLIPS: Realizing the extreme difference between invention and invention and the great difference in value of technical data contribution, between one situation and another, it is rather dismaying to see a complete leveling off of the incentive reward of contribution at

some arbitrary point. I do not mean that people should ever be exorbitant in trying to establish royalty without the interplay and freedom of negotiation and agreement. The problem is whether it is wise for the long view to set a ceiling as low as 5 percent regardless of the individual facts and circumstances, as matter of law.

MR. LEONARD FISHMAN: I am just wondering in view of these restrictions on remittances, is there any incentive at all for a foreign firm to introduce an invention in Brazil?

DR. FROES: No, there is not. Nevertheless, there has been great opposition to these new provisions in the press, in political channels, and there is a certain trend towards an amendment of the law, though we don't know yet whether all these efforts will succeed.

It is a very recent law. We are beginning to enforce it and if experience proves that the law is not desirable, I think the Government itself will do what is necessary to change it.

MR. WODAK: I would say that in Argentina we have none of these restrictions, but even so, most of the American firms are going to Brazil rather than to Argentina. I don't know the reason.

(Laughter.)

MR. PHILLIPS: Here is that same question in the same vein from Mr. G. C. Lucas:

"Will the limit on royalties encourage or discourage, one, exports of inventions to Brazil and, two, Brazilian inventions?"

DR. FROES: I think the present law is discouraging the export of inventions to Brazil, the filing of new applications as well as patent licensing, due to the fact that the patentee or the future patentee will not be in a position to get more than 5 percent royalties. On the other hand, profits are limited to 10 percent, as long as the present law prevails.

Therefore, these limitations are likely to discourage the export of inventions and, on the other hand, they will possibly encourage Brazilian inventions because of the lack of competition from abroad. But I think that the best way to encourage national inventions is to facilitate research, for instance, and not to set restrictions to foreign trade. That is my particular opinion as a lawyer without any connection with the Government.

MR. PHILLIPS: Mr. Gil-Massa presents this question for Dr. Fróes:

"Are the maximum royalties permitted consistent with rewards from other sources, for example, interest?"

DR. FROES: Yes, they are, and I wish to say there is no limitation in the foreign capital law as to the remittance of interest. It happens, however that according to another law, a rather old one, the maximum

interest is 12 percent a year. So in that case it will be possible to remit the interest once Article 9 of the Foreign Capital Law is complied with:

"Individuals or legal entities wishing to make transfers abroad on account of profits, dividends, interest, amortization, royalties, technical, scientific, and administrative assistance, and the like, must submit to proper authorities at the Superintendency of Currency and Credit and the Income Tax Division all contracts and relevant documents necessary to justify such remittance."

MR. PHILLIPS: Dr. Fróes, are the limitations that apply to percentages applicable to royalties paid by a Brazilian licensee to a Brazilian licensor, at the same rates as those that apply to a foreign licensor?

DR. FROES: The maximum royalty permissible is 5 percent whether the licensor is established abroad, or in the country.

FROM THE FLOOR: Five percent based on what?

DR. FROES: On the invoiced value of the products concerned, but 5 percent is the maximum rate:—don't forget that. It may be less, depending on the type of activity. Those which are considered as essential to the country allow a 5 percent royalty and, of course, those which are not regarded as so essential permit a smaller royalty: 4, 3, 2 or even 1 percent. We want to stimulate the patent licensing on those fields which interest the country, and to discourage patent licensing in respect of certain other activities.

For instance, just to give you an idea, going over the schedule prepared by the Ministry of Finance I can clarify that royalties for the working of patents concerning shaving articles cannot exceed 2 percent whereas the basic industries, such as electric power, fuels, transportation and others warrant a 5 percent royalty.

MR. PHILLIPS: These are deductions or credits against taxes, but can you pay more and not have a benefit taxwise? For example, may one of these licensees pay 7 percent but the licensor take only 5 percent, in this last field you mentioned, as a tax deduction? There is a distinction there, perhaps.

DR. FROES: Yes, that's right. The purpose of this law is only fiscal. It is possible to pay more as far as the Licensor is established in Brazil. However, as the Licensee can only deduct up to 5 percent, there is generally no practical interest to pay more.

FROM THE FLOOR: Is it still true that if a citizen of the Argentine should file an application for a registered trademark with many years' use in international commerce by an American company, but the American company itself failed to register in Argentina, that if the American company failed to file an opposition within the statutory

time of 30 days, or whatever it is, the registration by the Argentinian citizen becomes incontestable? That used to be true before the war.

MR. WODAK: I didn't get exactly the whole question.

FROM THE FLOOR: Assume that an Argentine citizen filed an application to register a trademark in Argentina—

MR. WODAK: Yes, sir.

FROM THE FLOOR: —and that that mark is, we will say, RCA, for instance—

MR. WODAK: Yes.

FROM THE FLOOR: —a well-known trademark of the Radio Corporation of America—

MR. WODAK: Yes, well-known in the United States.

FROM THE FLOOR: And well-known in international commerce.

If this commerce is exported to the Argentine, to that market in Argentina from the United States, but for some reason the Radio Corporation of America has never registered that trademark in the Argentine, has failed to do so, and then the Argentine citizen comes along and files an application, registers on that mark, and there is a period for opposition after publication of 30 days or something like that, and the Radio Corporation fails to file the opposition within the statutory time, then the registration to the Argentine citizen becomes incontestable. Is that not true?

MR. WODAK: It is so.

DR. FROES: May I answer this question as far as Brazil is concerned?

In Brazil that registration would be null and void in view of Article VI bis of the Paris Convention.

MR. WODAK: That is one of the reasons we are not parties to the Paris Convention.

(Laughter.)

DR. FROES: Quite recently, the Brazilian Supreme Court invalidated the registration of a trademark for crystals and glasses, which was identical to another one owned by a French citizen, which had never been used in Brazil, but was well known in our country, in that particular line of business, due to the fact that it had been advertised in foreign publications, especially technical magazines with circulation in Brazil.

MR. WODAK: May I question that the consumer is protected in this way. I would say you can look at this in another way.

RCA has never failed to come in in this 30-day period to oppose such a registration because RCA is a real world-wide organization, and what serves their interest and the interest of the consumers is closely watched by the company.

Now, a little company, suppose a little Washington concern of ten

people, they are not world-wide, and they don't know what is happening in Argentina. They may have a trademark over there, and look after it. But if they have not, they are not world-wide and consequently I think the Argentine Government is right. This trademark is not world-wide. You used the word "world-wide," and world-wide means really that everybody knows about it, you see. Did that happen to you?

FROM THE FLOOR: Well, the United States Department of Commerce before the war had a very special service for this type of problem, that is, the American agency in Buenos Aires had personnel delegated to look over the Argentine situation every week just looking for any opposition on applications whether they were small ones or large. Such information was handled right away in the Department of Commerce, and the Department of Commerce would send telegrams to even the small companies, and if it hadn't been for that, a lot of them would have not been aware of what was transpiring.

MR. WODAK: I think that is one of the reasons for having embassies and consuls in these places to watch out for their peoples' interests.

(Laughter.)

MR. JAMES GAMBRELL: I have a question directed primarily, perhaps to the guests from Mexico and Brazil.

In view of the interests of so many Latin American countries of not only protecting their dollars and keeping them in their countries and working for them and also promoting industrial progress, and also in connection with the UN they have, I think Brazil has, sponsored a resolution looking forward to trying to develop information in relation to industrial property protection and progress. Have any studies been made in these countries or any underway trying to ascertain what are the optimums related to industrial property protection and promoting progress in their particular complex?

DR. SEPULVEDA: I think they have tried to provide an answer to that sometime back, and if I am not very badly informed, they have not done that yet. It is a very difficult field, but in a private way I would say that the University of Mexico, in the School of Economics has been going into research concerning the effects of inventions in the national economy, but it still takes about five years or so.

MR. GAMBRELL: Are there any going on in Brazil?

DR. FROES: Yes, there are in Brazil, too, I would say. One is the proposition which was presented by a Brazilian delegate at the General Assembly of UNO last year, concerning the relation of patent protection and the fostering of industry, not only in Brazil but in the whole world. According to this proposition a study should be undertaken by UNO in order to make some amendments in the patent system in such

a manner that it would not constitute an obstacle to progress of industries and trade.

This resolution was approved by 57 votes against zero, 10 abstentions having been recorded. The International Chamber of Commerce has already reacted to this proposition which aims at weakening the patent system by showing that patents do not hinder progress but, on the contrary, foster it.

On the other hand, we have in Brazil a working party studying the problems of the pharmaceutical industry. There has been a considerable reaction to some abuses that have been committed in that field because though in Brazil there is quite a big deal of currency restrictions, enormous amounts of royalties were being remitted to foreign countries, particularly to the United States, Switzerland and France, before the Foreign Capital Law came into force.

The said working party suggested that an amendment should be made in the Code of Industrial Property in order to forbid the grant of patents for processes of manufacture of pharmaceutical goods, but so far the Government has not sent any bills to Congress.

This is what the working party had in mind, but so far the Government has not sent any bills to Congress. So on that we also have to wait and see what will happen.

MR. GAMBRELL: Are they undertaking any basic studies trying to look at the economic regulations, the economic relationships, or is this merely a collection of laws or opinions?

DR. SEPULVEDA: No.

DR. FROES: It is mostly a work of research in the various countries.

DR. SEPULVEDA: Yes.

MR. PHILLIPS: Do we have any more questions from the floor?

(No response.)

MR. PHILLIPS: I will then turn the meeting back to our Executive Director.

EXECUTIVE DIRECTOR HARRIS: First let me say that the minutes of this meeting will be published in *The Patent, Trademark, and Copyright Journal of Research and Education* of the Foundation, as the previous meetings have been. The one on the Common Market and Great Britain, which has recently been published and distributed, is now available. The meeting on Japan will be published shortly.

I also want to call to your attention the Conference of the Foundation in June, the afternoon and evening of June 20th and morning of June the 21st, here in Washington at the Mayflower Hotel. The theme is "Fostering and Rewarding Invention in the Company, the Government and the University." We interpret invention for the purposes

of the Conference to include all manifestations of purposeful creativity, that is, patentable development, engineering development, employee suggestions, et cetera.

The research of the Foundation will be presented and current issues relating to the fostering and rewarding of invention will be discussed. In attendance at the Conference will be representatives from the different areas involved in creativity throughout the country.

This is the last of the first series of public international lectures. We hope that we have developed a little more understanding, and that we have experimented successfully with a new instrument that might provide more informal personal consultation and exchange of informed opinion internationally.

I want to thank Dr. Fróes, Dr. Sepulveda, Mr. Wodak. I want to thank our moderator for setting the tone of the meeting, and to thank you all for a very informative and very interesting discussion.

Good night.

(Applause.)

(Whereupon, at 10:00 o'clock p.m., the meeting was concluded.)

Political Aspects of Accessibility to the European Patent

ANDRÉ ARMENGAUD*

I

TRYING TO UNDERSTAND OUR FRIENDS' REASONS and attempting to explain our own feeling must be our purpose, our task, as humans, each time a misunderstanding occurs on a difficult problem.

In this respect, I think it useful for maintaining friendly—one could even say cordial—relations between Americans and French to apprise the members of this Foundation of the reasons the Convention creating the European Patent should not include a clause providing for full free access to the European patent of nationals of all countries of the Paris Convention. Also marked advantage would ensue if a sensible solution is found to avoid the refusal of free access to the European Patent.

At first sight this seems quite a difficult task, so obvious it is that any applicant or any inventor who wishes for convenience and financial reasons should be able to obtain patent coverage territorially as large as possible with one single patent.

In this regard, I understand very well our American friends' feeling, in that it would seem normal to them to be granted the same facilities as those granted to nationals of the European countries who are members of the Convention, were it only to respect the cardinal principle of equality of treatment between member and non-member countries' nationals.

But is this the right way to ask the question at issue?

Let us first observe that, in this case, it is not the equality of treatment between Europeans (members of a Europe politically united) and Americans which is at stake. As long as these Europeans do not build Europe as one country economically and politically, they will remain the nationals of different independent states and they will be subjected to the laws of these respective countries. Perhaps, at most, there will be the possibility of acquiring a European title coexisting

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with their own national title, and strictly limited to the field of Industrial Property by virtue of some Arrangements. The equality of treatment regarding respective national laws would be within the terms of Article 2 of the Paris Convention. In this respect, the contemplated European Convention is nothing but an arrangement taken in the spirit of Article 15 of said Convention even though if, going further than the Madrid, The Hague, the Lisbon or the Panamerican Trademark Conventions, such an arrangement creates a new industrial property title of a scope determined by an ad hoc supra-national Patent Office.

And from the moment the requirements for adherence to the contemplated Convention are amended, so as to harmonize the material rights on patents filed in each respective member country with those secured by a European title, there is no longer any difference between the nature of such rights.

But the point at stake does not reside there. The matter is rather to determine if the advantage of the United States, as well as of the European countries which are to sign the contemplated Convention, is not— in view of the present comparative state of the strength and political structures in Europe—to give nationals of third countries (among which are today the United States and Japan, and tomorrow USSR if the latter becomes a member of the Paris Union) the right to obtain European patents without having first elected a domicile in the territory of a member country through an establishment or the setting up of a subsidiary.

The answer to this must, for the present, be negative.

As a matter of fact, how can occidental countries best establish their influence and attract hesitating countries? Is it through an eager competition between industrial countries, each one struggling to snatch some markets from the other? Is it by satellitizing occidental countries around the more powerful of them through economic and financial domination? Or is it by a concerted distribution of tasks conducive to harmonious and well-balanced economic and social development, based on equal access for all European countries to scientific progress?

The approach to this limited but important problem differs according to the answers given to the above questions. In fact, the two first questions make only one. An eager competition leading to a steady weakening of the less powerful or less economically advanced countries would end by their removal into the lot of those miserable states matured for other economic structures, or by the loss of their economic sovereignty.

Could we, in the circumstances, speak of "association" between the different countries involved and, yet more, of "partnership" between nations or group of nations equally responsible for common decisions?

On the contrary, the concerted policy the allied forces enjoyed when their respective manufacturing programs were first submitted to the freely accepted discipline of the War Production Board, led to a correct distribution of production and trade for the common advantage of all the parties, in avoiding redundances, excessive investment in some sectors and insufficient investment in others. A similar policy would ensure optimum employment of manpower and capital while at the same time it would raise peoples' standards and would reduce existing differences between rich industrialized countries and less developed or unfortunate countries.

Undoubtedly, this policy would allow an escape from the "brazen law" of unlimited competition, but is not this already so in our Western countries where the part of industrial activity corresponding to orders placed by the State, and in keeping with governmental scientific research programs, increases by year to year.

The first assumption—full competition policy in the Western world —implies free access by every one to all and any means of industrial development; hence, it implies the protection of inventions insofar as they are patentable and novel. In this light, and leaving aside juridical arguments authorizing arrangements between Member States of the Paris Convention, the access of third countries to the European patent may be understood.

The policy outlined in the second assumption would result in the equilibrium of production and research strength between the large economic areas constituting what we call "the industrialized nations of the free world." This equilibrium would be offset if one partner country can, through a unilateral policy, crystallize for its own benefit full sectors of activity, thanks to the technical advance secured by tremendous research investments. Official statistics show that the comparison between investments for industry and research work, provided by both the public and private sectors, in the United States for one part and in the European Community for the other part is of one to several.

The statistics furnished by Mr. Federico illustrate the consequences of this difference in terms of quantity of patents filed, if one keeps in mind that four-fifths of the foreign patents filed by Europeans are filed in the Six countries of the European Community, plus Great Britain, and about nine-tenths of the foreign patents are filed by American nationals in Europe.

A new facility—insofar as the grant of a European patent is not subjected to a very complicated prosecution—would allow third countries, already endowed with more important research funds than any other European countries taken separately (and separate allotments are a necessity as long as a European political Federation is not a reality), to increase still further the existing differences to the detriment of equilibrium between economic and political areas of equally full partners of the Atlantic community.

The only possible limitation of such risk is therefore to grant the benefit of the European patent only to Member countries of the Convention and to persons considered as such under the terms of the Paris Convention.

To this conclusion, it may of course be answered that the rights conferred by national patents in Europe involve also the same risk for each European State and that it would suffice to establish European subsidiaries or trustee Companies to fulfill the obligation of nationality.

But two arguments may be opposed to this answer:

First of all, experience has proved that non-European nationals very seldom seek patent protection in every and all European countries; some areas stay uncovered either because patent expenses would be too high or because the different patent prosecution regulations are too difficult or because only a few of the European markets justify the expense.

Secondly, the European subsidiaries or trustee Companies are authorized by their parent Company to file patents in their own names only if the authority is in the parent company management, which presupposes an unquestionable financial control. Only big foreign business can afford to own European subsidiaries or branches they fully control; this factor substantially reduces the number of patents of foreign origin in the adhering countries.

Moreover, if one thinks it over more thoroughly, it appears only fair that the benefit of a supranational title should apply only to those who admit its consequences and obligations in their home country. As a matter of fact, it would prove discriminatory to nationals of countries signatory to the Convention, if they were the only ones to be subjected to the regulations of the European patent in their home country, while third parties claiming the same benefit in the same European countries would not admit to the same regulations on their territory—regulations which would be the only return to Europeans for the facilities thus offered to outsiders.

II

I very much wish my American friends would give some further thought to the above remarks, which stem from the political aspect of the relations between Europe and the United States.

It is true that the Germans have officially taken a position opposite to the one I expressed above. Are the reasons for such an attitude so strictly political? In this respect the German policy is to keep in line with American desires in order to be assured of their full assistance in their relations with the East. The German patriotism is such that they prefer the risk of a certain economic subordination—while at the same time expecting to escape it thanks to their industrial dynamism —to the risk of being left alone in the event of negotiations with the USSR.

The French, who have just gone through the difficult period of "decolonization"—as the consequences of Algerian access to independence have proved—do not wish to be subjected to the ruling of richer industrial territories because French economic power has been diluted over a vast free trade area, far different from the principle of the European Treaties.

Hence, a European patent which would not engender a cohesive force for European industry and be beneficial to said industry, would be contrary to the French concept of Europe.

It would be unrealistic to ignore this situation.

In contrast, it would be unfriendly and unfair to ignore the feelings of our American friends.

A great effort should be made to avoid final and non-appealable conclusions which would endanger every one's interest, and make it impossible to reach a sensible solution.

Around which concepts can a solution be found?

The first one is that the greatest number of countries should adhere to the Convention. Nothing could be more pleasing to the French than to see the United States become a member of the Convention, all the more so if the adherence requirements are simplified and if the right to membership is admitted for all countries requesting it, after having harmonized their internal rights in patent matters with that of the European patent.

Unfortunately, it seems doubtful that the United States would accept a delegation—as limited in scope as it may be—of their sovereignty to the benefit of a supranational authority.

The second one is that Article 5 of the Convention should provide that all and any national of Member countries of the Paris Union shall

be entitled to obtain a European patent provided *it is based on a national patent, first in date,* i. e., a patent first filed in one of the adhering States, as the terms of the Union Convention state.

This solution would have the advantage to increase the number of inventions originating—from a juridical point of view—in Europe.

The third solution would consist in a formula of association providing that the European patent would enjoy the same value as the national patent in territories of associated countries possessing a full staff of examiners, provided that, in return, the measures applicable to Europeans, with a view to obtaining a European patent, are likewise applicable to nationals of associated countries. Also, that a close cooperation is established between the examination services in order that existing prior art may be exhaustively opposed to all applicants. A tax would have to be paid by holders of European patents for extension of the patent protection to the associated country, save when the applicant is a national of this country or has already acquired protection therein by a national filing.

In this way, nationals of an associated country would be on the same level as applicants of a member country, considering the double obligation they would have to file both a national and a European patent to obtain patent coverage in Europe. Europeans would have, on their side, to pay an additional tax to obtain extension to the United States territory of the European patent coverage.

The request for extension of protection to associated territories would first require transforming the provisional European application into a final application. The rejection of the final European application would abolish the right for protection in associated states.

Thus, the equality of opportunity for Europeans and Americans would derive from the reciprocal protection afforded by such association; the preeminence of the European patent being quite obvious to Europeans.

The last solution would consist in postponing the access to the European patent—agreement on its principle having first been reached—until such date as the adhering countries have unanimously accepted to put it into practice, or until they have established a united economic and political Federation with one common policy in all fields. Thus, they will have reached the stage where their industrial structure and capacity is comparable to that of the United States, thanks to the pooling together of all European industrial potentialities.

It is around these concepts, and others, that a friendly and trustworthy discussion should take place to achieve a well-balanced and co-prosperous Atlantic Community.

III

In any case, it would be an error of judgment to believe that a rapid access to the European patent is practically feasible, even for the Europeans themselves, unless a most rapid merger of all existing examination services (The Hague and International Institute in Munich) is realized.

This merger seems, at first, not to the liking of Germany, who does not mean to renounce the benefit of a national examination. Many years would consequently lapse before the setting up of a common and competent examination Office, possessing a staff of Examiners as technically efficient as good polyglots.

Under the best circumstances, a satisfactory European Patent Office is not to be expected before 1970. Until then, the number of European patents that might be filed will be very limited, and national patents will, in the meantime, and as provided for in the transitory period, keep all their interest.

This preliminary period should permit diverging positions to come closer and the laying down of solutions acceptable by third parties, under the express condition, however, that nothing be done to endanger the free development of European techniques, whose independence and strength are indispensable to the political equilibrium of the Atlantic Community.

The Utilization of Government-Owned Patented Inventions

MARY A. HOLMAN*

This is the conclusion of the paper published in the Summer 1963 issue (Volume 7, Number 2) of the Journal *on "The Utilization of Government-Owned Patented Inventions." The summary preceding that paper is reprinted below for the convenience of our readers who may not have ready access to the provious number.*

SUMMARY AND ACKNOWLEDGMENTS

AS ONE RESULT OF ITS EXPANDING RESEARCH and development activities, the United States government has become the largest single owner of patents. The role of government ownership in promoting technological advance by exploiting patented inventions is a much controverted issue. On June 30, 1961, the government owned 11,674 patents; their average annual rate of acquisition sharply rose from 50 patents in the mid-1940's to 1,175 patents in the late 1950's. The government's patent portfolio will probably double in the next decade. Acquiring most of its patented inevntions from its own employees and from its contractors under the title policy, the government usually makes these patents freely available to industry.

The materials of the several agencies administering the government's patent portfolio were assembled and analyzed. In addition, primary factual data were obtained from random samples of inventors and licensees. The rate of commercial use of government-owned patented inventions was found to be much lower than the rate of use of privately

* 1963 Assistant Research Professor of Economics, The George Washington University; 1961-1962 Thomas Alva Edison Fellow. The Thomas Alva Edison Fellowship is granted annually for graduate study of the patent and related systems. The grant is made available to The Patent, Trademark, and Copyright Research Institute by the Thomas Alva Edison Foundation for award to a candidate for a graduate degree in one of the schools of The George Washington University. The recipient follows an approved program of research under the supervision of a member of the research staff of The Patent, Trademark, and Copyright Research Institute assigned as counselor to the Fellow. This paper is the dissertation submitted by the Fellow in partial fulfillment of the requirements for the Ph.D. degree which was conferred June 5, 1963. The paper has been condensed for *Journal* publication.

developed and owned inventions. Differences in the rates of use among agencies administering patents are small. Government-owned patented inventions hold only slight commercial potential because most are military-oriented. Many cover technology on radiant energy, ammunition and explosive devices, and ordnance. If the government were to grant exclusive rights, the rate of commercial use would rise only slightly. Licensing is a poor measure of commercial use. Almost all commercialized government-owned patented inventions are used to some extent without licenses. For purposes of national defense, the government utilizes a relatively high proportion of the inventions it owns.

I wish to express my appreciation to Professor Donald S. Watson, The George Washington University, under whose suggestion and guidance this study was initially undertaken. I am indebted to the McGraw Foundation and The Patent, Trademark, and Copyright Foundation for their support and financial assistance.

I wish to thank Dr. L. James Harris of The Patent, Trademark, and Copyright Foundation, Dr. Theodore Suranyi-Unger, Jr. of the National Science Foundation, Dr. Joe W. Lee of the National Planning Association for their suggestions and criticisms. In addition, I wish to thank Mr. A. H. Helvestine, Office of Naval Research and Mr. Deck Reynolds, Small Business Administration for their helpfulness in providing necessary information.

COMMERCIAL USE REPORTED BY LICENSEES

Licensees were questioned about their use of government-owned patented inventions primarily to determine the extent to which the number of outstanding licenses reflects the rate of commercial use. The rate of licensing sometimes is considered synonymous with actual commercialization. Firms licensed to use government-owned patents reported that 19 percent of the inventions have been used commercially—25 out of 129 sampled patents. See Table 15.

Information supplied by licensed firms supports the belief that the rate of commercialization of patented inventions originating from R&D conducted by the Department of Agriculture is not substantially different from the rate of use for patented inventions administered by the Department of Defense. As a matter of fact the rate of use reported on Department of Agriculture patents is slightly lower than that on Department of Defense patents—27 percent compared with 32 percent.

TABLE 15

COMMERCIAL USE OF SAMPLED PATENTED INVENTIONS REPORTED BY LICENSEES

Agency or Department	Total No.	Used No.	Used Percent	Not Used No.	Not Used Percent
Department of Agriculture	22	6	27.3	16	72.7
Atomic Energy Commission	80	11	13.7	69	86.3
Department of Defense	19	6	31.6	13	68.4
Other Agencies	8	2	25.0	6	75.0
TOTAL	129	25	19.4	104	80.6

The rate of commercial use for all government-owned patented inventions cannot be determined from the rate of use for licensed government-owned patented inventions. Considering only the proportion of firms actually commercializing licensed government-owned patented inventions, and neglecting for the moment the possibility of use without a license, the rate of use for all government-owned patents is slightly less than 3 percent. About 20 percent of the licensed sampled patented inventions were reported to have been used commercially. Twenty percent of all the 1,487 government-owned patents on which licenses have been issued amounts to 297 patents. These 297 commercialized licensed patents are slightly less than 3 percent of the 11,674 patented inventions in the portfolio of the government. By agency, the extent of commercialization derived by this method is 6 percent for the Department of Agriculture, 5 percent for the Atomic Energy Commission, 1 percent for the Department of Defense, and 4 percent for all other agencies.

The substantially lower rate of use on patented inventions licensed by the Atomic Energy Commission, 14 percent, can be explained in part by provisions in contracts let by that agency. To put it briefly, the Commission grants three types of licenses. Two of them, Type B and Type C, are retained by the contractor, pursuant to the terms of the contract. Type B is an irrevocable, nonexclusive, royalty-free license; and Type C is a sole license for specific nonatomic energy purposes. Probably a substantial number of Type B licenses are automatically granted on patents that hold little or no commercial potential. For Type C licenses, the exclusive outfield rights (i.e., nonatomic energy) might be of little commercial value to the licensee, if most of the patents cover atomic energy technology. Commercial applications outside the field of atomic energy are probably limited. Several responding firms indicated that inventions covered under Type C licenses have little commercial potential outside the field of atomic energy. Officials

in the Atomic Energy Commission testify that the atomic energy field is still largely a government program for reactor power and production of nonconventional types of energy.[43] In addition, revocable, nonexclusive, royalty-free licenses (Type A) have been issued on only about 10 percent of Atomic Energy Commission patents with license retention stipulations.

For comparison, the Subcommittee conducted a study on the utilization of government-owned patents by licensees. That survey revealed that 23 percent of the firms licensed to use Department of Defense patented inventions have actually commercialized the inventions. Many firms probably obtain licenses to use government-owned patented inventions that have only a remote possibility of being used commercially. The licenses are royalty-free and are granted in a routine manner.

Classification of Commercialized Patents

It is not possible to list the numbers and titles of government-owned patented inventions reported commercialized by licensees. To do so would disclose the identities of the cooperating individuals and firms. Table 16 does, however, reveal the types of inventions used by showing the general patent classifications. Each of the 6 patented inventions included within the five most important classes for all government-owned patents is an invention administered by the Atomic Energy Commission. Of the 6 patents, 3 covered inorganic chemical procedures, and 3 radiant energy technology.

Similar information on the types of commercialized patented inventions is available from the report of the Subcommittee for licensed Department of Defense patents. None of the 19 inventions actually used falls within the first five patent classifications for all government-owned patents. As a matter of fact, only 7 of the inventions are included within the twenty-five most important classes of all government-owned patents. As noted earlier, these twenty-five classifications include about 70 percent of all government-owned patents.

Extent of Further Development

By chance, in no instance did both a licensee and an inventor report commercial use on the same invention. Licensees as a group, however, indicated a slightly larger amount of development work was required

[43] U.S., Congress, House, Special Subcommittee on Patents and Scientific Inventions of the Committee on Science and Astronautics, *Hearings, Patent Policies Relating to Aeronautical and Space Research, op. cit.*, Part 2, p. 225.

TABLE 16

CLASSIFICATION OF PATENTED INVENTIONS REPORTED COMMERCIALIZED BY LICENSEES

Title of Classification	Class Number	Number
DEPARTMENT OF AGRICULTURE		
Foods and Beverages	99	2
Bleaching and Dyeing Processes	8	2
Compositions	106	1
Chemistry, Carbon Compounds	260	1
Total		6
DEPARTMENT OF DEFENSE		
Wave Transmission Lines and Networks	333	2
Fluid Handling	137	1
Chemistry, Carbon Compounds	260	1
Electrical Generator or Motor Structure	310	1
Electricity, Measuring and Testing Devices	324	1
Total		6
ATOMIC ENERGY COMMISSION–CLASS "A"		
Inorganic Chemical Procedures	23	3
Radiant Energy	250	3
Valves and Valve Actuation	251	1
Plastic Block and Earthenware Apparatus	25	1
Aeronautics	244	1
Electricity, Measuring and Testing Devices	324	1
Electron Space Discharge Device System	328	1
Total		11
OTHER AGENCIES		
Electric Furnaces	13	2
Total		2
TOTAL ALL AGENCIES		25

for the commercial use of sampled patented inventions than that estimated by inventors. Fourteen licensees undertook further development work to commercialize the sampled inventions. Of these, 5 inventions required an extensive amount of development, 5 moderate, and 4 slight. Six inventions needed no further development for commercialization. Many licensees wrote that the know-how of the firm was the most important element in the commercialization of the invention. Only 2 licensees stated that know-how was not essential.

Commercial Value of Utilized Inventions

Licensees revealed very little information about the commercial value of inventions. This probably resulted from the difficulty of allocating benefits of increased sales or reduced costs to that portion of the final product contributed directly by the patented invention. Approximately one-third of the responding firms did not make reference to the commercial value of the inventions. Use of the patented inventions, however, results in an increase in sales more frequently than a reduction in costs. Licensees did not quantitatively estimate the value of greater sales or lower costs. Other studies on the utilization of inventions also indicate that inventions result in increased sales more frequently than reduced costs.

Reasons for Nonuse of Government-Owned Patents

One of the most curious findings of this study is the large number of firms that denied being a licensee, or were not able to find evidence of a license agreement in their records. Table 17 shows that 10 percent of the responding firms stated they are not licensed to use the sampled invention. It is possible to check the accuracy of the lists of licensees used for this study. The names of licensees used for this study were obtained from the files of government agencies. The check mechanism is provided by lists of individuals and firms licensed to use patented inventions administered by the Department of Defense and the Department of Agriculture. The Senate Subcommittee on Patents, Trademarks, and Copyrights had these lists published.[44] In addition, a list of most of the firms licensed by the Atomic Energy Commission has been published.[45] For these agencies, and without exception, the published lists verify the fact that the records of the administering agencies carry these 14 individuals and firms as licensees.

Lack of knowledge or information about being a licensee might have resulted from one or a combination of factors. The employee making the arrangement for the license might no longer be with the firm. Files and records of the organizations, or perhaps those of the government agencies, might be in error or incomplete. Or, it might have been the result of indifference toward government-owned patents

[44] U.S., Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, *Patent Practices of the Department of Agriculture, op. cit.*, pp. 118-132; and U.S., Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, *Patent Practices of the Department of Defense, op. cit.*, pp. 82-86.

[45] U.S., Congress, Joint Committee on Atomic Energy, *Selected Materials on Atomic Energy Patents*, 86th Cong., 1st Sess., 1959, Vol. I, pp. 70-96.

TABLE 17

REASONS FOR NONUSE OF GOVERNMENT-OWNED PATENTED INVENTIONS REPORTED BY LICENSEES

Reasons for Nonuse	Total		Department of Agriculture		Atomic Energy Commission		Department of Defense		Other Agencies	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Not a licensee	14	9.5	2	6.9	10	10.4	1	6.7	1	12.5
Rapid obsolescence	2	1.4	—	—	2	2.0	—	—	—	—
For government use only	17	11.5	—	—	17	17.7	—	—	—	—
Insufficient market demand	14	9.5	6	20.7	5	5.2	2	13.3	1	12.5
Government holds title to patent	16	10.8	3	10.3	11	11.5	1	6.7	1	12.5
Insufficient venture capital	3	2.0	2	6.9	1	1.0	—	—	—	—
Outside product line	20	13.5	1	3.4	18	18.8	1	6.7	—	—
Insufficient competitive advantage	9	6.1	3	10.3	6	6.3	—	—	—	—
Neglect to develop invention	1	.7	—	—	1	1.0	—	—	—	—
Too much sales or development effort	21	14.2	5	17.2	10	10.4	3	20.0	3	37.5
Substitutes available	20	13.5	5	17.2	10	10.4	3	20.0	2	25.0
Did not meet specifications	8	5.4	2	6.9	4	4.2	2	13.3	—	—
Academic interest only	2	1.4	—	—	1	1.0	1	6.7	—	—
Other	1	.7	—	—	—	—	1	6.7	—	—
TOTAL	148	100.0	29	100.0	96	100.0	15	100.0	8	100.0

because they are available on a royalty-free basis and available to all. Licensees frequently expressed such indifference.

Licensees most frequently cited the five following reasons for nonuse of the sampled patented inventions: (*1*) too much sales or development effort is required; (*2*) the product is outside the usual market line of the firm; (*3*) comparable or better substitutes are readily available; (*4*) the product is for government use only; and (*5*) the market position of the final product is in doubt because the government holds title to the patent.

The principal reasons for nonuse differ sharply among the various agencies administering government-owned patents. Firms licensed by the Department of Agriculture indicated that insufficient market demand is the foremost obstacle to commercialization. That reason is also the most difficult problem faced by business firms attempting to commercialize privately developed and owned patented inventions. As noted earlier, the Department of Agriculture directs much of its R&D work toward commercial applications of the results.

Firms licensed by the Atomic Energy Commission indicated that the licensed patents often are outside their usual product line. Firms holding Type B and C licenses of the Commission most frequently said that the patents cover technology having only government application. This provides additional evidence to support the belief that many of the Type B and C licenses probably hold little commercial potential. Licensees of the Department of Defense and "Other Agencies" revealed that too much sales or development effort is required for commercialization of many government-owned patented inventions. The Senate Subcommittee on Patents, Trademarks, and Copyrights also found this to be an important factor for the nonuse of patented inventions licensed by the Department of Defense.

Sources of Information about Government-Owned Patents

Commercialization of government-owned patented inventions is inseparably interwoven with the dissemination of information about the inventions. Licensees were requested to indicate how they learned that the sampled patented inventions were available for commercial use. Table 18 presents the responses received from licensees. A great number of firms hold Type B and C licenses issued by the Atomic Energy Commission. Because of this, knowledge about the patented invention is most frequently the direct result of the research contract under which the invention originated. About 15 percent of the licensees acquired information about the sampled patent from government

TABLE 18

SOURCE OF INFORMATION ABOUT THE AVAILABILITY OF GOVERNMENT-OWNED PATENTED INVENTIONS

Source of Information	Total Number	Department of Agriculture	Atomic Energy Commission	Department of Defense	Other Agencies
		Number	Number	Number	Number
Government information:					
publications	9	2	4	3	—
agency representatives	14	9	1	—	4
Trade or professional journals	7	5	1	—	1
Imitating competitors	2	1	1	—	—
Simultaneously invented	3	—	—	2	1
Government contract[a]	44	—	42	2	—
Patent searches	18	5	6	7	—
Request of customer	1	1	—	—	—
Do not remember	3	1	—	1	1
No information supplied	55[b]	11	33	6	5
TOTAL	156	35	88	21	12

[a] Includes subcontractors.
[b] Includes firms that denied being licensed.

sources—publications and representatives of the government departments. Firms licensed by the Department of Agriculture and the Tennessee Valley Authority said that this is a particularly valuable source of information. About 20 percent of the licensees obtained information about sampled government-owned patents by means of what can be considered regular business activity. Such endeavors include: reading articles in trade and professional journals, imitating competitors, and being requested to produce a product by a customer.

COMMERCIAL USE OF GOVERNMENT-OWNED PATENTED INVENTIONS WITHOUT LICENSES

Using a patented invention without the consent of the patent owner constitutes an infringement of the patent. The usual procedure of government agencies and departments is to grant revocable, nonexclusive, royalty-free, licenses to use inventions covered by government-owned patents upon request. Although the license to use a patent is a formal waiver of the right to sue, the government has long followed the policy of not prosecuting infringers of its patents. Patent personnel in the government departments administering government-owned patents frequently express the view that use of these patented inventions without licenses is widespread.

Possibilities for Use Without Licenses

It is best to view the use of government-owned patents without licenses from two levels, with separation based on the technological nature of the invention. Commercial application of the inventions is assumed. First, there are inventions requiring a substantial amount of technological ability, and perhaps further engineering development, on the part of the firm for commercialization. If these inventions are to be used by firms without the required technological know-how, officials of the firms must seek technical assistance from private or government sources.

Technological ability and engineering know-how required to use inventions arising from government research contracts are obviously possessed by the contracting firm. The contracting firm might also own unique equipment, obtained as a direct result of the contract, that is essential for the commercialization of the invention. Competitors of the contractor are also likely to have the needed technological capabilities. They are less likely, however, to own special equipment. In addi-

tion, patent disclosures can be incomplete. When contractors know in advance that the government will retain title to patented inventions, they might make incomplete patent disclosures. A number of licensees believed that this is why some government-owned patented inventions are not used, with or without licenses.

When the required technology is advanced, there is only a limited possibility that firms not having such engineering ability can use government-owned patented inventions without licenses. The Department of Agriculture has an active program for giving technical assistance to firms. Officials in that Department contend that firms licensed to use government-owned patents are those firms seeking technical assistance.[46] Commercial use, without licenses, of government-owned patents that cover advanced technology is probably much more feasible for contractors and their technically competent competitors.

On the second level, there are government-owned patented inventions that require little technical or engineering ability. Use of these inventions without licenses is possible for firms without special technological resources. In addition, commercialization of these inventions probably has the following characteristics: (*1*) no extensive financial expense in relation to the financial capacity of the firm; (*2*) an end product within the usual product line of the firm; and (*3*) an end product with an established market.

There are incentives that encourage firms to obtain licenses to use the kinds of patented inventions embodying simple technology. In the first place, costs incurred for securing licenses are negligible. In the past licensing fees have been charged. Also, at one time some government departments sent periodic questionnaires to licensees requesting information on the use of licensed patented inventions. Now, no fees are charged for a license and generally, agencies do not follow up on the use of licensed inventions. Consequently, the costs of completing repeated and time-consuming questionnaires do not exist. Small business firms might find a prestige value associated with being licensed to use a U.S. patent. Public relations, or even fear of possible legal action, can induce firms to acquire licenses. This is true when firms want to avoid questioning or censure from public officials for using patented inventions without licenses.[47]

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[46] U.S., Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, *Patent Practices of the Department of Agriculture, op. cit.*, p. 27.

[47] U.S., Congress, House, Special Subcommittee on Patents and Scientific Inventions of the Committee on Science and Astronautics, *Hearings, Patent Policies Relating to Aeronautical and Space Research, op. cit.*, Part 1, p. 310.

Sources of Information About Use Without Licenses

Three methods were used to obtain factual information about the use of government-owned patented inventions without licenses. First, inventors were asked to supply information on use without licenses. It was hoped that inventors would have information about inventions covering advanced, as well as simple, technology. Officials of firms licensed to use government-owned patents were asked to give opinions about the extent of use without licenses. In addition, they were requested to cite specific examples of such use. It is quite likely that licensees would know whether or not their competitors were using the sampled patented inventions. Replies from this group would also supply information on technically advanced and simple inventions.

Most of the firms licensed under Types B and C licenses of the Atomic Energy Commission are among the largest companies in the United States, as well as the recipients of a substantial share of the research and development contracts let by the government. It was believed that this would be a good source of information on use without licenses for those patented inventions requiring a great deal of technological know-how for commercialization. To supplement information provided by inventors and licensees, a short questionnaire was sent to a selected group of persons and firms requesting information about government-owned patents from the Small Business Administration. The Research and Development Division of that agency prepares a monthly bulletin describing inventions that might be of particular interest to small business. This monthly *Products List Circular* includes some government-owned patents. The listed inventions are carefully selected and include only those requiring little or no further engineering or financial development.

Information Supplied by Inventors

Inventors were asked to indicate whether or not the sampled patented invention has been used commercially by firms without obtaining a license, and to state the extent of such use. This question had significance only for those sampled patented inventions on which commercial use was reported.

There is evidence to indicate that only 2 of the 23 inventions on which use was reported have not been used without licenses. Only 2 inventors stated that the patented inventions have not been used without licenses. For both inventions, the extent of commercial use was slight. A check of the list of firms licensed under these patents shows that one has been licensed to 3 firms and the other to 4 firms. Because the

inventors were not requested to name organizations, it cannot be inferred that these are the only firms using the inventions. Based on the above, however, it is not unreasonable to assume that the inventors were correct in their statements.

One or more licenses have been issued on only 6 of the 23 commercialized inventions. The inventors of 4 of the 6 patented inventions indicated that the inventions have been used without licenses. Of the 17 remaining commercialized, but not licensed, patented inventions, 8 were said to have been used without licenses. Inventors were noncommittal about 9 inventions.

Information Supplied by Licensees

The response from licensees was disappointing. Well over half—80 out of 127—of the firms from which a reply was received neglected or refused to comment about the use of government-owned patents without licenses. An additional 16 firms stated that they have no knowledge about the matter. Of the 31 firms responding, 20 said that the practice is not widespread, and 11 said that they believe that many government-owned patented inventions are used without licenses.

Only 9 firms cited actual instances when competitors or other firms have used sampled government-owned patents. On 5 of these patents, the responding firm is the sole licensee. Therefore, the other firms must have been engaged in unauthorized use of the patented inventions. Records reveal that more than one license has been issued on 3 of these patents. There is no way to determine whether the firms licensed are the same firms that the responding licensees contemplated. Licensees were not asked to give the names of other firms using sampled government-owned patented inventions.

Upon first inspection, there appears to be an inconsistency between information supplied by inventors and that provided by licensees about the extent of use without licenses. On the one hand, evidence from inventors shows that it is likely that almost all commercialized inventions have been used without licenses. On the other hand, licensees were able, or willing, to cite only 9 instances of unauthorized use. This discrepancy is more apparent than real. About the same proportion of inventors as licensed firms did not know whether or not the sampled patents are used without licenses. However, when the inventor reported use, lists of licensed firms revealed whether or not firms are licensed under the patent. For example, if an inventor stated that the patented invention has enjoyed extensive commercialization and no organization has been licensed, use without a license is certainly im-

plied. Of course, it is possible that inventors were too optimistic and, in fact, the inventions have not been used commercially. It is not possible to make this cross-check for licensees reporting that they have no information about the matter.

Use without Licenses by Small Businesses

To obtain information on the use of government-owned patented inventions without licenses by small businesses, a very short questionnaire was sent to individuals and firms requesting information about these patents from the Small Business Administration. The method used for selecting these firms was arbitrary because there is no clearly defined universe from which to take a random sample. Files of the Small Business Administration contained letters dating from December, 1960. The first 100 letters, written between December, 1960 and March, 1961, were selected and the individuals and firms writing these letters were sent questionnaires. Letters with the earliest dates were chosen because it was necessary that a sufficient amount of time had elapsed to permit commercialization or a decision against use. The 100 individuals and firms had requested information about 88 different patented inventions.

Questionnaires were sent in June, 1962. For a copy of the questionnaire and the covering letter, see the Appendix. Two questionnaires were returned because the individuals had moved and left no forwarding address. Replies were received from 47, or slightly less than half of those receiving a questionnaire. No follow-up letter was sent to nonrespondents because of the initially high level of response, and because this survey was undertaken primarily as a check mechanism. The belief that utilization of government-owned patented inventions by individuals and firms requesting information about particular patents might be quite high rested on a firm foundation. Each of these patented inventions was publicized because of an apparently strong commercial potential without the need for extensive further engineering or financial development. The replies, however, revealed the reverse.

Respondents supplied information about the commercial utilization of 51 of the 88 different patents. Only 2 firms reported commercialization of an invention, and the same invention is used by both firms. The patented invention is in the patent portfolio of the Department of Agriculture. The patent covers the production of food. Neither concern is licensed by the Department of Agriculture to use the patented invention. Both firms indicated that the end product covered by the patent has an established market. The end product is also within

the usual product line of the firm. An official of one firm said that the invention required only a slight amount of financial and engineering development for commercialization. A representative of the other said the required development work was extensive.

It can be reasoned that the use of government-owned patented inventions without licenses is a common practice. This, however, should not be interpreted to mean that unauthorized use is widespread in the sense that a large proportion of government-owned patented inventions are used without licenses. Rather, it should be construed to mean that use without licenses by one or more firms, probably occurs on the vast majority of the 10 percent to 15 percent commercialized inventions.

PART VII

ADMINISTRATION OF THE PORTFOLIO

Despite repeated attempts to initiate change, two policies in the history of the administration of government-owned patented inventions have been stable. They are the policy of charging the government agency that acquires patents with the chores of administration, and the policy of making the patented inventions freely available to the public. With relatively few exceptions, government-owned patented inventions have been licensed on a revocable, royalty-free, nonexclusive basis.

ADMINISTRATION OF THE CURRENT PATENT PORTFOLIO BY THE GOVERNMENT

The two most important aspects of the administration of government-owned patents are the dissemination of the technology embodied in the inventions to the business sector and the conditions under which business firms are permitted to commercialize the patented inventions. Successful transmission of new technology to industry does not necessarily result in widespread utilization. Although firms may know about the availability of government-assigned patented inventions and possess the technological ability to apply them, they can be reluctant to use them. Inertia on the part of some decision makers can block the use of new technology. Also, some of the patented inventions might not be economically competitive with alternative opportunities for business investment. The terms on which government-owned patents are made available for use will, to some extent, alter incentives.

The Dissemination of Information About Government-Owned Patents

Unlike other forms of the results of government-financed research and development, such as technical papers and reports and perhaps

unpatented inventions, the technology covered under patented inventions is atomatically transmitted from the government to the civilian sector of the economy. When a patent is granted on an invention, the new technology embodied in that invention is opened to the public. This does not mean, obviously, that the patented invention is publicized and promoted and immediately received by industry. It means that those in industry wishing to avail themselves of this form of the technology arising from government research and development can study official publications of the Patent Office and obtain all of the technology revealed in the patent disclosure.

Widespread use of government-owned patented inventions can depend upon successful transmission of the technology covered under the patents to the private sector of the economy. The technology contained in some of these patented inventions is so simple that copies of the patent disclosure yield sufficient information to permit commercial use. The Official Patent Gazette might be an adequate channel of communication for innovation-conscious firms. To bring information to complacent ones, however, special bulletins or circulars might be required.

Other government-owned patented inventions embody complicated technology and require special technical skill and know-how, or perhaps special equipment, for commercial application. If such inventions are to be used, it might be necessary to have government representatives demonstrate or instruct industry personnel, whenever this can be done.

None of these procedures is without cost, with the spectrum running from the routine Patent Office expenses to costly pilot plants. It cannot be automatically assumed that a certain percentage increase in the use of government-owned patents warrants the corresponding public expenditure required for that additional use. Likewise, it is not self-evident that the dissemination of information and the transmission of technology contained in government-owned patented inventions is necessarily a function or task to be undertaken by the government.

At present, there is no central agency with the specifically assigned duty of promoting the utilization of patented inventions owned by the government. The task of disseminating information about government-owned patents rests with the several government agencies and departments administering the patents. Two bulletins about government-owned patents held by all government agencies, however, are published by the government.

Each month the Small Business Administration (SBA) publishes a *Products List Circular,* which includes government-owned patents

thought to be of particular interest to small business. The patented inventions appearing in this circular are evaluated and include only those that appear to require little further financial and technical development and seem to have a strong potential for immediate commercialization. SBA estimates that there are about four inquiries for each patent abstract published in the circular. In 1960, SBA received approximately 1,000 letters requesting information on about 232 government-owned patents.[48] When the SBA receives a request for additional information about these patents, the usual practice is to refer the individual to the agency administering the patent. An annual subscription to the *Products List Circular* costs $1.50.

Since the Department of Commerce has published several abstricts of government-owned patented inventions available for license. The price of the *Patent Abstract Series* ranges from $.50 to $3.75. Again, more detailed information must be obtained from the agencies administering the patents. Publication of the *Patent Abstract Series* is but one small part of the operations of the Office of Technical Services in its capacity as a clearinghouse for the collection and transmission of scientific, technical, and engineering information arising from government-financed research and development.

The Department of Defense, which administers about 62 percent of all government-owned patents, does not consider the dissemination of technology contained in its patented inventions to fall within its assigned mission. Industry secures information about these inventions through its own initiative, or by means of publications of the Office of Technical Services, Department of Commerce, or of the Small Business Administration. The Department of Agriculture and the Tennessee Valley Authority have actively attempted to disseminate information and transmit the technology covered in inventions to promote widespread utilization. These departments work closely with industry by sponsoring demonstration projects, providing agency representatives to furnish technical know-how, and describing inventions in trade and professional journals. Although with much less aggression, the Atomic Energy Commission publicizes its inventions in a similar manner.

Licensing Procedures

As indicated, most government agencies follow the practice of granting revocable, royalty-free, nonexclusive licenses upon request. At present, no fee to cover administrative expenses is charged for these

[48] Russell B. Long, "Patent Policy and Public Interest," *The Federal Bar Journal*, 21 (Winter 1961), p. 9.

licenses. But there are a few exceptions to the general policy of royalty-free licensing.

The Tennessee Valley Authority has specific statutory authority to issue exclusive royalty-bearing licenses.[49] The current policy of that agency, however, is to grant nonexclusive, royalty-free licenses. About 1940, the Tennessee Valley Authority issued on a royalty basis a number of licenses on patents pertaining to food processing. It was found that these licenses were costly and difficult to administer in relation to the insignificant return that was realized from the royalty payments. This practice was discontinued. The Tennessee Valley Authority has also granted several exclusive licenses. Such licenses were granted on the basis of the ability of the licensee to make necessary developments to commercialize the inventions, and to utilize them in accordance with the interests of the R&D program of the Tennessee Valley Authority. Five exclusive licenses were granted to employee-inventors. Another exclusive license was issued to a private firm, with exclusivity limited to five years, as a means of inducing commercialization. The license required that at the end of five years the firm was to provide technical and economic data about the inventions to the Tennessee Valley Authority. The license also provided that if the licensed concern did not use the patented invention over any period of twelve consecutive months, the license could be rescinded. At the end of the period of exclusivity, another firm was granted a nonexclusive license. The company that initially enjoyed the exclusive license also retained a nonexclusive one.[50]

Under the Act of 1954, the Atomic Energy Commission issues licenses in two general categories: Schedule A and Schedule B. Schedule A patents are usually licensed automatically upon written request. Type A licenses are granted under Schedule A. These licenses are revocable, nonexclusive, and royalty-free. Schedule B patents are patents on which contractors retain a license. Type B and Type C licenses are issued under Schedule B. On most Schedule B patents, the contractor retains a Type B license, which is nonexclusive, irrevocable, and royalty-free. Some Type C licenses are retained by the contractor on Schedule B patents. Type C licenses are exclusive, with the sole right to grant sublicenses, for nonatomic energy purposes. Type A licenses can also be issued on Schedule B patents, including

[49] See Archie M. Palmer, *Administration and Utilization of Government-Owned Patent Property,* Contract NASA-177, National Aeronautics and Space Administration, Washington, D.C., December 23, 1960, p. 15. (Processed.)

[50] U.S., Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, *Patent Practices of the Tennessee Valley Authority,* 85th Cong., 2nd Sess., 1959, pp. 6-9.

those with Type C licenses outstanding, if the use relates to atomic energy.[51]

The Federal Aviation Agency departs from the usual practice of granting royalty-free licenses. Patent clauses in contracts recently let by that agency have contained a "Recovery of Development Cost" clause. If the contractor sells or licenses to third parties equipment developed under a contract, or equipment that is substantially similar, the contractor must make payments to the government. For sales, the payments are up to 7½ percent of the income received. The payments to the government can be up to 33⅓ percent of any income obtained from royalties. These payments, however, are limited to the costs incurred by the government for the equipment developed. The "Recovery of Development Costs" program of the Federal Aviation Agency is not limited to patented inventions; it is applicable to all equipment developed. In addition, royalty payments made under this provision do not necessarily mean exclusive use of inventions by the contractor. The Federal Aviation Agency retains title to patents and has the right to grant licenses in the manner it deems most expedient.[52]

The National Aeronautics and Space Administration has proposed, but has not adopted, licensing regulations that differ from the usual practice of most government agencies. That agency would grant contractors nonexclusive, royalty-free licenses, which are voidable. If after a specified period, probably five years, a patented invention has not been commercialized, the National Aeronautics and Space Administration would consider revoking outstanding licenses and issuing royalty-bearing, exclusive ones.

PROPOSALS FOR CHANGES IN ADMINISTRATION

Since 1919, recommendations for changing the procedures for administering government-owned patents have continually been forthcoming from the Legislative and Executive Branches of the government, as well as from other sources. So far, however, Congress has taken no action.

Proposals for administrative changes date from the period of World War I. They contain one or more of the following five provisions: (*1*) The most frequently suggested change calls for a royalty to be paid to the government for the use of its patented inventions. (*2*) Some or

[51] U.S., Congress, Joint Committee on Atomic Energy, *Selected Materials on Atomic Energy Patents, op. cit.*, Vol. I, p. 69.

[52] U.S., Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, *Patent Practices of the Federal Aviation Agency, op. cit.*, pp. 9-11.

all of the patents in the portfolio of the government should be licensed on an exclusive basis. (*3*) The sale of patented inventions after they have been acquired has been suggested, usually by individuals or groups opposed to the ownership of patents by the government. (*4*) Arrangements should be made whereby the government can cross-license the patents it owns with patents owned by private industry. (*5*) An interagency or interdepartmental patents board should be established to administer all government-owned patents in a uniform and consistent manner.

Royalty Payments

The usual justification for royalty payments to the government is that they are equitable means to recover the constantly rising research and development expenditures made by the government. Royalty payments are also considered an expedient source for new general revenue. Officials of the Federal Aviation Agency believe that royalty payments are an equitable and proper way to recover development costs. They contend that royalty payments provide a mechanism to shift the burden of paying for government-financed research and development work from the general taxpayer to those directly benefiting—consumers of the final products.[53]

A royalty payment is an additional cost of production. The increase in cost arising from a royalty payment equals the change in equilibrium price only when long-run perfectly competitive equilibrium, with constant costs, is assumed. This model, however, is so unrealistic that it is not relevant. Under all other assumptions for rational pricing, the change in price does not equal the change in cost. In profit maximizing pricing, the increase in price can be less than the change in cost. Therefore, some of the burden of a royalty payment can be on the producer.

If full-cost pricing is assumed, the change in price equals the change in cost. With full-cost pricing, the producer establishes a price based on cost plus a mark-up for profit. Full-cost pricing, however, is subject to qualifications. For example, the producer might not raise the price of product by the full increase in cost because he wants to maintain a price that consumers are accustomed to paying, or because he fears the threat of actual or potential competition.

According to officials of the Federal Aviation Agency, the ultimate objective of the research and development program of that agency is,

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[53] *Ibid.*, p. 10

"air safety through technology."[54] The Federal Aviation Agency might jeopardize safety by insisting on royalty payments. Conceivably, producers might not use a safety device because the increase in cost arising from a royalty payment might exceed any increase in revenue and their profits would be reduced.[55]

Some advocates of the title policy believe that royalty payments would reduce the amount of revenue that need be raised from other sources to meet public expenditures. The experience of the government holds little promise, however, that substantial revenue can be earned from royalty payments. The Chemical Foundation,[56] which bought the bulk of former enemy-owned patents during World War I, incurred a net loss on seized patents. The British National Research Development Corporation,[57] which administers patents originating

[54] Statement of Daggett H. Howard, General Counsel, Federal Aviation Agency, U.S., Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, *Hearings, Government Patent Policy, op. cit.*, Part I, p. 151.

[55] If the producer does not incorporate the new equipment it is because marginal private cost exceeds marginal private benefit, i.e., the increase in cost exceeds the increase in revenue, with reduced profits. If the producer uses the safety equipment, the marginal social benefit is likely to exceed the marginal private cost. Although not directly measurable, the marginal social benefit, the additional benefit to society as a whole resulting from the saving of human life, probably exceeds the increase in cost to the producer.

[56] The first time the government faced the necessity of administering a sizable patent portfolio was during World War I when enemy-owned patents were seized. Title to these patents were initially put in trust rather than vested. The Federal Trade Commission, however, was authorized to grant exclusive and nonexclusive licenses to use these patented inventions. Licensed firms were required to contribute to a special fund; the fund was to be used for possible royalty payment suits brought by enemy-owners after the war.

An amendment to the Trading with the Enemy Act of 1917 enabled the Alien Property Custodian to seize patent rights to these inventions and to dispose of them by sale to American citizens or corporations. The Custodian sold the largest block of patents—about 4,500—to the Chemical Foundation. The Foundation was a corporation organized at the suggestion of the Custodian to administer seized patents in the public interest. It had been anticipated that the former enemy-owned patents would prove highly valuable and provide a considerable income for research in chemistry and allied sciences. Although the Foundation granted many royalty-bearing licenses, gross income from the patents when balanced against necessary operating expenses resulted in an annual deficit. See Howland H. Sargeant and Henrietta L. Creamer, "Enemy Patents," *Law and Contemporary Problems*, 2 (Winter and Spring 1945); Otto E. Sommerich, "Treatment by U.S. of World War I and World War II Enemy-Owned Patents and Copyrights," *The American Journal of Comparative Law*, 4 (Autumn 1955); and Francis P. Garvan, *The Chemical Question: An Open Letter to Warren G. Harding, President of the United States* (New York: The Chemical Foundation, 1922).

[57] To date, the British National Research Development Corporation, the quasi-governmental organization assigned the task of administering patents originating from research undertaken by the British government, has not received enough

from government-financed research has also suffered losses. The Tennessee Valley Authority discontinued its policy of charging royalties on some patented inventions because royalty receipts were small and administrative burdens great. Contractors with the Department of Defense, who have retained titles to patented inventions, receive relatively insignificant amounts of royalty income.

Even though experience suggests little promise of the government earning more than a few hundred thousand dollars annually from royalty fees, larger sums could conceivably be earned in the future. Most of the successful inventions developed by the government, such as frozen orange juice, are available for use free of charge.

In addition to possible adverse economic effects arising from royalty payments, three important administrative problems develop and must be solved. First, a royalty rate must be determined. It is sometimes argued that government bargaining with a business enterprise is contrary to the political-economic ideals of this country; also that such bargaining is difficult because there is no standard on which to base a reasonable royalty rate.[58] These arguments contending that the government should not bargain with a business concern do not consider the experience gained by the government from its extensive procurement activities. To some extent, the government bargains with and establishes rates for private industry each time it lets a contract.

Secondly, it is possible that the government might have to undertake infringement suits to insure the success of royalty payment schemes. Some government patent attorneys believe that the government can successfully avoid such litigation, if licenses would specify that the right to enforce the licensed patents is given to licensees. Licensees would have the explicit right to sue any party other than the government to enforce a licensed patent. Other patent attorneys contend, however, that giving the right to sue infringers is not an adequate measure. Royalty-bearing, nonexclusive licenses can be a complete nullity unless the government sues anyone practicing an invention covered by a government-owned patent without a license. Unless suit is undertaken, no one would derive any advantage from obtaining a license. It is also reasoned that because an exclusive license does not give the business firm effective ownership and control of the patented

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income from royalties to cover costs of operation. On June 30, 1961, after 12 years of operation the Corporation had accumulated an excess of expenditures over income of almost 4 million pounds. Only 16 percent of the inventions acquired by the Corporation do not cause a loss to the Corporation. See Mary A. Holman, "Patent Policies of Other Governments," *PTC J. Res. & Ed.*, in a forthcoming issue.

[58] U.S., Office of Alien Property Custodian, *Annual Report for the Fiscal Year Ending June, 1944*, pp. 98-104.

invention, the licensee cannot sue in his own name. Therefore, when the government retains title to patents, it can be joined as a plaintiff.

Thirdly, royalty payment provisions can affect waiver provisions in government contracts. Legislation governing the patent practices of some government agencies permits administrators to waive all or any part of the claims of the government to patented inventions. Implementation of waiver provisions is left to the discretion of the administrators. Some patent attorneys with private industry believe that the intentions of Congress, when it established waiver provisions, would not be fulfilled if the government charged royalties because administrators would be reluctant to grant a waiver if there were a remote possibility that the invention might yield a royalty income.

Provision for Exclusive Use

The two greatest difficulties associated with exclusive licensing are those of selecting licensees and policing them to see that licensees follow the provisions of the license contracts. If the government decides that exclusive licensing is desirable and necessary to promote the use of its patented inventions, many criteria can be followed in selecting licensees. One standard can be the selection of the most eminently qualified firm to commercialize the patented invention. Such qualifications as access to necessary financial resources, technological know-how, and possession of or ability to acquire essential equipment must be carefully considered. If the criterion is revenue for the government, selection can be based on the potential ability of the firm to pay royalties. Still a different method can be used when there is a twofold objective, for example, the utilization of inventions coupled with encouragement of small business. Candidates for exclusive licenses would then be limited to small business firms.

Selection of licensees on the basis of competitive bids is in complete accord with our competitive market system. The government employs this method in its procurement and surplus property disposal activities. If selection is based on competitive bids or on the ability to commercialize the inventions, the government contractors initially developing the patented inventions will frequently be granted the exclusive licenses.

After a firm has been granted an exclusive license, continuing government interest in the commercialization of the patented inventions would probably be required to insure that the licensee abides by the provisions of the license agreement. The government would probably require some form of evidence that the licensee is making reasonable

efforts to commercialize the patented invention for assurance that it is not being suppressed. To overcome difficulties arising if an exclusively licensed firm proves unable or unwilling to commercialize the patented invention, revocation clauses are advocated in many proposals for exclusive licensing.

Because the objective of exclusive licensing is to stimulate commercial use of inventions by providing an incentive for investment in innovation, it is often suggested that the period of exclusivity be limited to the time necessary to recover investment capital. The government can accomplish this, and at the same time reduce possible adverse effects arising from monopolization, by putting a clause into the license agreement that revokes the exclusive license after development and investment costs have been recouped. The success of an exclusive license termination scheme, however, depends upon the ability of the government, as well as the licensed firm, to know when development and investment costs have been recovered.

Sale of Patents

As are proposals for exclusive licenses, suggestions for the sale of government-owned patents are based on the possibility that some firms are unwilling to accept risks associated with the commercialization of new processes and products without patent protection. Although the sale of government-assigned patents might be attempted as a revenue device, public thinking about the sale of patents is geared toward a means of disposing of patents already in the portfolio of the government. Proposals for sale go hand in hand with proposals for adopting a government-wide license policy.[59] The sale of patents is fraught with many of the difficulties encountered with exclusive licensing, particularly selection of the purchasers and subsequent policing of the licensee to insure commercial use. With ownership of the patented inventions by private parties, the government probably would not become a party to infringement suits.

Cross-Licensing

The objective of cross-licensing government-owned patents with patents owned by private industry is to reduce procurement costs. For cross-licensing to be successful, the government must locate business concerns capable of supplying the goods that are to be procured. The same firms must also want to commercialize an invention covered by a

[59] Alexander Wiley, U.S., *Congressional Record,* 87th Cong., 1st Sess., 1961, XCVII, Part I, pp. 886-887.

government-owned patent. Even if the government succeeds in negotiating cross-licensing agreements and reduces or eliminates royalty-payments, procurement costs will not necessarily be lower. They can in fact increase. There is no reason to assume that business firms that are parties to cross-licensing agreements are the most efficient contractors, or that elimination of royalty payments will more than compensate for the possibility of higher costs elsewhere.

Central Administrative Agency

Most recommendations assign to an interdepartmental patent administration agency the following broad functions: (*1*) responsibility for the acquisition of patents by the government; (*2*) stimulation of research, development, and invention, primarily by incentive awards; (*3*) dissemination of information about patented inventions owned by the government; and (*4*) control and stimulation of the commercial use of government-owned patented inventions.

Recommendations for a single administering agency frequently suggest that the central authority work in an advisory capacity in drafting research contracts because patent matters usually transcend the mission of the agency letting the contract.[60] When inventions arise from research under contracts or from employees, the agency should review the inventions and determine whether the inventions should be published, patented, or perhaps neither.[61] Even though the central agency might act in an advisory capacity in drawing contracts and evaluating them, it does not follow that there must be a government-wide title policy. These duties are equally applicable to a license policy. The central agency can be responsible for the decision as to whether the government acquires title to inventions, following any regulations prescribed by Congress or the President. Or the Agency can merely act as the final arbitrator when conflicts over patent rights arise between the government and private parties.

Incentive rewards can take many forms: (*1*) retention of commercial rights to patents in the United States; (*2*) retention of rights for foreign exploitation; (*3*) cash bonuses; (*4*) merit promotion or salaries increases; and (*5*) nonmonetary commendation awards. Proponents of a license policy hold that retention of commercial rights to patented inventions developed by government employees is the most efficient means to stimulate invention and to compensate for lower salaries

[60] Ross D. Davis and Eugene J. Davidson, "Government Patent Policy—Another Look at an Old Problem," *The Federal Bar Journal,* 21 (Winter 1961), p. 77.

[61] Robert C. Watson, "Management of Government-Owned Inventions," *The Federal Bar Journal,* 21 (Winter 1961), pp. 124-125.

offered by the government compared with private industry. Supporters of a title policy frequently contend that cash bonuses and higher salary schedules are adequate means to compensate for any adverse effects of a government title policy in attracting the most efficient scientists into government employment. Some demands that the government charge royalties are based on the belief that such payments are an equitable means to obtain income for incentive awards.

It is expected, of course, that the central agency would keep records of its operations, to include indexes and abstracts of inventions in which the government has an interest. Accurate records and consistent data about the patent rights of the government do not exist at this time (1963). The possible scope of a general information program that could be undertaken by a central agency is the same as that discussed earlier in this chapter. The purpose of information programs is to enlighten decision makers in industry who are ignorant about the availability of government-owned patents or who lack the technological ability to commercialize them. It is submitted by the writer that investigations be made to find out whether widespread ignorance actually exists before a large-scale information program, such as the operation of pilot plants, other demonstrative activities, and libraries, is undertaken by the government. Ignorance is only one reason for nonutilization of inventions and it might not be widespread enough to justify costly promotion and publicity programs.

A fourth duty of a central administrative agency is to take active measures to encourage the commercial use of government-owned patents. The objective of these measures is to overcome passive attitudes on the part of business executives toward innovation and also to make the application of government-owned patented inventions economically competitive with alternative opportunities for business investment.

At one extreme, the central agency could actually undertake the development and commercial production of meritorious inventions. Many, if not most people, would probably agree that such a measure is an unnecessary intervention on the part of government into the private sector of the economy. Another possibility is for the government to undertake experimental and development work on new inventions. This can reduce the financial risks associated with innovation. After the invention is fully developed, it could be made available on a nonexclusive basis, with or without royalty payments. If royalties are to be charged for the use of inventions developed by the government, such income might not be sufficient to cover development, as well as operating, expenses of the agency. If government economic policy is to encourage the commercialization of inventions that have not been

utilized because of excessively high initial costs, great technological uncertainty, or insufficient competitive advantage, less conventional schemes could be adopted to create the necessary incentive for commercial application. Such methods could include preferential tax treatment, matching fund programs, or direct government subsidies.

At the other extreme, the central administrative agency could merely assume the duties that are currently undertaken by the various government agencies and continue to grant a license to any firm making a request for one, on a nonexclusive, revocable, royalty-free basis. Other conventional ways to administer the inventions include: (*1*) dedication to the public with free and unregulated use; (*2*) exclusive, royalty-free licenses with geographic or nature-of-use limitations; (*3*) exclusive royalty-bearing licenses, with geographic or nature-of-use restrictions; (*4*) assignment of part interest to the inventor or the contractor; and (*5*) assignment of all rights to the inventor or contractor.[62]

PART VIII

METHODS TO ENCOURAGE THE COMMERCIAL USE OF GOVERNMENT-OWNED PATENTED INVENTIONS

This section presents information on the attitudes and opinions of inventors and licensees about government patent policy. Although most of the discussion is on the means by which the government can encourage commercial use of government-owned patented inventions, some attention is given to the effect of the title policy on invention. The questionnaire sent to inventors and the letter sent to licensees contain questions about the effects of government ownership of patented inventions on incentives to invent, on the dissemination of information about government-owned patents, and on the commercial use of these inventions. The responses to the questions are important because the individuals and business firms are directly affected by government patent policy. Analysis of the responses can indicate the extent to which changes in administrative policy might increase the rate of use of government-owned patented inventions.

Conceivably, the opinions of these individuals and firms could influence the evolution of government patent policy. If dissatisfaction with government patent policy exists, this discontent can create pressures for a modification of the policy.[63] The government can effectuate

[62] Howard I. Forman, *Patents, Their Ownership and Administration by the United States Government* (New York: Central Book Company, 1957), p. 165.

[63] The Department of Health, Education, and Welfare had to go from the title policy to the license policy to get contract research and development work done in

changes to accord with the needs of firms using government-owned patented inventions and of inventors.[64] This is true particularly of licensees because of the diversity of these individuals and firms. At one extreme are the small firms without research facilities of their own. They rely on the government for the provision of technological advances and for the know-how essential to utilize these developments. At the other extreme are those firms on which the government relies because of their technical experience and ability.

GOVERNMENT PATENT POLICY AND THE COMMERCIALIZATION OF INVENTIONS

Certainly the most consequential matter is the extent to which the government can increase the commercial use of patented inventions arising from government-financed research by granting exclusive licenses or by adopting the license policy.

Commercialization by Inventors of Additional Inventions

The inventor of each sampled patent was asked whether or not he, or his employer, would have commercialized the invention if title to the patent or an exclusive license had been obtained. The inventor was asked to omit the question if the sampled patented invention was commercialized. Twenty inventors stated that they would have commercialized the invention with an exclusive license or a title to the patent. These replies apply only to inventions that were not commercialized. The 20 replies cover 19 different sampled patented inventions —10 percent of the sampled patents. Inventors indicated that 12 of the inventions required no additional development for commercialization, and 7 only a slight amount. None of the inventions needed either extensive or moderate development work for use.

Effectiveness of Governmental Efforts to Encourage Use

Question 2b of Part III of the questionnaire was designed to obtain the opinions of inventors on the effectiveness of governmental efforts to encourage commercial use of their patented inventions. Answers to this question reflect satisfaction or dissatisfaction with the admin-

its cancer chemotherapy program. Private profit-making chemical and pharmaceutical firms had no interest in contracts with the Department of Health, Education, and Welfare under the title policy. See Watson, Burns, and Bright, *op. cit.*, p. 373.

[64] James N. Mosel, *"Public Attitudes Toward the Patent System," PTC J. Res. & Ed.*, Vol. I, No. 1 (June 1957), p. 160.

istration of government-owned patented inventions. A number of inventors objected to the phrasing of the question, "Do you believe that the government has done all it could do to encourage commercial utilization of your patented invention?" Those inventors replaced "should" for "could." The same objection was made about Part (*a*) of the question – governmental efforts to disseminate information about their sampled patented inventions. These inventors contend that the government has done all that it *should* do to promote the use of their inventions, but, of course, the government *could* do much more.

The opinions of about 60 percent of the inventors reveal that they are either satisfied with the administration of their patented inventions or else that they are indifferent toward the matter. See Table 19. Of the 206 responding inventors, 23 percent left the question blank, 16 percent think the government is doing all that it is expected to do, and 22 percent believe that the government is doing all that it can do to commercialize the invention. The other 39 percent hold that the government is not doing enough to encourage the use of the inventions. This does not mean that the majority of inventors favor a title policy.

By agency, there is a considerable difference of opinion about the efficiency of administration. As indicated earlier, the administration of

TABLE 19

OPINIONS OF INVENTORS ON THE ADEQUACY OF GOVERNMENTAL EFFORTS TO ENCOURAGE THE COMMERCIAL USE OF SAMPLED PATENTED INVENTIONS

Agency or Department	Total Replies	Opinions of Inventors: All It Could Do		All it is Expected To Do		It Has Not Done Enough		Blank	
	No.	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent
Department of Agriculture	28	13	46.3	1	3.6	8	28.6	6	21.5
Atomic Energy Commission	51	12	23.5	6	11.8	20	39.2	13	25.5
Department of Defense	116	16	13.8	25	21.6	49	42.2	26	22.4
Other Agencies	11	5	45.4	–	—	3	27.3	3	27.3
TOTAL	206	46	22.4	32	15.5	80	38.8	48	23.3

government-owned patents rests primarily with the agency that sponsors the R&D from which the patented inventions arise. Inventors in the Department of Agriculture and the combined category "Other Agencies" express a significantly greater amount of approval on the administrative policies of their agencies than do inventors in the Atomic

Energy Commission and the Department of Defense. Inventors with the latter agency reveal the greatest amount of dissatisfaction.

These differences of opinion among inventors in the various agencies probably reflect two factors. First, that a phase of the R&D policy of the Department of Agriculture and the Tennessee Valley Authority is to work directly with industry to encourage the commercialization of newly developed techniques and products. To a lesser extent so does the Atomic Energy Commission. Secondly, the discontent that inventors in the Department of Defense express probably mirrors reaction against a somewhat more stringent policy of taking title to inventions made by employees, since the issuance of Executive Order 10096. This is not very significant for the Atomic Energy Commission because most of the research and development of that agency is undertaken by contracts with industry.

Effect of a Title Policy on Commercialization

Inventors were also asked to indicate their attitudes on the effect of a government title policy on the commercial use of inventions. As Table 20 shows, inventors express considerably more dissatisfaction with the effectiveness of such a policy on commercialization than with the administration of such patents after they are acquired by the government. About 48 percent of the inventors do not believe that government ownership of patents encourages commercialization of the inventions. This compares with about 39 percent of the inventors being dissatisfied with the administration of the government-owned patented inventions. Approximately 15 percent of the inventors indicate that a title policy encourages commercial use of inventions, and 3 percent think that it has no effect on utilization. The question was

TABLE 20

THE EFFECT OF THE TITLE POLICY ON THE COMMERCIALIZATION OF PATENTED INVENTIONS
(OPINIONS OF INVENTORS)

Agency or Department	Total Replies	Favorable Effect		Adverse Effect		No Effect		Blank	
	No.	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent
Department of Agriculture	28	11	39.3	14	50.0	2	7.1	1	3.6
Atomic Energy Commission	51	6	11.7	21	41.2	3	5.9	21	41.2
Department of Defense	116	13	11.2	59	50.9	2	1.7	42	36.2
Other Agencies	11	1	9.0	5	45.5	—	—	5	45.5
TOTAL	206	31	15.0	99	48.1	7	3.4	69	33.5

not answered by 34 percent of the inventors. On an agency basis, only slight differences in the replies can be discerned. The percentage of inventors indicating that government-ownership of patented inventions does not encourage use is about the same, 50 percent, for the Department of Defense and the Department of Agriculture. It is only slightly lower for the other agencies.

The comments offered by inventors on the effect of government ownership of patented inventions on commercial use do not give new information about the issue. The general approach is that many inventions holding commercial potential are not pursued by industry when development requires extensive financial outlays. Most of the commenting inventors indicate that they or the contracting firm should retain titles; or at least, that the contractors should obtain exclusive licenses to develop the inventions. Government employees, particularly those of the Department of Defense, think that title should be retained by the inventor.

Individuals and firms licensed to use government-owned patents were also requested to express views on the effect of government ownership of inventions on commercial use. Because these individuals and firms have royalty-free licenses to use government-owned patents it was anticipated that almost all of these responding to the letter would comment on the matter. As it turned out, a substantial number of firms displayed indifference by avoiding reference to the issue. Of the 113 responding firms, only 58, or slightly over 50 percent expressed an opinion. As indicated earlier, part of this general apathy can be explained by the fact that many firms probably obtain licenses on government-owned patents when the inventions are of only remote interest. The licenses are issued automatically upon request and almost no cost is incurred by parties obtaining licenses.

Table 21 shows that 40 of the 58 firms responding to this question believe that government ownership of patented inventions retards the rate of commercial use. Only 2 percent of the firms hold that such ownership has no effect, and 14 percent contend it encourages commercialization. It is significant to note that among the 21 different firms that actually commercialized one, or more, sampled patented invention, 14 indicated that government ownership retards use. Seven said it does not retard use.

Reasons for the Ineffectiveness of a Title Policy

As expected, the most frequently cited cause for retardation is that commercial use does not take place without patent protection when

TABLE 21

THE EFFECT OF THE TITLE POLICY ON THE COMMERCIALIZATION OF PATENTED INVENTIONS (OPINIONS OF LICENSEES)

Agency or Department	Total Replies	Favorable Effect		Adverse Effect		No Effect		Blank	
	No.	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent
Department of Agriculture	29	7	24.1	13	44.8	—	—	9	31.1
Atomic Energy Commission	54	5	9.2	20	37.0	1	1.9	28	51.9
Department of Defense	18	3	16.7	3	16.7	1	5.5	11	61.1
Other Agencies	12	1	8.3	4	33.3	—	—	7	58.4
TOTAL	113	16	14.2	40	35.4	2	1.8	55	48.6

firms find it necessary to invest substantial amounts of financial capital on new plant and equipment, or when they find that extensive testing, development, and marketing programs are required.

Three additional reasons are very prominent in the replies of licensees. The first applies primarily to inventions developed under contract. Some inventions which appear to have good prospects for commercial application are neglected by both the government and the contractor. A privately owned patent is an asset to its owner. It is actively exploited either through actual production by the owner or through aggressive licensing programs. When the invention is not within the usual product line of the firm owning the patent, the owner attempts to determine its commercial potential and negotiates with firms in whose main line of business the invention falls. If successful, the owner obtains royalty-bearing licenses or sells the rights to the patent. This incentive to seek out other manufacturers to commercialize patented inventions does not exist when the government holds title to patents.

Secondly, some companies find that banks or other institutional investors consider the ownership of a patent or an exclusive license necessary for outside financing because of the risk between the initial development of the invention and the successful commercial marketing of the finished product. The entrepreneur might be willing to accept risks without patent protection; but officials of financial institutions are not willing to lend without patent protection.

The third reason given is difficult to appreciate in view of the fact that government-owned patents are utilized without licenses and without apparent penalty. Even though reasons might not always seem to be completely logical or rational, they can be considered sufficiently

important to actually deter commercialization of government-owned patented inventions. Some firms indicated that the terms of most licenses issued by the government contain a revocability clause. If it were invoked, it would leave the licensee without legal protection. This objection is equally applicable to exclusive or nonexclusive licenses. It is said to be important particularly when investment funds are required for commercialization. Patent personnel in the various government agencies have frequently been asked during Congressional hearings to cite an actual instance when a license issued by the government was revoked. A study of Congressional hearings and other literature gives the author the impression that no license issued by the government has been revoked within the last decade or so.

Another matter is brought to light by licensees. It is not about the commercial development of inventions being inhibited or held in check because of the lack of patent protection. Rather, it is the ability of small businesses to compete in the production of products covered by government-owned patents. Several small firms indicated that they wanted to commercialize the sampled patent but found that the market demand was completely satisfied by the output of large corporations.

Many of the firms whose managers do not believe that government ownership of patents retards growth stated that they have no research facilities or staff comparable to larger firms. Consequently, they can never discover and develop inventions similar to those owned by the government. Although some of these managers think exclusive licenses might expedite development and use, they also believe that the licensing program should not be changed because of the difficulties of establishing an equitable plan for exclusive licensing.

Commercialization by Licensees of Additional Inventions

To obtain more concrete information about government ownership of patents and the rate of commercialization, licensees were also requested to indicate whether they would have used or developed the sampled patent more rapidly with title or an exclusive license to the patent. Of the 156 responding licensees, 28 revealed that the invention would have been commercialized or developed more expeditiously. The 28 licensees reported on 26 different sampled patents. If such action materialized, 7 inventions would have been developed more rapidly and 19 additional inventions would have been commercialized. Proportionately more inventions administered by the Department of Agriculture would have been developed—7 of the 19 inventions are held by that agency.

In addition to the sampled patents, licensees were asked whether there are any other government-owned patented inventions that they would commercialize with title or an exclusive license to the patent. Only 45, or 40 percent of the responding firms, answered this question. Twenty-two licensees said they know of other government-owned patented inventions they would develop. Of these, 7 firms are licensed by the Department of Agriculture, 7 by the Atomic Energy Commission, 5 by the Department of Defense, and 3 by all other agencies. It is not known which government agencies administer the inventions that the licensees contemplated.

GOVERNMENT PATENT POLICY AND THE DISSEMINATION OF INFORMATION

Inventors were requested to express their opinions on the effectiveness of the program of the government in disseminating information about their sampled patents. They were also queried on the effect of a title policy on the widespread transmission of technology to the private sector of the economy. Because of strong pride in originality that many inventors are thought to possess toward their patented inventions, it was believed that the majority of respondents would be critical of governmental efforts to publicize inventions. Quite the contrary is in fact the case.

Effectiveness of Governmental Efforts to Disseminate Information

Question 2, Part II, of the questionnaire asked inventors if they believe the government has done all that it could do to disseminate information about their sampled patented inventions. As previously indicated, a substantial number of inventors objected to the wording of this question. They said that the government certainly *could* do a great deal more to disseminate information about inventions, but that it has done all it *should* do to transmit the technology.

As Table 22 shows, 26 percent of the inventors returning the questionnaires did not reply to this question. The vast majority of those responding, 47 percent of the total, think that the government is doing all that it could and should do to transmit information about the sampled patent. Some of the opinions expressed were: "no need to disseminate or encourage, since applications are evident;" "the current action is appropriate, this is industry's job;" "AEC generally overpublishes its inventions;" and "the government's role is passive and rightly so."

As one might expect, a few more inventors in the Department of

TABLE 22

OPINIONS OF INVENTORS ON THE ADEQUACY OF GOVERNMENTAL EFFORTS TO DISSEMINATE INFORMATION ABOUT THE SAMPLED PATENTED INVENTIONS

Agency or Department	Total Replies	Opinions of Inventors: All it Could Do		All it is Expected To Do		It Has Not Done Enough		Blank	
	No.	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent
Department of Agriculture	28	18	64.3	1	3.6	6	21.4	3	10.7
Atomic Energy Commission	51	26	51.0	6	11.8	8	15.6	11	21.6
Department of Defense	116	37	31.9	1	0.9	41	35.3	37	31.9
Other Agencies	11	7	63.9	—	—	2	18.2	2	18.2
TOTAL	206	88	42.7	8	3.9	57	27.7	53	25.7

Defense express disapprobation rather than approval of the dissemination of information about patents administered by that agency. Officials in the Department of Defense do not consider the transmission of technology covered by patents within the scope of the mission of that agency.

Inventors holding that the government has not done all that it could do to disseminate information about government-owned patented inventions offered one main remedy. The commercial potential of patented inventions should be evaluated by a knowledgeable committee, preferably the inventors and their research staff. The group should also suggest potential uses for and users of the invention. Copies of the patent and supplementary information should then be sent to these concerns. There were variations on the idea.

Effect of a Title Policy on the Dissemination of Information

Also, inventors were asked to give opinions on the more general issue of the effect of a government title policy on the dissemination of information about all government-owned patented inventions. Even more inventors, about 35 percent, neglected to respond to this question. A greater proportion of inventors indicate that a title policy has an adverse rather than favorable effect on the dissemination of information about inventions—36 percent compared with 27 percent. Inventors in the Department of Defense and the Atomic Energy Commission are especially dissatisfied with the effect of government ownership of patents on the transmission of new technology. The consensus is that when privately owned patents are outside the product line of the firm,

information about them is actively disseminated in an attempt to obtain royalty-bearing license agreements. Individual inventors also have this incentive to transmit information in the hope of earning income. The inventors contend that neither industry nor the government disseminates information about government-owned patents.

The majority of inventors in the Department of Agriculture believe that government ownership of patented inventions promotes the dissemination of information about inventions. Several inventors indicate that when the government retains title to inventions they are permitted to publish articles on the subjects in advance of the patent issue. They think that this might not be permitted by a private company. See Table 23 for a tabulation of these replies by agency.

TABLE 23

THE EFFECT OF THE TITLE POLICY ON THE DISSEMINATION OF INFORMATION ABOUT PATENTED INVENTIONS
(OPINIONS OF INVENTORS)

Agency or Department	Total Replies	Favorable Effect		Adverse Effect		No Effect		Blank	
	No.	No.	Per-cent	No.	Per-cent	No.	Per-cent	No.	Per-cent
Department of Agriculture	28	17	60.7	10	35.7	—	—	1	3.6
Atomic Energy Commission	51	11	21.6	17	33.3	2	3.9	21	41.2
Department of Defense	116	22	19.0	47	40.5	2	1.7	45	38.8
Other Agencies	11	5	45.5	1	9.0	—	—	5	45.5
TOTAL	206	55	26.7	75	36.4	4	1.9	72	35.0

GOVERNMENT PATENT POLICY AND THE INCENTIVE TO INVENT

In addition to possible effects on the commercialization of and dissemination of information about patented inventions, government patent policy can affect the incentive to invent new products and processes. As in the commercialization of patented inventions originating from government-financed research, proponents of the title policy contend that government ownership of inventions has no adverse effect on incentives. Those favoring the license policy usually hold the reverse opinion. The 1947 Report of the Attorney General, based on an investigation of government patent practices and policies, best summarizes the first point of view. The Attorney General reported that, "the retention of patent rights by the Government employee is not necessary to attract and retain competent personnel and is not a necessary form of stimulus or incentive to make inventions.[65]

[65] U.S., Department of Justice, *op. cit.*, Vol. I, pp. 39-47.

This view is founded mainly on the belief that the average government scientist or engineer has little interest in obtaining title to patented inventions because the patent rights rarely prove lucrative. The employee-inventor also rarely has the financial ability to exploit the patented inventions himself. At times, patent personnel and other officials in the various government agencies have reported that when employees were permitted to retain title to their patented inventions the policy did not increase the ability of the government to attract qualified employees or the productivity of inventors. The Report of the Attorney General further argued that retention of title by employees has an adverse effect on inventiveness because it results in secretiveness and a lack of cooperation among employees.

Officials of the Department of Defense believe that their employees are most productive when they can retain title to the patented inventions they develop.[66] It is also held that the extra incentive of patent rights compensates for the disadvantage of lower salaries offered by the government compared with those of private industry. Competent and well-qualified engineers and scientists are not attracted into federal service without this additional incentive.[67]

The matter of incentives is more complicated when inventors are hired by private firms under contract with the government. The inventors might discover very promising ideas for improvements on products and processes useful to the government in the course of this work. When these ideas are not within the specifications of contracts, the companies might not pursue them. Title to possible inventions might be retained by the government. One inventor, working on government contracts, states that during a 20-year period at least 200 improvements which appeared valuable to the government were discarded. The reason, he contends, is that neither he nor his employer would have been compensated for time and money expended on the necessary development of the ideas.

Not surprisingly, inventors responded more enthusiastically to the question about the effects of government patent policy on invention than on the dissemination of information and commercialization. Approximately 23 percent of the inventors did not give an opinion about the effects on invention. This compares with 35 percent on the transmission of information, and 34 percent on commercial utili-

[66] U.S., Congress, Senate, Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, *Patent Practices of the Department of Defense, op. cit.*, p. 40.

[67] U.S., Congress, House, Subcommittee No. 3 of the Committee on the Judiciary, *Hearings, Rights of Government and Its Employees in Inventions Made by Such Employees, op. cit.*, p. 10.

zation. More than twice as many inventors indicated that government ownership of patents has an adverse rather than favorable effect on invention—48 percent compared with 21 percent. See Table 24. Approximately 8 percent of the inventors believe that such a policy has no effect on inventiveness.

Most of the inventors replying in the negative think that the financial rewards given by the government are not commensurate with the value of inventions. They believe that inventors should have rights to exploit commercially their patented invention; or at least, they should receive a substantial monetary award when a good invention contributes to the advancement of a government program. A study on incen-

TABLE 24

THE EFFECT OF THE TITLE POLICY ON INVENTIVENESS
(OPINIONS OF INVENTORS)

Agency or Department	Total Replies	Favorable Effect		Adverse Effect		No Effect		Blank	
	No.	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Department of Agriculture	28	13	46.5	10	35.7	3	10.7	2	7.1
Atomic Energy Commission	51	10	19.6	21	41.2	4	7.8	16	31.4
Department of Defense	116	19	16.5	62	53.4	9	7.7	26	22.4
Other Agencies	11	2	18.2	5	45.5	1	9.1	3	27.2
TOTAL	206	44	21.4	98	47.6	17	8.2	47	22.8

tives and deterrents to inventing for national defense reveals that inventors deem financial awards to be the most important factor spurring inventiveness.[68]

Many of the inventors employed by industry, who think that government patent policy has no effect on inventiveness, believe that the inventor is discriminated against with either the title or the license policy. If the government does not take title to the invention, industry inevitably does. The largest proportion of inventors neglecting to respond to the question are those whose patents are administered by the Atomic Energy Commission. The R&D sponsored by that agency is conducted through contracts with industry. A great number of the inventors employed by industry think they have little chance of obtaining title to inventions themselves.

Opinions held by inventors differ sharply by the agency adminis-

[68] James N. Mosel, Barkev S. Sanders, and Irving H. Siegel, "Incentives and Deterrents to Inventing for National Defense," *PTC J. Res. & Ed.*, Vol. I, No. 1, (December 1957), pp. 185-215.

tering the patented inventions. A substantially larger proportion of inventors in the Department of Agriculture think that government ownership of patented inventions stimulates invention. Inventors employed by the Department of Defense voice the least amount of approval for the title policy. The proportion of inventors in the Department of Agriculture approving of the title policy is 47 percent compared with 17 percent for the Department of Defense. The proportion of inventors indicating that government ownership of patents is a stimulant to invention is only slightly higher for the other agencies. These differences in view might reflect the effect of Executive Order 10096 on inventors in the Department of Defense. They might also mirror a weaker demand by industry and government for scientists and engineers in the agricultural field than for those with specialties in nuclear energy and other technologies for national defense. This, of course, means that on the average scientists in the field of agriculture have fewer alternative employment possibilities.

PART IX

GOVERNMENT USE OF ITS OWN PATENTED INVENTIONS

In 1961, the federal government spent approximately $50 billion on goods and services for the national defense—about 10 percent of the $520 billion gross national product. Some of the final goods purchased by the government embodied patented inventions owned by the government. The use of government-owned patented inventions by the government itself is one facet of utilization that has received virtually no attention.

DEFINITION OF GOVERNMENT USE OF PATENTED INVENTIONS

For every patented invention it owns, the federal government holds licenses to about two more. The government uses many of the inventions it owns, as well as those it is licensed to use. This analysis is limited to government-owned patented inventions.

For this discussion, government utilization of patented inventions is defined to mean the use of patented items and processes in the production of goods and services for the satisfaction of defense and civilian requirements. Government use includes the utilization of government-owned patented inventions in: (*1*) production in government installations; (*2*) research and development in government laboratories; (*3*) production of final products for the government by private contractors; and (*4*) research and development activity for the government

by private contractors. This definition excludes uses of patented inventions for purposes of control. The government exercises control when it uses patented inventions for such purposes as earning income from royalties and issuing licenses which contain terms and conditions appropriate for the particular desired end.

GOVERNMENT PRODUCTION OF GOODS AND SERVICES

In the private sector of the economy, R&D activities and the utilization of inventions that arise therefrom are spurred by the profit motive. Such, of course, is not the case for the federal government. Two forces propel the government to undertake research and development work: (*1*) military and defense requirements; and (*2*) meritorious or vital civilians needs. If left alone, the price and resource allocating mechanism of the private market system would not supply, or would supply in insufficient amounts, the goods and services that satisfy these needs.

National Defense Requirements

Goods and services for the national defense must be provided by the government because they must be consumed collectively or not at all. It is neither possible to divide national defense into units that directly benefit individuals, nor is it possible to sell units of national defense on the market. Because most of the R&D undertaken by the government is designed solely to increase the effectiveness of our national defense, about 85 percent of all government-owned patented inventions are for purposes of national security. If these inventions also hold commercial potential, the economy derives additional benefits.

Civilian Requirements

About 15 percent of the patents in the portfolio of the government originate from R&D work undertaken to advance specific technologies—agriculture, mineral resources, saline water, and chemical fertilizers. Also, the Atomic Energy Commission holds some inventions that were developed to foster civilian uses of atomic energy. The nondefense needs are technological advances with civilian applications. The government develops more efficient processes and technologically superior goods for civilian use, because private producers do not find it sufficiently profitable to engage in the necessary amount of R&D work. If only the private sector of the economy provided new technology, the advances would not be sufficient because the financial gains to producers are less than the benefits to society as a whole.

The government can use some of its civil-oriented patented inven-

tions. For example, new devices and techniques might be developed by the government for use in its flood control projects, its programs for conservation and improvement of soil and mineral resources, its activities for peaceful uses of atomic energy, or its postal operations. However, the main objective of most civil-oriented research and development work financed by the government is commercial utilization of the results by private firms. Unlike commercial use of military inventions, commercialization of civilian inventions owned by the government does not yield additional benefits to the economy. For example, government-owned patents covering inventions on new food products are designed to be used by private firms and sold on commercial markets. An ultimate objective of the research is to increase the demand for farm products and to raise incomes in the agricultural sector of the economy. Commercial use of other inventions developed by civilian agencies is designed to increase productivity.

THE REPORTED RATE OF USE

To obtain specific and factual data about the use of government-owned patented inventions by the government, inventors were asked whether the sampled inventions have been used by the government. In addition, they were requested to provide information on how, when, and where the inventions were used by the government. Before the questionnaires were sent, it was fully recognized that inventors might encounter difficulties in responding to the questions because of security restraints.

Of the 271 sampled patents, information on government use was supplied for 148, or 55 percent of the total. Similar information on commercial use was provided for a slightly larger proportion of the sampled patents. The author believes that the lower rate of response

TABLE 25

GOVERNMENT USE OF GOVERNMENT-OWNED PATENTED INVENTIONS (REPORTED BY INVENTORS)

Agency or Department	Total Reply	Used		Not Used	
	No.	No.	Percent	No.	Percent
Department of Agriculture	20	0	0	20	100.0
Atomic Energy Commission	40	30	75.0	10	25.0
Department of Defense	78	58	74.4	20	25.6
Other Agencies	10	6	60.0	4	40.0
TOTAL	148	94	63.1	54	36.9

about government use results from a reluctance on the part of inventors to disclose possibly security-classified material. The percentage of employee-inventors answering this question is somewhat lower than that for contract-inventors. In addition, fewer inventors inserted "do not know." The question was merely omitted.

As Table 25 shows, inventors reported government use on 94 of the 148 sampled patented inventions, or about 63 percent. A rate of government use of government-owned patented inventions as high as 60 percent is not out of line with estimates of commercial utilization of about 55 percent to 65 percent on privately developed and owned patented inventions.

The rate of government use of inventions administered by the Atomic Energy Commission is about the same as that of the Department of Defense—75 percent and 74 percent, respectively. The R&D mission of the Department of Defense is to provide new and more effective equipment and techniques for the national defense. Use of these new technological advances for national security is a governmental function. Although the Atomic Energy Commission has a R&D mission encompassing both civilian and military needs, the latter certainly is the more important. Three nuclear reactors are in operation for the production of power for civilian use, but such production has not yet proved economically feasible.[69] The operation of these nuclear power plants still is a government operation. The production of nonconventional energy for national defense can also be accomplished only by government use of the new technology it develops.

The government did not use any sampled patented inventions administered by the Department of Agriculture. It is not surprising that there was no government use of these patented inventions. The research work of the Department of Agriculture is undertaken mainly to increase agricultural productivity and the demand for farm products through commercial utilization of the results by private firms. With the exception of one invention, government use of patented inventions administered by "Other Agencies" also was for national security or civil defense. No government use was reported for Tennessee Valley Authority patented inventions. These inventions also arise from research designed to increase productivity through commercial use of the results by private businesses. One invention, developed by the Bureau of Mines, Department of the Interior, was used by the government to

[69] Robert A. Solo, *Report to the CARMRAND Committee,* National Planning Association, Washington 9, D.C., M-7157, March 16, 1962, pp. 33-34 (Mimeographed).

satisfy a nondefense need. Although the inventor did not provide adequate information about that use, the government probably used the invention for soil and mineral conservation purposes.

The majority of patented inventions used by the government, about 65 percent, are components of final or end products. Approximately 35 percent of the inventions cover processes. Unfortunately, more precise information on how the government uses its patented inventions cannot be ascertained from the replies received from inventors. The responding inventors were scrupulous not to disclose information that might have a bearing on national defense. The following are typical examples of the replies: "in moderate use," "in certain instrumentation," "for atomic energy," "sorry," "AEC plant," and "in military equipment."

To compensate partially for incomplete responses from inventors about the way the government uses its own patented inventions, the inventions reported to have been used by the government were classified by kinds of inventions. Table 26 shows this classification for 73 percent of the patented inventions used by the government. About

TABLE 26

CLASSIFICATION OF PATENTED INVENTIONS USED BY THE GOVERNMENT

Title of Classification	Class Number	Number of Patents
Radiant Energy	250	14
Inorganic Chemical Procedures	23	7
Ordnance	89	6
Communications, Radiant Energy	343	4
Electricity, Measuring and Testing	324	4
Ammunition and Explosive Devices	102	4
Repair and Manufacture of Electrical Lamp and Discharge Devices	315	4
Chemistry, Electrical and Wave Energy	204	3
Measuring and Testing Devices	73	3
Wave Transmission Lines and Networks	333	3
Electricity, Residual Class	317	3
Chemistry, Carbon Compounds	260	2
Oscillators	331	2
Electric Lamp and Discharge Devices	313	2
Batteries, Primary, Secondary, and Thermal	136	2
Machine Elements and Mechanisms	74	2
Electrical Transmission or Interconnection Systems	307	2
Communications, Electrical	340	2
Total Above		69
Percent in the Above Classifications		73.4
Total Number Used by Government		94

half of the classified inventions are included in the five most important classes for all government-owned patents. Only a few of the patented inventions commercialized by private firms fall in these same classes, and they are administered by the Atomic Energy Commission. Only 9 of the inventions used by the government do not fall in the twenty-five most important categories. Compare Table 12 with Table 26.

PART X

CONCLUSIONS

Government ownership of patents is new and is becoming increasingly important. The 12,000 government-owned patents constitute about 2 percent of all unexpired U.S. patents. The patent portfolio of the government is now large and it is growing. The government is the largest single owner of patents in the United States, and about one-half of the patents it owns were acquired during the last five years. It is probable that the patent portfolio of the government will continue to expand, and that the policy issues surrounding government ownership of patents will become more important. The number of patents owned by the government can easily double during the next decade. Federal expenditures and obligations for R&D continue to increase substantially. The National Aeronautics and Space Administration, a title policy agency, is growing in importance.

Most patented inventions are privately developed and owned, and most inventions must be exploited by private enterprise. In the United States, there is a political and economic predisposition against the government's conducting commercial activities. With the exceptions of electric power and lending programs, the commercial activities undertaken by the government can usually be explained by national defense requirements. Furthermore, the patent system is an institution, under the patent law, designed to encourage invention and innovation by private individuals and organizations. The patent system was established and is maintained under the auspices of the federal government. Despite assertions to the contrary, it is not self-evident that the government will undertake risks associated with the development and commercialization of the patented inventions it owns.

If government-owned patented inventions are to be exploited commercially, this must be done by private industry. Under the title policy, these inventions are freely available to all. This policy implicitly assumes either: (*1*) that patent protection is not necessary to stimulate innovation; or (*2*) that the social costs that can be incurred

from the monopoly exceed the social benefits that can be derived from innovation. Except for a few patented inventions administered by the Tennessee Valley Authority which are completely developed, there is no factual evidence indicating that patent protection is less important as an incentive for the development and exploitation of government-owned patented inventions than it is for those developed and owned by private firms and individuals.

The patent portfolio of the government, however, differs from any other collection of 12,000 patents. Most government-owned patented inventions originate from research undertaken by the Department of Defense and the Atomic Energy Commission. The research and the resulting inventions are designed to increase the effectiveness of the national defense. Many of the patents owned by the government cover technology on radiant energy, ordnance, ammunition, and explosive devices. There is, however, a substantial block of patented inventions, administered by the Department of Agriculture, that are intended for commercial use. These patents cover technology on carbon compounds, foods and beverages, bleaching and dyeing processes, and fermentation.

The government itself does use a large proportion of the patented inventions it develops for military requirements. The rate of government use of its own patented inventions is at least as high as 60 percent. Because of national security restrictions, some government use of its own inventions is enshrouded in mystery. Government use of new technology contributes to economic growth in a manner similar to that of commercial use—formation of new capital and more efficient use of a given amount of resources from technological change. However, the impact of government use of new technology on economic growth should not be exaggerated. Government purchases of goods for the national defense comprise about one-tenth of the gross national product.

In contrast with government use, the rate of commercial use of government-owned patented inventions is low—between 10 percent and 15 percent. Nonexclusive rights, arising from government ownership and a policy on the part of the government to grant only revocable, nonexclusive, royalty-free licenses are not the main reason for non-commercialization. The low rate of commercial use results from more advantageous alternative investment opportunities. Many of these inventions have only government applications. For others, there is either an insufficient commercial market demand for the final product, or substitutes for the inventions are readily available.

Because of the kinds of inventions owned by the government, they

hold little commercial potential. Although additional government-owned patented inventions can be commercialized, the rate of commercial use would still be low—between 20 percent and 25 percent. Other studies show that privately owned patented inventions originating from government-sponsored research also have slight possibilities for commercial use.

The specific R&D projects from which most government-owned patented inventions originate do not have the dual goal of providing for military and commercial requirements. Any commercial benefits the economy derives from military-oriented patented inventions can be considered as additional social benefits to the economy.

With the exception of the Department of Defense, government agencies with sizable patent holdings actively encourage the commercialization of their patented inventions. The R&D missions of the Department of Agriculture and the Tennessee Valley Authority are to promote technological advances in agriculture and fertilizers, respectively. The ultimate goal is the commercial use of new technology by private enterprise. To accomplish this end, representatives of these agencies work closely with industry. They provide technical advice; they widely publish information about technological advances in trade, professional, and government journals; and sometimes they give technical demonstrations. The R&D mission of the Atomic Energy Commission is dual—to increase the effectiveness of national defense and to promote the development of nonconventional sources of energy. The Commission disseminates information about its patented inventions in the same manner as the Department of Agriculture, but less intensively. Officials in the Department of Defense consider the transmission of new technology to industry outside the mission of that agency.

In addition to information programs of the agencies, the Small Business Administration and the Office of Technical Services, Department of Commerce, publish information about government-owned patents. Given the slight commercial potential of most government-owned patented inventions, the information program of the government for its patents should not be greatly expanded. No justification can be found for new government programs, which require substantial outlays of public funds, for the transmission of information about government-owned patents to the private sector of the economy. The costs incurred to obtain additional use probably would exceed benefits derived from the incremental use. There is little difference in the rate of commercial use of patented inventions administered by the Atomic

Energy Commission and those held by the Department of Defense. The majority of inventors believe that the government has done all that it should do to transmit information about the inventions it owns. In addition, technological advances covered by patents are automatically opened to the public when patents are issued. This is not true of other forms of the results of government-financed research.

A relatively cheap means to disburse information about government-owned patents is to have inventors, or the research teams, who develop these inventions analyze their commercial potential and suggest industries most likely to utilize such technology. Information about the inventions can be sent to those organizations.

Proposed methods for widening the commercial use of government-owned patented inventions frequently include the establishment of a central administrative agency. Because the possibilities of increasing the commercial use of government-owned patented inventions are slight, the desirability of establishing a central agency is not great. The principal responsibilities of a central agency would be to transmit information about patents to the private sector of the economy and to make arrangements for licensing these patented inventions. Government agencies sponsoring the R&D from which the inventions arise would be unwilling and unable to relinquish complete responsibility for all administrative chores. Undoubtedly, there would be some unavoidable and unnecessary duplication of facilities and activities. Duplication would be particularly prevalent for agencies such as the Department of Agriculture, the Atomic Energy Commission, and the Tennessee Valley Authority. These agencies have had close working arrangements with industry for years.

Conceivably, a central administrative agency could also sponsor development work on government-owned patented inventions to compensate for risks associated with the lack of patent protection. As indicated, in the United States, the government does not usually undertake commercial activity. In addition, it is doubtful whether a development program would be self-supporting. Even without an invention development program, the possibility of recovering substantial R&D expenditures made by the government through a system of royalty payments is remote. In fact, it is possible that income from royalties might not be sufficient to cover administrative expenses. In addition to the small commercial potential of government-owned patented inventions, the average annual earnings from the use of privately-owned and government-owned patented inventions arising from federally financed research are low. The Tennessee Valley Authority discontinued its

policy of charging royalties because the receipts were small and the administrative burdens great. The British National Research Development Corporation incurs a loss on 84 percent of the patents it acquires.

Provision for exclusive use of government-owned patented inventions would probably increase the rate of utilization. Some advocates of the title policy, particularly officials of the Department of Agriculture, contend that exclusivity should be granted for inventions that require extensive further development work. On the average, the amount of further development required for commercialization of utilized inventions is less than that for all inventions in the patent portfolio of the government. Of the inventions reported to have been commercialized, well over half needed no or only a slight amount of additional development. Many licensees said that they did not commercialize government-owned patented inventions because too much development or sales effort is required.

The possibility of raising the rate of commercial use by providing for exclusive use, however, is not great. It is estimated that no more than an additional 10 percent of the patented inventions owned by the government would be used commercially. Although a detailed outline of the administrative arrangements providing for exclusive use is beyond the scope of this paper, it is suggested by the author that sale of licenses by a system of competitive bids conforms to the competitive principles of our economy. In addition, competitive bidding schemes are widely used by the government in procurement and surplus disposal activities.

Because government-owned patented inventions hold slight commercial potential, and because the commercial value of these inventions is small, the possibilities for monopolistic abuse are also slight. If, however, the sale of an exclusive license on a patented invention would create a clear and present danger of monopoly, the government could grant nonexclusive licenses or none at all. In addition, the government has the legal authority to control the use of revolutionary inventions, such as a means to modify weather or a cure for cancer. Governmental authority to control inventions that vitally affect public health, safety, and welfare also extends to privately developed and owned patented inventions.

The title policy may adversely affect incentives. The attitudes and opinions of inventors and licensees reflect a strong sentiment against the ownership of patents by the government. These negative attitudes toward government ownership of patents might adversely affect the incentives of government employees to invent, the incentives of government contractors to disclose new technology that holds commercial

potential, and the incentives of government contractors to employ their most productive scientists and engineers on government research contracts.

The policy of the government's taking title to patented inventions arising from federally financed research, and making these inventions freely available to all, does have a slightly adverse effect on commercialization. Some patented inventions would be developed more rapidly and additional inventions commercialized, if business firms were given exclusive rights to the inventions. The title policy, however, can be modified to permit greater commercialization of government-owned patented inventions. Provision for exclusivity can be made by the sale of licenses.

The contribution of government-owned patented inventions to economic growth is slight. The rate of commercial use is low, and the inventions that are used do not have much commercial value. The rate of government use is high, but government purchases of goods for the national defense constitutes only 10 percent of our gross national product. If most of the R&D sponsored by the government continues to be directed toward defense requirements, there is little reason to believe that patented inventions arising from government research will have a greater impact on economic growth than those currently owned by the government.

APPENDIX

Letter Sent to Inventors of Government-Owned Patented Inventions

THE PATENT, TRADEMARK, AND COPYRIGHT FOUNDATION
OF
THE GEORGE WASHINGTON UNIVERSITY
Washington 6, D.C.

Dear

The Patent, Trademark, and Copyright Foundation needs your help and cooperation with an important research project on the utilization of government-owned patented inventions. As the inventor of one or more government-owned patents, you have information that is not available from other sources.

Directly or through contracts with private organizations, the government now pays for approximately 65 percent of the billions of dollars spent on research and development in this country. Some of this government-sponsored research has resulted, and will continue to result, in patented inventions. Growing out of its scientific activities, the government now owns about 12,000 unexpired patents. How does the government use these? Does government ownership result in the greatest commercial use and the most rapid spread of new technology? These are

some of the significant questions being studied by Mary A. Holman, a Fellow of the Foundation.

As you know, there have been lively public debates as to whether the nation's welfare is best served by government or private ownership of these patented inventions. The extent and type of commercial use is one of the subjects for heated controversy. Those favoring government ownership contend that use is widespread because the inventions are available to all. Opponents argue that when the government owns a patent and grants a royalty-free, nonexclusive license, the incentive provided by patent protection is absent. Consequently, a substantial number of potentially new products and processes will not be developed for commercial use. There is little factual evidence to confirm or disprove either view.

We would appreciate it if you would provide us with information requested on the enclosed questionnaire. Your government-owned patented invention was one of a group statistically sampled by the Foundation. The success of this undertaking depends on the response of those selected. A very high rate of response is needed to make the survey results truly representative of all government-owned patented inventions. It is essential to account for each sampled patent, so please reply even if you are not able to answer all of the questions.

We know that you are extremely busy. The questionnaire has been made as simple as possible, requiring only check marks or brief answers. Your replies will be kept strictly confidential. A report on the findings of this study, which will be of great interest to persons in government and industry, will be made available in the *Journal* of the Foundation. We sincerely appreciate your cooperation in helping us with this important study.

Yours very truly,

L. James Harris

QUESTIONNAIRE SENT TO INVENTORS OF
GOVERNMENT-OWNED PATENTED INVENTIONS

THE PATENT, TRADEMARK, AND COPYRIGHT FOUNDATION OF THE GEORGE WASHINGTON UNIVERSITY

UTILIZATION OF GOVERNMENT-OWNED PATENTED INVENTIONS STUDY

QUESTIONNAIRE: PART I

Information about the Inventor

Date_____

1. Name (s) of Inventor (s) _____
2. Patent Number_____
3. Title_____
4. How many U.S. Patents have been issued to you? (Please include sampled patent)
   (*a*) Title assigned to the government_____
   (*b*) Title assigned to a private firm or organization_____
   (*c*) No title assignment_____

(*d*) Other (Please specify) _____

5. How many of your U.S. patented inventions actually are being or have been used?
   (*a*) Commercially* _____
   (*b*) By the government _____
6. How many of your U.S. patented inventions, assigned to the government, actually are being or have been used?
   (*a*) Commercially* _____
   (*b*) By the government _____
7. Where were you employed at the time the sampled patented invention was made? _____
8. If you are or ever have been employed by private industry, have you or your firm ever made any further engineering or development efforts to commercialize* any government-owned patented invention?
   Yes _____ No _____ Never employed by industry _____
   (*a*) If "yes," did these further developments result in the commercial utilization* of the invention? Yes _____ No _____
   (*b*) If "yes," was a patent issued on the further developments?
   Yes _____ No _____

* Commercial use, commercial utilization, or commercialize mean producing the patented invention or using it in the production of commercial goods and services.

QUESTIONNAIRE: PART II

Information about the Sampled Patented Invention

1. How did the government acquire title to the sampled patented invention?
   (*a*) You were a federal employee _____
   (*b*) You were employed by a firm that had a government contract providing that patent rights would be transferred to the government _____
   (*c*) Other (Please specify) _____
2. Can the sampled patented invention be commercially used, without further developments? Yes _____ No _____ Do not know _____
3. If the sampled patented invention needs further development for commercial use*, is the necessary development:
   Extensive? _____ Moderate? _____ Slight? _____
4. If the sampled patented invention has not been developed for commercial use*, please check the reason or reasons which apply:
   (*a*) Rapid obsolescence _____
   (*b*) Insufficient time to develop _____
   (*c*) Product for government use only _____
   (*d*) Insufficient market demand _____
   (*e*) Market position in doubt because government holds title _____
   (*f*) Insufficient venture capital _____
   (*g*) Product outside normal market line of company _____
   (*h*) Insufficient competitive advantage _____
   (*i*) Outright neglect to develop it _____
   (*j*) Other (Please specify) _____
5. Is the sampled patented invention now being or has it ever been used commercially?* Yes _____ No _____
   If "yes," is or was the use:
   Extensive? _____ Moderate? _____ Slight? _____

6. Is the sampled patented invention being used or has it ever been used commercially* by firms without obtaining a license?
   Yes_____ No_____ Do not know_____
   If "yes," is or was the practice:
   Extensive?_____ Moderate?_____ Slight?_____
7. Is the sampled patented invention now or has it ever been used by the government? Yes_____ No_____
   If "yes," please indicate how, when, and where it is or was used by the government_____

QUESTIONNAIRE: PART III

Attitudes and Opinions of the Inventor

1. If the sampled patented invention has not been used commercially*, would you or your employer at the time the patent was issued, have put the invention into commercial use, if title to the patented invention or an exclusive license were obtained? Yes_____ No_____
2. Do you believe that the government has done all that it could to:
   (*a*) disseminate information about your patented invention?
   Yes_____ No_____
   (*b*) encourage commercial utilization of your patented invention?
   Yes_____ No_____
   If "no," please comment. _____
3. In your opinion does the policy of the government taking title to a patent on an invention encourage:
   (*a*) invention? _____
   (*b*) the dissemination of information about inventions?_____
   (*c*) the commercial utilization of inventions?_____
4. If your answer to question number 3 is "no," what do you think the government could do to stimulate invention, the dissemination of information about inventions, and the commercial utilization of inventions? (Please specify)

LETTER SENT TO INDIVIDUALS AND FIRMS LICENSED TO USE GOVERNMENT-OWNED PATENTED INVENTIONS

THE PATENT, TRADEMARK, AND COPYRIGHT FOUNDATION
OF
THE GEORGE WASHINGTON UNIVERSITY
Washington 6, D.C.

Dear

The Patent, Trademark, and Copyright Foundation needs your help and cooperation with an important research project on the utilization of government-owned patented inventions. As the licensee of one or more government-owned patents, you have information that is not available from other sources.

Directly or through contracts with private organizations, the government now pays for approximately 65 percent of the billions of dollars spent on research and development in this country. Some of this government-sponsored research has resulted, and will continue to result, in patented inventions. How does the government use these? Does government ownership result in the greatest commercial use and the most rapid spread of new technology? These are some of the significant questions being studied by Mary A. Holman, a Fellow of the Foundation.

As you know, there have been lively public debates as to whether the nation's welfare is best served by government ownership of patented inventions and type of commercial use is one of the subjects for heated controversy. Those favoring government ownership contend that use is widespread because the inventions are available to all. Opponents argue that when the government owns a patent and grants a royalty-free, non-exclusive license, the incentive provided by patent protection is absent.

Although the government now owns about 12,000 unexpired patents, there is little factual information available as to whether the patented inventions are commercially used. Licenses have been issued on about 1,000 of these government-owned patents, but almost no data exist on the uses to which the licensees have put the inventions.

Your firm has been licensed to use the patent (s) listed at the end of this letter. This (these) patent (s) was (were) one of (among) several hundred government-owned patents, statistically sampled by the Foundation, for which licenses have been issued. Because your firm has been so licensed, we would appreciate it if you would provide information on your commercial use of the sampled patented invention (s). The success of this undertaking depends on the response of those selected. A very high rate of response is needed to make the survey results truly representative of all government-owned patents for which licenses have been issued.

Your reply will be kept strictly confidential. It will be most helpful if it includes the five points indicated below. If, however, you wish to supply additional information or present your personal opinions on the problem, your comments will be greatly appreciated.

1. It is frequently said that use of government-owned patents for which licenses have been issued is not widespread. (*a*) Have you ever commercialized the sampled patented invention or used it in the production? (*b*) How much further development was necessary before you could commercialize the patented invention (extensive or not extensive)? (*c*) Was the "know-how" of your firm an essential element in that use? (*d*) Did commercialization of the patented invention result in an increase in your sales or a reduction in your costs of production?

2. If you have never used the patented invention, please indicate the reason or reasons. For example, was there insufficient time to develop it; was the product

outside the normal market line of your company; was the market position in doubt because the government held title to the patent; or was there insufficient venture capital?

3. Is the commercial use of government-owned patented inventions without a license a widespread practice? Do you know of any other firm using the sampled patent, or any other government-owned patented invention, without a license? It is not necessary to name the firm, but an indication of the nature and extent of such use would be most helpful.

4. Does government-ownership of patents retard the rate of commercial development and use of these inventions? (*a*) Would you have developed and used commercially the sampled patented invention more rapidly if you had title to the invention or an exclusive license to it? (*b*) Are there any other government-owned patented inventions which you would develop and use commercially, if you had title or an exclusive license?

5. How did you find out that the sampled patent was available for licensing?

We know that you are extremely busy and that only brief answers might be possible, but we hope that you will reply and provide us with information that is not presently available. It is essential that we account for each of the sampled patented inventions. A report on the findings of this project, which will be of great interest to persons in government and industry, will be published in *The Patent, Trademark, and Copyright Journal of Research and Education*. We sincerely appreciate your cooperation in helping us with this important study.

Yours very truly,

L. James Harris

LETTER SENT TO INDIVIDUALS AND FIRMS REQUESTING INFORMATION ABOUT GOVERNMENT-OWNED PATENTS FROM THE SMALL BUSINESS ADMINISTRATION

THE PATENT, TRADEMARK, AND COPYRIGHT FOUNDATION
OF
THE GEORGE WASHINGTON UNIVERSITY
Washington 6, D.C.

Dear

Are government-owned patented inventions being used commercially to the greatest possible extent for the nation's welfare? This important question is being studied by Mary A. Holman, a Fellow in The Patent, Trademark, and Copyright Foundation, in connection with a research project on the utilization of government-owned patented inventions.

The Foundation needs your cooperation to help answer this question. We are asking for your help, and the help of many others, because you have expressed an interest in the possible commercialization of one, or more, government-owned patented invention. In relation to other questions pertaining to the use of government-owned patents, we have sent letters requesting information to a group of inventors.

Directly or through contracts with private firms and research organizations, the government now pays for approximately 65 percent of the billions of dollars spent on research and development in this country. Some of this government-sponsored research has resulted, and will continue to result, in patented inventions.

For more than a decade there have been lively public debates as to whether the government or private individuals and organizations should own these patented inventions. Does government ownership result in the greatest commercial use and the most rapid promotion of new technology? Opponents argue that when the government owns a patent and grants a royalty-free, nonexclusive license, there is no stimulus of patent protection. Consequently, a substantial number of potentially new products and processes will not be developed for commercial use. Although the government now owns about 12,000 unexpired patents, there is little factual information available as to whether the patented inventions are used commercially.

We would appreciate it if you would provide us with information on your commercial use of the government-owned patented invention (s) listed on the enclosed card (s). We know that you are extremely busy, but we hope you will reply. The success of this undertaking depends on a very high rate of response of those selected. The information is not available from other sources. The questionnaire has been made as brief and simple as possible, only five questions which require a check mark.

Your replies will be kept strictly confidential. A report of the findings, which will be of great interest to the general public and to officials in government and business will be made available in the *Journal* of the Foundation. We sincerely appreciate your cooperation in helping us with this important study.

Yours truly,

L. James Harris

QUESTIONNAIRE SENT TO INDIVIDUALS AND FIRMS REQUESTING INFORMATION ABOUT GOVERNMENT-OWNED PATENTS FROM THE SMALL BUSINESS ADMINISTRATION

PATENT NUMBER:_____

TITLE:_____

1. Did you commercialize the patented invention (production for sale or use in the production of goods)? Yes_____ No_____

If the answer to question one is "yes," please answer the following questions:

2. How much further technical or engineering development was necessary for that commercialization?
   None_____ Slight_____ Moderate_____ Extensive_____
3. How much financial expense (in relation to your firm's financial capacity) was necessary for that commercialization?
   None_____ Slight_____ Moderate_____ Extensive_____
4. Did the end product have an existing established market?
   Yes_____ No_____
5. Was the end product within the usual product line of your firm?
   Yes_____ No_____

FORUM

Although the primary purpose of this *Journal* is to communicate the research work of the Foundation, it also serves as a vehicle for educational activities designed to exchange informed opinion and stimulate additional study. This section provides a medium for the presentation of papers and notes which do not necessarily rest as yet on a firm basis of empirical research. It is hoped that the material published in this section will stimulate researchers to undertake factual study of the issues.

Registration and Publication of Dedicated Discoveries by the Patent Office

FRANK A. HOWARD*

* Chairman, Sloan-Kettering Institute for Cancer Research.

THIS PAPER EXAMINES WHAT SEEMS TO BE A NEW QUESTION related to the effectiveness of the patent system. Should the Patent Office publish descriptions of potentially patentable discoveries which the owner believes to be new and offers to register as irrevocably dedicated to the public?

There is now an enormous volume of research and development work carried on at public expense. Several different procedures are used to handle the patent rights so as best to promote and protect the public interest in discoveries or inventions made in this work. A very large proportion of the patentable discoveries now become dedicated to the public however, belatedly and by default, by failure to file patent applications on them. Some may, in effect, now become dedicated to the public by patents assigned to the government, and for that reason legally or practically unenforceable. This is an unsatisfactory situation in itself which might be resolved by the suggested procedure. For many reasons, therefore, the right of the public to patentable discoveries made at public expense now remains uncertain, at least for a considerable period, and even disclosure, by publication in one or more of the thousands of possible media which could be used, may be delayed, inadequate to bring them to the notice of those most able to take advantage of them, or even entirely lacking.

Universities, non-profit private or quasi-private institutions of many other kinds, and innumerable agencies of state and local government

engage in research and development work on a large scale, either under direct federal support or incidentally to the performance of some public duty for which the organization exists and because of which it draws support from private philanthropy or from government at many different levels. Here again there are a number of different practices used for promoting and protecting the public interest in the discoveries which are made in or incidentally to such work.[1] But the most direct and simple course, officially registering and promptly publishing them as irrevocably dedicated to the public, in those cases in which this would be the most appropriate way to deal with them, is not now open.

Industry takes out some patents not with any intention to enforce them or to use them for trading purposes but because it considers this the most effective way to prevent the issue of troublesome patents to later claimants. If there were a more satisfactory method of getting the same result it might be used by industry to some extent.

Last and probably least important economically, but of great human interest, there is a considerable volume of research, especially in public health, now conducted by distinguished scientists who are reluctant to have their discoveries patented or their names associated with patents over the handling of which they would have no control. Such individuals should have the alternative, in suitable cases, of agreeing to register a formal dedication to the public of their discoveries or inventions instead of being required to assign all patent rights to the government or to some private granting agency deriving its funds from philanthropic gifts, as a condition for financial support of their work. There is a special problem here since the research often receives support from several sources. One solution might be to register a dedication of any patenable results, unless all parties, including the one who has made the discovery, agree on some other course. This principle might be applied quite generally to research done at public expense in non-profit institutions.

Incomplete but probably representative data indicates that the average cost of obtaining a patent by a corporate patent department is over $2,000. The cost under other auspices could be higher or lower, but for the same quality of service performed is not likely to be much different. If a potentially patentable discovery, believed by its owner to be new, were offered to the Patent Office for registration and pub-

[1] For example, the Research Corporation handles such inventions for a great number of universities and non-profit institutions, usually by granting nonexclusive licenses, the net proceeds from which are applied to the support of research in non-profit institutions.

lication as dedicated to the public, without claims but with only a description and summary, the cost of preparing and registering the dedication and publishing the discovery would probably be a fraction of the cost of processing a patent application to allowance. In comparison with the present handling of unpatented discoveries the public would have earlier and more effective knowledge of the discovery and of its irrevocable right to use the same, and, to aid them in novelty examinations, the Patent Offices of the world could receive and file promptly, well-classified, indexed and summarized descriptions of unpatented discoveries which the owners believed to be new. It has been estimated[2] that there are now 3,000,000 to 5,000,000 technical articles published annually in 50,000 to 100,000 different journals, and the task of the Patent Examiner in finding the best prior art references in this avalanche of current technical publicity may be an impossible one. The suggested procedure would somewhat improve this situation by providing good indexing and summaries and by concentration on potentially patentable discoveries, and would seem to be consistent with any revision of the United States patent laws. Foreign rights to the dedicated discoveries might, on request, be reserved or treated separately since the primary objective is to promote the economy and well-being of this nation.

The considerations mentioned above seem to make a prima facie case for the suggested new procedure, but its practical usefulness would depend first upon the number and importance of the potentially patentable discoveries which would be voluntarily offered for registration. This in turn might depend upon the charges, if any, made by the Patent Office, for such registration. To estimate these factors would require further examination of the present situation in each of the principal categories of prospective users and of the problems involved from the standpoint of the Patent Office. Various incidental legal questions, such as the effect of such a registration on the interference procedure of the Patent Office, the effect as a reduction to practice or as a reference against other applicants or against other patentees, and the relation of the registrations to the International Convention, could arise if the registered dedications are given any legal status other than that of a publication.

It could be said that this new proposal can be viewed as merely a short cut to avoid the filing of a complete patent application, fol-

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[2]E. B. Jackson, librarian, General Motors Research Laboratories, reported in Journal of SAE for June, 1963, p. 116. Stamford Research Institute report on long-range planning, Report No. 90 of February, 1961, entitled "Research and Development Industry."

lowed or accompanied by abandonment or complete disclaimer, a procedure which might arrive at the same legal result indirectly. In addition to the semantic and psychological differences, however, there are some difficulties involved in trying to follow this course under the terms of the existing patent statutes. It seems clear that no new or different principle of basic law is involved, however, and for this reason the proposal may not be highly controversial if it seems important enough for incorporating into the patent procedure or patent law. It is obvious that the formal dedication of a patentable invention would fail to serve the purpose of a patent in providing the special protection often needed for the sheltering of pioneer industrial activities. Save perhaps in the case of patents now assigned to the United States, the alternative provided by the suggested new procedure would not often be to dedicate *instead* of patenting, but rather to dedicate formally and in the most useful and efficient way from the standpoint of the national economy, or to let the patent right on the new discovery expire by default, usually with belated or inadequate public disclosure and no public record of irrevocable dedication.

STUDENT PAPER

By making available student papers, students will receive an incentive and our readers will appreciate the evidence of scholarly development in the fields of interest. These papers are carefully reviewed by the Editorial Committee and other specialists, and helpful suggestions are made to the students as part of the educational function of the *Journal*. The Foundation invites educational and research institutions to submit informative student manuscripts on the patent, trademark, copyright, and related systems.

Inventions—Inventor's or Employer's?

LAURENCE R. HEFTER*

* This paper was submitted in fulfillment of the requirements for Research in Patent, Trademark, and Copyright Law, a special graduate course conducted by Professorial Lecturer L. James Harris in The George Washington University Law School. Mr. Hefter is a registered patent agent and Assistant Patent Editor of *The George Washington Law Review*.

INTRODUCTION

A QUESTION WHICH IS FREQUENTLY LITIGATED and, consequently, one on which the law is quite involved and difficult to ascertain is "What is the status of rights to an invention where the invention is conceived and developed by an employee who is not contractually bound to assign his right, title and interest in the invention to his employer?" Today most major corporations require each employee involved in research and development, and associated fields, to sign a uniform, comprehensive assignment contract which establishes, or at least purports to establish, the respective rights of the employee and employer with regard to subsequent inventions.[1] However, many smaller companies, perhaps unaware of the well established rights of an employee who is not under contract to the fruits of his invention, do not have an established policy with regard to assignment contracts.[2]

With the hope of clarifying the present status of the law concerning the above stated problem and, perhaps, to enlighten those employers who are unaware of the precarious position they might currently

[1] Karl B. Lutz, *The Contract to Assign Inventions,* Practicing Law Institute, July, 1955 (a survey of corporate practices regarding such contracts).

[2] *Ibid.,* The survey indicated that 56.5 percent of the companies surveyed require employees to sign an invention agreement, and of these companies only 36 percent require all employees to sign such agreements.

be in, it is the purpose of this paper to consider the rights of an inventor-employee with particular emphasis placed on the proverbial "shop right" rule. It is not the purpose of this paper to examine the cases and authorities in depth but rather to communicate significant recognized rules and new trends.

Jurisdiction and Applicable Law

Without dwelling at length on jurisdictional matters,[3] it should be noted that disputes often arise as to whether a suit involving contest of title to patents or assertion of rights to practice under a patent should originate in federal or state courts.

With respect to patent matters, Congress has made the federal jurisdiction exclusive by enacting that jurisdiction of federal courts "shall be exclusive of the courts of the several states . . . of all cases arising under the patent-right or copyright laws of the United States."[4] The determinative phrase in the statute is "cases arising under" the patent-right laws for there is a distinction between a "case" arising under the patent laws and a "question" arising under those laws.[5] If a suit is founded directly on a breach of some right created by the patent laws,[6] the case arises under those laws and the federal courts have jurisdiction;[7] but if the suit is founded on some right derived from the common law, or by general equity jurisprudence, the case arises under state law and only a state court has jurisdiction.[8] Therefore, when title questions arise in conjunction with, or in defense of, an infringement suit, the federal courts may retain jurisdiction to adjudicate the title question[9] provided the infringement suit is not a mere sham. But when the issue is primarily one of title, there is no inherent federal jurisdiction[10] and the federal courts may entertain jurisdiction only if diversity of citizenship exists.[11]

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[3] For a detailed analysis of jurisdictional problems arising under actions involving patents, see 167 A.L.R. 1114 (1947).

[4] 28 U.S.C. 1338 (1948).

[5] Pratt v. Paris Gas Light & Coke Co., 168 U.S. 255 (1897).

[6] Title 35, United States Code (1958).

[7] Thimgan v. State, 251 N.W. 837 (1933); cert. denied 292 U.S. 656 (1934).

[8] A & C Engineering Co. v. Atherholt, 95 N.W. 2d 871, 121 U.S.P.Q. 235 (1959), cert. denied 361 U.S. 824 (1959).

[9] White v. Rankin, 144 U.S. 628 (1892); Victor Talking Mach. Co. v. The Fair, 123 F. 424 (7th Cir. 1903).

[10] The Dill Mfg. Co. v. Goff, 125 F. 2d 676 (6th Cir. 1942); cert. denied 317 U.S. 672 (1942); see also, Luckett v. Delpark, 270 U.S. 496 (1926) and the cases cited therein.

[11] Friedman v. Washburn Co., 145 F. 2d 715 (7th Cir. 1944); Eckert v. Braun,

A case founded on a principle of tort, contract, or equity law is a case arising under state law and, whichever court has jurisdiction by reason of the nature of the cause of action advanced by the plaintiff may decide such issues as arise incidentally to the decision. By virtue of the Supreme Court's decision in *Erie Railroad* v. *Tompkins*,[12] rights under a contract must be decided according to state law[13] even though the jurisdiction is lodged in a federal court.

The leading cases in the area involving the rights of an employer with respect to inventions conceived and developed by an employee have been decided by the United States Supreme Court[14] and, therefore, since state courts have almost uniformly followed these decisions, it is of small consequence whether suit is brought in federal or state courts. Similarly, where conflicts of law issues arise, the particular resolution of the problem is of no great consequence because of the coincidence of the several state laws.

Title to Inventions

It is well settled that title to an invention made by an employee during the course of his general employment remains in the employee, absent an agreement to the contrary.[15] There is, however, a very important, and often crucial, limitation to the general rule.

Ancillary circumstances which surround the employment relationship may create an obligation on the employee to assign inventions to his employer, even in the absence of an express agreement to assign. The Supreme Court in *Solomons* v. *United States*[16] stated that where one is specifically hired to invent, the results of his efforts expended in an inventive capacity are considered to be the consideration which was bargained for by the employer when entering into the contractual (employment) obligation[17] and "that which he has been employed and paid to accomplish becomes, when accomplished, the property of

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62 F. Supp. 264 (E.D. Wis. 1945), aff'd. 155 F. 2d 517 (1946); Universal Winding Co. v. Clarke, 108 F. Supp. 329 (D. Conn. 1952).

[12] 304 U.S. 64 (1938).

[13] Fremon v. W. A. Shaeffer Pen Co., 209 F. 2d 627 (8th Cir. 1954); see e.g. A&C Engineering Co. v. Atherholt, *op. cit., supra,* note 8; Universal Winding Co. v. Clarke, *op. cit., supra,* note 11.

[14] See discussions of specific problems *infra.*

[15] U.S. v. Dubilier Condenser Corp., 289 U.S. 178 (1933); Hapgood v. Hewitt, 119 U.S. 226 (1886). For more recent holdings to the same effect, see Cahill v. Regan, 165 N.Y.S. 2d 125 (App. Div. 1959); Marshall v. Colgate-Palmolive-Peet Co., 76 F. Supp. 378 (D. Del. 1948), aff'd. 175 F. 2d 215 (1949).

[16] 137 U.S. 342 (1890).

[17] In Fish v. Air-O-Fan Products Corp., 285 F. 2d 208 (9th Cir. 1960), the court,

his employer."[18] Furthermore, this limitation applies to the relationship existing at the time of discovery, and is not concluded by the original employment contract.[19]

While the general rule and its primary limitation are quite easy to state, their utilization requires a critical examination of the nature of and circumstances surrounding the employment.

Determining just how specifically the employee's duty to invent must be defined before an obligation to assign the results of his inventive employment arises, is a question that has been in gradual development for almost three-quarters of a century.

In *Solomons* v. *United States*[20] the Supreme Court said that the obligation to give an irrevocable license may be found when "one is employed to devise or perfect an instrument, or a means for accomplishing a prescribed result."[21]

Amplifying this doctrine, the same court, in *Dazell* v. *Dueber Watch Case Mfg. Co.*,[22] held that,

> "A manufacturing corporation, which has employed a skilled workman . . . to devote his time and services to devising and making improvements in articles there manufactured, is not entitled to a conveyance of patents obtained for inventions made by him while so employed, in the absence of an express agreement to that effect."[23]

Thus, as of 1900, the general rule could be stated that when one was employed to devise or perfect an article or process, the employee had title to the invention while the employer had a right to an irrevocable license to practice it. This doctrine was expanded in *Standard Parts Co.* v. *Peck*[24] where the Supreme Court held that if an employee is hired to *invent* or is given the task of devoting his efforts to a specific problem, title to the resulting invention should lie in the employer

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in answer to a defense that there was no adequate consideration to support an implied contract, held that if the consideration was adequate to support the employment contract as a whole, it was adequate to support an obligation to assign invention.

[18] *Op. cit., supra,* note 16 at 346. While this statement is really dictum, the Supreme Court in the later case of Standard Parts Co. v. Peck, 264 U.S. 52 (1924) adopted this statement as the controlling rule of law.

[19] Houghton v. U.S., 23 F. 2d 386 (4th Cir. 1928), cert. denied 277 U.S. 592 (1928).

[20] *Op. cit., supra,* note 16.

[21] *Ibid.,* p. 320, citing Hapgood v. Hewitt, *op. cit., supra,* note 15.

[22] 149 U.S. 315 (1893).

[23] *Ibid.,* p. 320, citing Hapgood v. Hewitt, *op. cit., supra,* note 15.

[24] *Op. cit., supra,* note 18.

and the employee must accordingly assign all rights thereto to his employer.[25]

The most recent high court decision concerned with this question is *United States* v. *Dubilier Condenser Corp.*[26] In that decision the court distinguished between two types of employment, (*1*) general employment, where an employee is entitled to retain title to his invention even though the employment "cover a field of labor and effort in the performance of which the employee conceived the invention" and (*2*) specific employment as discussed in the *Standard Parts* case.

In determining whether an employee has been employed to invent a particular device, a distinction must be drawn between "the inventive act, the birth of an idea" and the "embodiment" of that idea "in a mechanism or a physical or chemical aggregate."[27] This distinction, however, is often more academic than practical and, consequently, in cases where an employee was not hired to "invent" solely, but was hired to apply his intellect generally to the solution of technical problems, it is extremely difficult to predict the result of an adjudication.[28]

In specific situations, certain factors may exist which tend to favor either the employer or the employee. For example, where an employer has conceived a plan of invention and engaged in experiments to perfect it, the court has held that he is not to be deprived of the exclusive property in the perfected improvement by reason of suggestions from employees unless such suggestions rise to the level of invention.[29] Furthermore, a history of past assignments by the employee presents a rebuttable presumption of a contractual obligation to assign inventions to an employer.[30]

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[25] See e.g. Marshall v. Colgate-Palmolive-Peet Co., *op. cit., supra,* note 15; Salterini v. Schneider, 45 N.Y.S. 2d 645 (1943).

[26] *Op. cit., supra,* note 15 at 87.

[27] *Op. cit., supra,* note 15 at 188; see also Cahill v. Regan, *op. cit., supra,* note 15.

[28] As stated in B. F. Gladdings & Co. v. Scientific Anglers, 248 F. 2d 483 (6th Cir. 1957) at 485: "The mere creation of an employer-employee relationship does not per se cause any and all inventions, patents or trade secrets to belong to the employer. It must be shown that under the particular employment contract that that which is being claimed by the employer is the precise subject of the contract of employment such as for 'solving a defined problem' or to 'evolve a process or mechanism for meeting a specific need.'"

[29] Agawam v. Jordan, 74 U.S. 583 (1869); Milwaukee v. Activated Sludge, 69 F. 2d 577 (7th Cir. 1934), cert. denied 293 U.S. 576 (1934); Deforest v. Ownes, 49 F. 2d 826 (C.C.P.A. 1931); but see also DeLaski & Thropp C. W. Tire Co. v. William R. Thropp & Sons Co., 218 F. 458 (D. N.J. 1914), aff'd. 226 F. 941 (3rd Cir. 1915) where the court found a true joint invention, and Fersing v. Fast, 121 F. 2d 531 (C.C.P.A. 1941) where the court found the employee to be the true, sole inventor.

[30] Fish v. Air-O-Fan Products Corp., *op. cit., supra,* note 17; Magnetic Mfg. Co.

On behalf of the employee, continued refusals to assign inventions may be indicative of no obligation to do so[31] as are agreements to pay compensation.[32]

The above cases well point out the implications when no relevant, specific agreement between an employer and his employee exists as pertains to the rights to an invention. Because of the close interrelationship between the employer and employee during the initiation and development of an invention and because of the vast consequences arising from the determination of rights in the invention, the courts are torn between conflicting considerations. Incentive to invent and the need for investment in research and development are generally regarded as essential mainsprings of American industrial progress under the private competitive enterprise system. In attempting to balance these considerations, the distinction between employment to invent and employment to devise and perfect arose and a compromise known as a "shop right," between the rights of the inventor-employee and the employer evolved.

The Law of Shop Rights

The shop right is an equitable right,[33] created by the operation of law to compensate the employer for his contribution to the inventive process[34] and, yet, still properly and adequately compensate the inventor-employee for his inventive genius.

The shop right concept was positively espoused for the first time when *McClurg* v. *Kingsland*[35] was decided in 1843. The court held that a right in the nature of an irrevocable, royalty-free license in the employer to use an employee's invention arises when an invention is made at the expense of the employer, during the course of employment, coupled with the employee's consent to use of that invention by the employer in his shop.[36]

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v. Dings Magnetic Separator Co., 16 F. 2d 739 (7th Cir. 1926), cert. denied 274 U.S. 740 (1927); Bowers v. Woodman, 59 F. 2d 797 (D. Mass. 1932).

[31] Heywood-Wakefield Co. v. Small, 87 F. 2d 716 (1st Cir. 1937); Dysart v. Remington Rand, Inc., 40 F. Supp. 596 (D. Conn. 1941).

[32] Matarese v. Moore-McCormick Lines, Inc., 158 F. 2d 631 (2nd Cir. 1946).

[33] Gemco Engineering & Mfg. Co., Inc. v. Henderson, 84 N.E. 2d 596 (1949).

[34] Gate-Way, Inc. v. Hillgren, 82 F. Supp. 546 (S.D. Calif. 1949).

[35] 1 How. 202 (1843).

[36] A more recent, succinct definition of a shop right was announced by the Supreme Court in United States v. Dubilier Condenser Corp., *op. cit., supra,* note 15 at 188 where the court said: "Recognition of the nature of the act of invention also defines the limits of the so-called shop-right, which shortly stated, is that where a servant, during his hours of employment, working with his master's materials

INCEPTION OF THE SHOP RIGHTS RULE

When the question of title to an employee's invention is an issue, the nature of the employment (to invent or to devise or perfect) is the determining factor. The crucial factors in determining the rights of an employer to practice the invention are considerably different.

An examination of the decided cases indicates that the shop right privilege has been justified on three entirely different principles, legal, ethical and sociological.

Initially, the shop right rule was based solely on the doctrine of estoppel, the rationale being that the inventor-employee-patentee led his employer to believe that he would not insist on his right as a patentee to prevent the employer from making, using or vending the patented device.[37] If the employer, in reasonable reliance upon this "representation," incurred a detriment, all the elements of an equitable estoppel were present[38] resulting in the employer's right to make, use, or vend the invention, even absent express permission from the inventor.[39] But where an employee completely averted an estoppel situation, as when he continually made demands for an agreement providing compensation from the time the manufacture of the invention began in the employer's plant, the court held no element of estoppel existed, and this would have to be proved to invoke a shop right.[40]

In relatively recent cases, the courts seem more inclined to recognize the rights of employers and, consequently, have permitted the establishment of a shop right in the absence of some of the facts necessary to form the basis of a true estoppel.[41] While sometimes these cases

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and appliances, conceives and perfects an invention for which he obtains a patent, he must accord his master a non-exclusive right to practice the invention."

[37] See McClurg v. Kingsland, *op. cit., supra,* note 35; Solomons v. United States, *op. cit., supra,* note 16.

[38] The basic elements of the doctrine of estoppel are a knowledge that someone is infringing upon one's rights, silent acquiescence in such conduct, and reliance on the acquiescence to one's detriment where proper action could have prevented the injury.

[39] Gill v. United States, 160 U.S. 426 (1896); Tin Decorating Co. v. Metal Package Corp., 29 F. 2d 1006 (D. N.Y. 1928), aff'd. 37 F. 2d 5 (2nd Cir. 1930), cert. denied 281 U.S. 759 (1930).

[40] White Heat Products Co. v. Thomas, 109 A 685 (1920); see also, Toner v. Sobelman, 86 F. Supp. 369 (D. Pa. 1949); Aero Bolt & Screw Co. of Cal. v. Iaia, 5 Cal. Rpte. 53 (1960).

[41] See United States v. Dubilier Condenser Corp., *op. cit., supra,* note 15; Brown v. The L. V. Marks & Sons Co., 64 F. Supp. 352, 357 (E.D. Ky. 1946): "I can not conclude in the light of the Dubilier case that estoppel is longer an essential element in establishing shop rights. Frequently it is present, and must strengthen the case. . . ."

are based on an implied contract theory, a panoramic analysis indicates that the rationale is more closely allied to the doctrine that equity is unwilling to help the employee "bite the hand that fed him,"[42] and thus refuses to help him prevent his employer from practicing an invention conceived or developed in part with the employer's material or during hours for which the employee was accepting pay from the employer.

The third principle on which the shop right rule has been predicated is the practical consideration of harmonizing employer-employee relations by avoiding conflict there between which might be caused by the employee's claims of inventions or novel ideas conceived or developed during the regular course of work.[43]

Of course, when an express contract is available, a right analogous to a shop right may be created if the terms of the contract point in that direction. The Supreme Court, in *McAleer* v. *United States*[44] held that where such a contract has been duly executed, parol evidence is inadmissible to vary the contract terms.[45] Parenthetically, an express agreement may anticipate and prevent the formation of a shop right.[46]

Estoppel Doctrine

The shop right rule predicated on an estoppel basis requires as prerequisites (*1*) the development of an invention, (*2*) by an employee, (*3*) during his hours of employment, (*4*) working with his employer's material or at his employer's expense coupled with (*5*) acquiescence by the employee in the use of his invention by the employer.[47]

To begin with, a patentable invention must have been conceived and developed for the shop right rule to apply, because if the inven-

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[42] See the dissenting opinion by Judge Taft in Gemco Engineering Mfg. Co. v. Henderson, *op. cit., supra,* note 33.

[43] Kinkade v. New York Shipbuilding Corp., 122 A. 2d 360 (1956).

[44] 150 U.S. 424 (1893).

[45] See also, Gill v. United States, *op. cit., supra,* note 37; Consolidated Vultee Aircraft Corp. v. Garbell, 204 F. 2d 946 (9th Cir. 1953); Gate-Way, Inc. v. Hillgren, *op. cit., supra,* note 34.

[46] See: Deye v. Quality Engraving & Electrotype Co., 100 N.E. 2d 310, 317 (1950) rev'd. on other grounds 106 N.E. 2d 584 (1951) where court held: "It is entirely within the rights of an employer to contract away a 'shop right' which would arise under equitable principles if no agreement were made. An express agreement supersedes an implied right which would come into existence if the parties remained silent." Toner v. Sobelman, *op. cit., supra,* note 40; Gemco Engineering & Mfg. Co. v. Henderson, *op. cit., supra,* note 33.

[47] Bowers v. Woodman, 59 F. 2d 797 (D. Mass. 1932). See also, *Employer's Invention-Shop Right Rule,* 61 A.L.R. (2d) 356 (1958) for a collection of cases employing the estoppel doctrine.

tion could not be protected from utilization by others, the employer would have no prohibitions from use of the invention.[48] Next, an employer-employee relationship, or something akin thereto, must have been established before a shop right can arise.[49]

Furthermore, the invention must have been essentially created and reduced to practice during the hours of employment.[50] While incidental and secondary work performed during personal time and performed away from the place of employment will generally not negate the application of a shop right,[51] if the invention is actually the result of work performed during personal time and away from the place of employment, a shop right will not inure to the employer[52] even though the subject of the invention pertains to the employer's business.[53]

However, if the employer's financial resources are utilized to exploit the invention, whether the invention was completed prior to employment[54] or at home and at the employee's own expense,[55] a shop right may be found. But even this exception has exceptions where equity so requires. For example, in *Shearer* v. *United States,*[56] where an employee submitted his invention to his employer for testing purposes, the court did not find a shop right since the employer's facilities were only used to prove the operativeness of the invention. In *Texas Co.* v. *Gulf Refining Co.*[57] the court failed to invoke a shop right because the employer refused to acknowledge the employee as the inventor. Similarly, where an employer flatly rejected the invention as being valueless, the court refused to apply the shop right rule.[58]

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[48] Jasper Silva Costa, *Law of Inventing in Employment,* Central Book Co., Inc. (1953) p. 13.

[49] Crom v. Cement Gun Co., 46 F. Supp. 403 (D. Del. 1942); Fort Wayne, C. & L. R. Co. v. Haberkorn, 44 N.E. 322 (1896); but cf. Gate-Way, Inc. v. Hillgren, *op. cit., supra,* note 34.

[50] United States v. Dubilier Condenser Corp., *supra,* note 15; Solomons v. United States, *op. cit., supra,* note 16.

[51] Wiegand v. Dover Mfg. Co., 292 F. 255 (N.D. Ohio 1923).

[52] Gemco Engineering & Mfg. Co., Inc. v. Henderson, *op. cit., supra,* note 33; Heywood-Wakefield Co. v. Small, 87 F. 2d 716 (1st Cir. 1937), cert. denied 301 U.S. 698 (1937).

[53] Banner Metals Inc. v. Lockwood, 3 Cal. Rptr. 421 (1960).

[54] Consolidated Vultee Aircraft Corp. v. Garbell, *op. cit., supra,* note 55. DeJur-Amsco Corp. v. Fogle, 119 F. Supp. 262 (D. N.J. 1954).

[55] Dovel v. Sloss Sheffield Steel & Iron Co., 139 F. 2d 36 (5th Cir. 1943); Gill v. United States, *op. cit., supra,* note 39; Wiegand v. Dover Mfg. Co., 292 F. 255 (N.D. Ohio 1923).

[56] 87 Ct. Cl. 40 (1938).

[57] 26 F. 2d 394 (5th Cir. 1928).

[58] J. A. Migel, Inc. v. Bachofen, 126 A. 396 (N.J. 1924); Consolidated Vultee Aircraft Corp. v. Garbell, *op. cit., supra,* note 45.

The fourth requisite, which is closely allied to the last discussed requisite, is the use of an employer's materials, equipment, other employees or time.[59] It is not the value of the employer's contribution that is critical[60] but just the fact that the contribution is directly related to the invention.[61]

The last, and perhaps most important requisite where the estoppel doctrine is relied upon is acquiescence by the employee. The acquiescence, or consent may be explicit,[62] implied from surrounding facts and circumstances[63] and even implied from a failure to take proper steps to preserve all rights to the invention.

Equitable or Implied Contract Doctrine

The application of the shop right rule to settle disputes by use of the equitable or implied contract doctrine requires the establishment of the same requisites as those required under the estoppel doctrine[64] with the exception of acquiescence by the employee.[65] Obviously, by having to prove one less factor, and that factor being one difficult to prove, the burden on the employer to establish a right in the employee's invention is considerably diminished where the equitable doctrine is used.

While the estoppel doctrine and equitable doctrine have been discussed above individually and while they basically differ in that the former requires the element of consent while the latter does not, in most situations, if the other elements are present, the element of consent, either actual or implied, is present and, thus, the requisite elements of both doctrines can be found. Courts frequently employ the

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[59] United States v. Dubilier Condenser Corp., *supra,* note 15; Gill v. United States, *op. cit., supra,* note 39; Lane & Bodley Co. v. Locke, 150 U.S. 193 (1893); Leon Mfg. Corp. v. Chicago Flexible Shaft Co., 106 F. 2d 930 (7th Cir. 1939).

[60] Callahan v. Capron Co., 280 F. 254 (D. R.I. 1922); Jencks v. Langdon Mills, 27 F. 622 (D. N.H. 1886). See also Aero Bolt & Screw Co. v. Iara, *op. cit., supra,* note 40, where court found employer's contribution too menial to justify a shop right.

[61] Fort Wayne, C. &. L. R. Co. v. Haberkorn, *op. cit., supra,* note 49.

[62] Solomons v. United States, *op. cit., supra,* note 16.

[63] Wilson v. American Circular Loom Co., 187 F. 840 (1st Cir. 1911); Boston v. Allen, 91 F. 248 (1st Cir. 1898). For a more detailed discussion and bibliography of cases, see *Employee's Invention-Shop Right Rule, op. cit., supra,* note 47 and *Law of Invention in Employment, op. cit., supra,* note 48 at 10-18.

[64] See Massie v. Fruit Growers' Express Co., 31 F. 2d 463 (D. Del. 1929).

[65] Brown v. The L. V. Marks & Sons Co., *op. cit., supra,* note 41; United States v. Dubilier Condenser Corp., *op. cit., supra,* note 15. See also: Grip Nut Co. v. Sharp, 150 F. 2d 192 (7th Cir. 1945); Deye v. Quality Engraving & Electrotype Co., *op. cit., supra,* note 46.

shop right rule without specifying upon which theory the remedy is based.[66] However, from the tenor of the more recent decisions, it seems that the equitable or implied contract theory has become the predominant doctrine. Therefore, while the existence of the element of consent may facilitate the courts' finding a shop right, the absence of such element will not preclude the same result.

Nature of a Shop Right

Assuming the necessary factors for establishing a shop right have been shown to exist and, consequently, a shop right inures to the employer, it is important to explore the nature of such a right. The courts have not clearly defined and limited the nature of the employer's right but instead, as could be well expected because of the equitable nature of the shop right, merely apply the rule to the facts of a particular case.

Of little doubt is the rule that an employer is under no obligation, legal or ethical, to compensate his employee for use of the invention once a shop right inures to him.[67]

It is also well established that, under the shop right rule, the employer acquires merely a non-exclusive license to use the employee's invention[68] as contrasted with the exclusive rights enjoyed by a patentee. The only two cases[69] *Deane* v. *Hodge* and *Eustis Mfg. Co.* v. *Eustis* which hold contra to the rule that a shop right is a royalty-free, non-exclusive license were both adjudicated prior to the turn of the century and, considering the vast amount of authority subsequent to these cases, it appears safe to assume that these cases no longer have persuasive precedent value.

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[66] See e.g. Lukens Steel Co. v. American Locomotive Co., 197 F. 2d 939 (2nd Cir. 1952); Farrand Optical Co., Inc. v. United States, 175 F. Supp. 230 (S.D.N.Y. 1959). A member of the Editorial Committee commented that the Lukens case "did not involve shop right at all since the inventor was in the employ of a different company from the company which used the invention and, if the court 'applied the shop right rule' to this situation, the unorthodox factual background becomes the point of interest.

[67] Gill v. United States, *op. cit., supra,* note 39; Toner v. Sobelman, *op. cit., supra,* note 40; Barry v. Crane Bros. Mfg. Co., 22 F. 396 (N.D. Ill. 1884); Deye v. Quality Engraving & Electrotype Co., *op. cit., supra,* note 46. The only case which holds contra is Deane v. Hodge, 27 N.W. 917 (1886).

[68] See e.g. United States, v. Dubilier Condenser Corp., *op. cit., supra,* note 15; Marshall v. Colgate-Palmolive-Peet Co., *op. cit., supra,* note 15; National Development Co. v. Gray, 55 N.E. 2d 783 (1944). For the only case holding contra see, Eustis Mfg. Co. v. Eustis, 27 A. 439 (1893).

[69] *Op. cit., supra,* notes 67 and 68.

The question of assignability of a shop right is equally well settled. The privileges under a shop right do not include the right to assign.[70] The Supreme Court, in the *Hapgood* case,[71] held that whatever right the employer had to the invention via the shop right rule it was a naked license to make and sell the device as part of its business and was only a personal right which was not transferable.

However, while not being assignable, a shop right may pass to a successor in business of the original recipient of the right.[72] The rationale behind this "successor exception" to the non-assignable rule was aptly expressed in *Wilson* v. *J. G. Wilson Corp.*[73] where the court said that the rights to practice under the employee's patent "are no less essential to the successor corporation's operation of its business than they were to the original company" and it would effectively be fraudulent to allow the original company to sell and dispose of its assets, which included these rights, and then negate the shop rights.

The furthest extension of the "successor exception" to date was the case of *Papazian* v. *American Steel & Wire Co.*[74] where the court permitted a shop right which was established by a wholly owned subsidiary to inure to the benefit of the parent company.

While it has not often been adjudicated, those cases in which the issue has been raised unanimously hold that the duration of a shop right is "coextensive with the life of the patents and with the needs of (employer's) business"[75] and is not limited to the duration of the inventing employee's employment.[76] This is not to indicate, however, that a shop right cannot be limited by an agreement to that effect, express or implied. For in *Beecraft & Blackman* v. *Rooney*[77] where an employee-patentee wrote his employer a letter before the latter had made any substantial expenditures to the effect that the employer should have a shop right for only so long as he continued in the em-

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[70] Hapgood v. Hewitt, *op. cit., supra,* note 15; Gate-Way, Inc. v. Hillgren, *op. cit., supra,* note 34; Neon Signal Devices v. Alpha-Claude Neon Corp., 54 F. 2d 793 (D. Pa. 1931).

[71] *Op. cit., supra,* note 15.

[72] Lane & Bodley Co. v. Locke, *op. cit., supra,* note 59; Neon Signal Devices v. Alpha-Claude Neon Corp., *op. cit., supra,* note 70; McKinnon Chain Co. v. American Chain Co., 259 F. 873 (D. Pa. 1919).

[73] 241 F. 494 (D. Va. 1917).

[74] 155 F. Supp. 111 (N.D. Ohio 1957).

[75] Wiegand v. Dover Mfg. Co., 292 F. 255, 261 (N.D. Ohio 1923); Withington-Cooley Co. v. Kinney, 68 F. 500 (6th Cir. Mich. 1895).

[76] H. F. Walliser & Co. v. F. W. Maurer & Sons Co., 17 F. 2d 122 (E.D. Pa. 1927); Barber v. National Carbon Co., 129 F. 370 (6th Cir. 1904); Re Slommer, 98 Am. Dec. 248 (1868).

[77] 268 F. 545 (S.D.N.Y. 1920), rev'd on other grounds, 280 F. 543 (1922).

ployer's service and the employer never dissented from this assertion of limited shop rights, the court so limited the duration of the shop right.

Scope of a Shop Right

In determining the scope of a shop right, the courts seem unanimous in considering such factors as "the nature of the employer's business, the character of the invention involved, the circumstances which created it and the relation, conduct and intention of the parties."[78] But in considering these factors, the liberality with which the courts determine the metes and bounds of the shop right has increased with time.

A number of earlier cases expressed the view that where the shop right related to a patented machine, the employer's license was limited to machines which were manufactured for use prior to the termination of the inventor's employment.[79]

Courts using this limitation seem to lose sight of the difference between *invention* and *production,* for while production can be considered in terms of specific articles, invention is a metaphysical concept dealing with the development of an idea and, consequently, can not be limited to specific articles. The shop right concerns the right to use an employee's *invention,* not the items he has produced.

The conservative interpretation of the scope of a shop right as illustrated above, while not expressly overruled, has given way to a more liberal application as expressed in *Tin Decorating Co.* v. *Metal Package Corp.*:[80] "(*A*) shop right or an implied license is coextensive in scope with its (the employer's) legitimate business requirements."[81] The courts now allow the employer to replace expired parts of ma-

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[78] Flannery Bolt Co. v. Flannery, 86 F. 2d 43, 44 (3rd Cir. 1936), cert. denied 309 U.S. 671 (1940). For a complete bibliography of cases see *Employee's Invention-Shop Right Rule, op. cit., supra,* note 63 at 411.

[79] Boston v. Allen, *op. cit., supra,* note 63 (implied license to use gangway on one ferry did not permit their use, some years later, on another ferry); Wade v. Metcalf, 16 F. 130 (C.C. Mass. 1883) (limited to specific machines already made); Barry v. Crane Bros. Mfg. Co., 22 F. 396 (C.C. Ill. 1884) (license enforceable as long as original tools lasted).

[80] 29 F. 2d 1006 (S.D.N.Y. 1928), aff'd. 37 F. 2d 5 (2nd Cir. 1930), cert. denied 281 U.S. 759 (1930).

[81] *Ibid.,* at 1007. See also: United States v. Dubilier Condenser Corp., *op. cit., supra,* note 15; Solomon v. United States, *op. cit., supra,* note 16; Thompson v. American Tobacco Co., 174 F. 2d 773 (4th Cir. N.C. 1949); Wiegand v. Dover Mfg. Co., *op. cit., supra,* note 75.

chines,[82] make and use additional machines[83] and even make and use the first machine where the shop right relates to a designed but not as yet constructed machine.[84] Articles made for the employer by a third party have even been protected under the liberal view[85] on the ground that if the article is made strictly for the employer, there is no difference if the employer makes it himself.

With regard to the sale of patented articles, a distinction is drawn between an employer whose business it is, and has been, to sell the articles and an employer who normally does not engage in selling. In *Withington Cooley Mfg. Co.* v. *Kinney*,[86] a manufacturer and seller of power presses was allowed to supply machines to the trade without payment of a royalty to the inventor-employee, and, similarly, in *Flannery Bolt Co.* v. *Flannery*,[87] the court said the only use of a shop right to an employer who manufactures articles for sale is the right to sell the articles once produced.

On the other hand, where employees of a railway company invented certain lubricating devices the court allowed the company a shop right to use the invention but not to sell to others.[88]

While the distinction between conservative and liberal views existed with regard to machines, even the earlier, conservative cases held that a shop right on processes was limited in duration only to the term of the patent.[89]

The liberality of the courts has also increased with regard to the place at which the shop right can be exercised. The earlier, conservative view was that the right could only be exercised at the place where the invention is made,[90] the right being considered as being applicable only at the place where the use is contemplated.[91]

In view of the *Schmidt* v. *Central Foundry Co.*[92] case protecting

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[82] Barber v. National Carbon Co., *op. cit., supra,* note 76.

[83] McKinnon Chain Co. v. American Chain Co., *op. cit., supra,* note 72.

[84] H. F. Walliser & Co. v. F. W. Maurer & Sons Co., 17 F. 2d 122 (D. Pa. 1927).

[85] Schmidt v. Central Foundry Co., 218 F. 466 (D. N.J. 1914), aff'd. 229 F. 157 (1916).

[86] *Op. cit., supra,* note 75.

[87] *Op. cit., supra,* note 78.

[88] Imperial Supply Co. v. Grand Trunk R. Co., 7 D.L.R. 504 (1912 P.E.I.).

[89] Wiegand v. Dover Mfg. Co., *op. cit., supra,* note 75; Texas Co. v. Gulf Refining Co., *op. cit., supra,* note 57.

[90] M. J. Lewis Products Co. v. Lewis, 57 F. 2d 886 (E.D. Pa. 1931); Rowell v. Rowell, 99 N.W. 473 (1904).

[91] Boston v. Allen, *op. cit., supra,* note 63; Brickill v. The Mayor of New York, 7 F. 479 (S.D.N.Y. 1880).

[92] *Op. cit., supra,* note 85.

articles made for an employer by a third person and in view of the *Papazian* case[93] permitting the shop right to inure to the benefit of a parent company when the right originally arose in favor of a subsidiary, it appears that the shop right now can be extended to plants of the employer other than that in which the invention was developed. No cases have been found stating differently.

Conclusion

Considering the great number of cases[94] in which the question of title of an employee's invention is of primary concern, employers would be well advised to establish and closely follow a procedure whereby employees, especially those where the chance of invention is relatively good, specifically assign all rights to future inventions dealing with any product or business in which the employer is engaged. Employers should not take solace, to a point of unconcern, because the earlier judicial conservatism in finding title to an invention in the employer has been relaxed. The courts have faded slowly away from insistence upon a showing that the employee was hired to invent a particular device. Proof that an employee is of the class where inventions can be considered as expected or common would perhaps be sufficient to rest title in the employer. But if the nature of employment is too general or such that the probability of invention is not very high, the courts will probably leave title in the inventor.

As with the title question, the courts have recently become more favorably disposed towards finding a shop right in the employer. The switch away from the estoppel doctrine to the equitable or implied contract doctrine reduces the burden on the employer who is attempting to establish a shop right. However, because the shop right rule is a rule of equity, the tests and practices that have evolved through the years will not be permitted to produce injustice. Therefore, when evaluating the possible results of an adjudication, one should not only look for the individual requisites needed to prove a shop right, he should look at the over all picture as a unit to predict what an "equitable" finding is likely to be. The shop right rule is very flexible and the court can stretch it and use it as it sees fit to resolve the problem equitably.

One should also not overvalue the worth of a shop right. While it

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[93] *Op. cit., supra,* note 74.

[94] Note the number of cases cited in this paper, and this paper does not contain an exhaustive case bibliography.

is quite valuable as compared to no right at all (with a shop right, an employer has a royalty-free, right of use which is coextensive with the life of the patent), its value can not compare to the value of owning title in the invention. Without title, one can not control the invention, one can not prevent others from using it and one can not license another to practice under it. These factors additionally point up the need for a strong employee invention-assignment contract policy.

Legal Protection of Know-How*

STEPHEN P. LADAS**

KNOW-HOW IS A SUBJECT OF INCREASING IMPORTANCE in international agreements and international investment. The subject matter designated by it has come to be the handmaid of progress and the core of industrial competition. Efficiency of production, effective pricing, superior quality standards, are based on know-how. The success of an industry in the competitive market depends on its being able to develop know-how by research of its own or its ability to obtain the benefits of know-how developed by others. New inventions permit an industry to make a leap but these have to be set in a broader technological framework and supplemented by the practical procedures which will make them workable particularly by resolving the cost problem. Know-how has also assumed an aura of fascination for newly developing countries which see in it a mystical factor which may resolve or bridge over the difficult initial steps of technical and economic development.

In international trade, know-how may be involved in various forms. It may be part of an agreement relating to patents, designs or trademarks, and may be secondary to those rights or, on the contrary, these may be mere appendages to the principal grant of know-how. Or know-how may be the sole subject matter of a license agreement. Finally, know-how may be in a package deal of a construction or engineering contract under which a firm undertakes to erect a plant and supply the know-how for the construction and operation of the plant.

Newly developing countries, because of their general lack of traditional techniques and skills and inability to invest in local research, depend even more heavily on foreign know-how. Indeed, in such countries, it is not the local industrialists or inventors who are the prime movers but rather the Governments who see the political future of their country in industrialization and are pushing their citizens along the road of progress. In such cases, know-how agreements replace even patent agreements since foreign patentees do not generally take out patents in under-developed countries in view of the lack of local industry that may use the inventions covered by the patents.

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In connection with all these types of agreements involving know-how, several legal problems arise, such as: the propriety and adequacy of clauses seeking to protect the licensor's know-how; their legal enforceability and the kind of remedies available not only against licensees but also against third parties; tax problems on the royalties or other compensation payable by the licensee in the country of the payee and in the receiving country; and finally, antitrust law problems with respect to restrictive clauses included in the agreement. These problems depend largely on the question of the legal nature of the right in know-how.

Some of the difficulties in dealing with this basic question stem from the absence of precise definition of the expression "know-how." While this is a convenient term to denote a variety of different matters, it does not define protectable subject matter. Indeed, in ordinary use know-how may include tangible materials: recipes, formulae, designs, drawings, patterns, blueprints, technical records, specifications, lists of materials, technical product and process manuals, written instructions for operating the process and analytical means for checking and controlling the product and the process and the like; and intangible information consisting in practical procedures, details of workshop practice, technical training, personal visitation and inspection, etc. It also may include singly or in combination:

> information relating to a patented invention not included in a patent specification;
> inventions capable of being patented but not patented;
> inventions incapable of being patented in a particular country because of the subject matter being excluded in the patent law;
> inventions incapable of being patented by reason of lack of inventive height;
> industrial designs capable of being registered but not registered;
> industrial designs having functional characteristics;
> skill, experience and craftsmanship of technicians.

The element of secrecy may not be indispensable as to all of the subject matter involved, yet the possessor of the know-how, the subject of a grant, must want to preserve it against unauthorized publication. Nor is the element of "exclusiveness" indispensable since more than one person may develop the same know-how, and if each of them preserves it from publication, each of them may have a right to his creation.

Because of these differences and the indefiniteness of the term "know-how", agreements often avoid the use of such term or use it subsidiarily and instead employ terms describing and defining the subject matter of the grant more specifically, such as secret or technical information, manufacturing processes, or knowledge relative to the

use and application of the industrial technique required for the establishment and operation of a particular plant or the production of the subject matter of the agreement.

II

The question of the legal nature of the right in know-how usually proceeds with the query whether in the particular country this is recognized as a property right or not. The answer to this requires a definition of the word "property" which raises difficult problems under the law of various countries. In countries with a codified civil law, there is a definite classification of "property" rights and the only class available for know-how would be that of "intangible rights".[1] But there has been no thoroughgoing legal analysis of this right in know-how so as to distinguish the various types of relationships involved and give it an orderly pattern. There is a recognition that know-how can be sold, licensed, assigned, taxed, subjected to levy, exchanged for stock in a corporation, etc., but no conscious attempt on the part of writers or the Courts to resolve all problems created by dealings with know-how.[2]

There has been a tendency to dodge the issue by pointing out that there is always the contract which is law between the parties and that any violation of undertakings under the contract with respect to know-how may be reached by an action under the contract. This, however, leaves out the whole aspect of protection against third parties: employees and competitors who may obtain unauthorized disclosure of know-how and use it without the owner's consent, and does not dispose of the necessity to supplement the absence of a contract by reference to other law.

In common law countries, the concept of property is more flexible and the Courts have granted protection by reference to rules of law or equity in all cases of inequitable or unfair conduct. As Justice Holmes was able to say in *DuPont Powder Co. v. Masland* (1917) 244 U. S. 100:

> "The word 'property' as applied to trade secrets is an unanalyzed expression of certain secondary consequences of the primary fact that the law makes some rudimentary requirements of good faith."

The British Courts also have avoided the question of definition. The Master of the Rolls, Lord Greene, in *Saltman Engineering Co.*

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[1]Roubier, *Le Droit de la Propriete Industrielle,* p. 372.

[2]Nash, "The Concept of Property in Know-How," *PTC J. Res. & Ed.,* Vol. 6, No. 2 (Summer 1962), pp. 289, 294, 295.

v. Campbell Engineering Company (1948) 65 R.P.C. 203, 213, held that:

> "Even if Mr. Ransom did not make a contract with the defendants, it does not alter the fact that the confidential drawings handed to the defendants for the purpose of executing the order placed with them were the property of Saltman Engineering Co., and the defendants knew that."

and stated the general principle as follows:

> "If a defendant is proven to have used confidential information directly or indirectly obtained from the plaintiff, without the consent, expressed or implied, of the plaintiff, he will be guilty of an infringement of the plaintiff's rights."

Most interesting in connection with the nature of know-how are the statements of Lord Radcliffe in *Rolls-Royce Ltd. v. Jeffrey*.[3] He said that the case involved first "the nature of this asset of the appellants which is conveniently comprehended in the word 'know-how' ", and continued:

> "I see no objection to describing this as an asset. It is intangible, but then so is goodwill. . .It is a reality when associated with production and development as that of Rolls-Royce, and a large part, though not the whole of it, finds its material record in all those lists, drawings, and manufacturing and engineering data that are specified in the various license agreements. . . . An asset of this kind is, I am afraid, that I must use the phrase, sui generis. It is not easily compared with factory or office buildings, warehouses, plant and machinery, or such independent legal rights as patents, copyrights or trademarks, or even with goodwill. 'Know-how' is an ambiance that pervades a highly specialized production organization and, although I think it correct to describe it as fixed capital so long as the manufacturer retains it for his own productive purposes and expresses its value in his products, one must realize that in so describing it, one is proceeding by an analogy which can easily break down owing to the inherent differences that separate 'know-how' from the more straightforward elements of fixed capital. . . . Know-how has the peculiar quality that it can be communicated to or shared with others outside the manufacturer's own business, without in any sense destroying its value to him."

It is submitted that it may be advisable to look closely into the genesis of know-how and its development, in the most usual cases. We have really two situations:

> (*a*) An invention is made and application is filed for a patent. This necessarily must be filed as quickly as it is completed so that it may not be anticipated by another inventor working in the same field. So far as the requirements of the patent law are concerned, the disclosure may be complete. The public is advised as to what the invention is and the process or method of manufacture is fully disclosed. But after the ap-

[3] (1962) 1 All E.R. 801, 805.

plication is filed, the inventor must still work out practical details of workshop technique so that the invented process or product may be manufactured at the least possible cost. Indeed, the cost of manufacture is an important consideration of any new invention. If the making of the product is too expensive, or if the new process cannot be fitted into existing machinery or tooling, the invention may be impractical. The manufacturer or inventor works these details out and it may take years before these may be fully developed. These details are not patentable, because they are not inventions; they are merely improvements of workshop technique. Competing manufacturers working in the same field of research are able to absorb the invention immediately, and all they may need is a license under the patent. But other competing manufacturers cannot by themselves work out these details except by research which takes time and expense, and therefore, they are anxious to acquire the knowledge of these details, i.e., the know-how. There may not be holding back of information which should have been disclosed in the patent application because these details are not patentable and they are not even known to the inventor at the time of filing the application.

(*b*) On the other hand, research is a continuous process of improvement of technology step by step. There may be nothing in these improvements which is patentable because there is nothing that can be deemed as real invention, i.e., an advance in the art which is not obvious to a person having ordinary skill in such art. The improvement may consist in adjusting machinery or tooling, in using a certain type of metal rather than another, the laying out of a plant, the siting of the various types of equipment, the layout of the valve system, and the use of one known chemical rather than another. Each of these data may be in the public domain, but their combined effect is what does the trick. It may take research of many years and considerable investment to work out all these improvements step by step, but no patent can be obtained on them, because they are not patentable inventions. If they were patentable, the manufacturer would rather take a patent and be protected by the patent law rather than rely on the uncertainties of know-how protection, or take the risk that the same know-how may be developed by others or may be published. A competing manufacturer making similar research and spending time and money can work out the same technological improvements but it is economically advantageous to them to acquire such know-how from one who developed it rather than remain behind in the technological progress.

III

Thus, know-how appears to be essentially a supplement to patented or patentable inventions or a variety of technical achievements in the process by which industry seeks to gain a competitive position in the market place. It follows that the legal relationship between the person coming into the original possession of know-how and other persons in privity or without privity to the former is of the same nature as the relationship with governs the owner of a patent or design or trademark and other persons. Law has grown out of relation-

ships and there is a relationship of competitors in the market place whether the subject matter is patents, designs, trademarks or know-how.

In this relationship we are seeking to recognize, reconcile and satisfy competing interests, claims and demands. An attempt has been made elsewhere to recognize and identify these in the legal ordering involved in patent law, design law and trademark law.[4] With regard to know-how, we recognize the following competing interests, claims and demands:

> (*a*) The interests, demands and claims of an enterprise which by costly research and experiment has developed information, inventions, skills and knowledge, i.e., know-how, that gives to such enterprise an advantageous competitive position in the market place. This is a valuable business asset for the acquisition of which other enterprises are willing to pay a price and the unauthorized disclosure or misuse by others would inflict a serious damage to the originating enterprise.
>
> (b) The interests, demands and claims of competing enterprises which desire to obtain the benefit of know-how developed by others as an effective instrument for the promotion of their interests. They are looking out for the publication of any information on such know-how and desire to enter into agreements to obtain communication of know-how maintained in secrecy.
>
> (*c*) The interests and claims of the community in the widest possible intercommunication of know-how by enterprises and the resulting high quality standards and low cost of goods, and in the avoidance of undue or excessive restraints between those competing in the market place.
>
> (*d*) The interests of the social and legal order of the country concerned which would be fatally injured if the spirit of invention and creation and the investment in research and development of know-how was to be discouraged, and if it would be permitted to enterprises to engage in unlawful competition and unauthorized use of secret know-how of others, or in the disinclination to share technical knowledge and skills.

The competitive relationships involving these interests, claims and demands are the same whether we are dealing with national or international markets.

There is a need for a legal control by which we recognize, reconcile and satisfy all these interests, claims and demands, just as we need similar legal control in the relationship involved in patents, designs and trademarks. In connection with patents, such legal control is exercised by the statutory law on patents which defines patentable inventions, the requirements of patentability and novelty, the conditions for applying for a patent wherein particularly a full disclosure of the subject matter is required, the rights and obliga-

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[4]See Ladas, "Industrial Property and Economic Development," *The Trademark Reporter* (1955) Vol. 45, p. 615.

tions of the patentee, the term of the patent, etc. Analogous is the situation with respect to the Design Law and Trademark Law.

With respect to the know-how, there is generally no specific all-embracing Statute which attempts to define and regulate the competitive relationship, analogous to the patent, design or trademark legislation, but one may be permitted to inquire whether such detailed Statute is really necessary if other general legislation applicable to know-how does in fact recognize, reconcile or satisfy the competitor relationship involved, and if the Courts have in fact defined and circumscribed the right by the remedies granted. We have in most countries in the world a law of unfair competition which generally is not a full statutory law. Most often this law has been fashioned as a full-bodied law by the Courts on the basis of a single provision in the Civil Code or of a general principle formulated by a succession of Court decisions. Yet we have a quite clearly established legal ordering of the conflicting interests, claims and demands of competitors in the market place through this type of unfair competition law.

It is precisely the same thing that appears to be the case in respect to the right in know-how. A review of the law of a number of countries is revealing.[5]

First, we have the German Law of 1909 against Unfair Competition which outlaws generally, in its first section, competitive conduct contrary to honest practices, and specifies and prohibits in subsequent sections various acts of unfair competition, such as acts causing confusion of the public, deceptive and unfair advertising, discrediting of competitors, interference with contracts, etc. Then in Sections 17-19, it prohibits unauthorized disclosure and misuse of business or manufacturing secrets. These Sections read as follows:

> *"Section 17*
>
> (*1*) An employee, worker or apprentice of a firm who unlawfully imparts a business or manufacturing secret entrusted or made accessible to him by reason of his employment relationship to anyone during the term of service for the purpose of competition or for personal gain or with the intention of damaging the owner of the firm, will be liable to imprisonment of up to three years and to a fine, or to either.
>
> (*2*) Anyone making use for purposes of competition or personal gain of a trade or manufacturing secret or imparting the same to third parties, knowledge of which he obtained through the means described

[5]The writer's attention was called, after this paper was completed, to the article by Mr. Van Notten, "Know-How Licensing in the Common Market" (1963) 38 *N. Y. U. Law Review*, pp. 525, 541 ff.

in paragraph (*1*) or through conduct of his own contrary to the law or contra bonos mores, will be punished in the same manner.

(*3*) If, when imparting the said information, the perpetrator knows that use is to be made of the secret in foreign countries, or if he himself makes use of it in foreign countries, he may render himself liable to imprisonment up to five years.

(*4*) The provisions of paragraphs (*1*) to (*3*) also apply in cases where the person receiving the information is already familiar with the secret or is entitled to know it, without the perpetrator being aware of this fact.

Section 18

Anyone unlawfully making use of or imparting to third parties for the purpose of competition or personal gain any designs or instructions of a technical nature confided to him in the course of his business dealings, particularly drawings, models, stencils, cuttings and formulae, is punishable with imprisonment up to two years and with a fine, or one of these two measures.
Section 17, par. 4, applies equally.

Section 19

Acts contrary to the provisions contained in Sections 17 and 18 entail liability for the resulting damages. Where several persons are involved in such an infringement, there is a joint liability."

Thus, the German Act deals with the following relationships in respect to know-how:

(*a*) the relationship between the owner of know-how and his employees;

(*b*) the relationship between the owner of know-how and a competitor to whom the employee makes an unauthorized disclosure of the know-how;

(*c*) the relationship between the owner of know-how and a competitor who, through any conduct contrary to law or to good morals, obtains knowledge of the know-how;

(*d*) the relationship of the owner of know-how and a person who obtains confidential communication of such know-how and proceeds to use it without the authorization of the owner;

(e) any other relationship or situation involving unauthorized use or misuse of know-how would also come under the general principle of the first section of the Act of 1909 which condemns and prohibits any act contrary to honest practices.

In all these cases, the owner has a right to sue for damages under Section 19 and may also file criminal complaint under Sections 17 and 18. He may also obtain an injunction against such unauthorized use or threatened misuse of his know-how under the general provisions of the German law. It is highly significant that Germany had dealt with the relationships involved in know-how under the general provisions of the Unfair Competition Act. Indeed, the German Supreme Court (Bundesgericht) in a decision in 1951 (17 B.G.H. 2 p.

42) has placed the whole subject of know-how squarely under the general principles of unfair competition. It stated:

> "With respect to so-called secret processes and other commercial or manufacturing secrets, the protection involved is in accordance with the general provisions of the Civil Code and the law against unfair competition. Secrecy is protected by the right to unrestricted exercise of commercial activity (Section 823, par. 1, and Section 826 of the Civil Code, and Arts. 1, 17 and 18 of the Act against Unfair Competition). Under these articles a petition, by application of Section 1004 BGB for injunction of unauthorized use is available against the person to whom the licensor has entrusted a commercial secret in business relationship. If, under manufacturing arrangements, the licensor communicates to the licensee process instructions based on commercial secrets, this constitutes entrusting of technical instructions in the meaning of Art. 18 of the Act against Unfair Competition."

Next, it should be noted that similar legislative handling of the competitive relationships in know-how is made in other countries. Indeed, provisions analogous to those of the German Unfair Competition Act exist in the Austrian Act against Unfair Competition of 1923, Sections 11 and 12; the Norwegian Law of July 7, 1922, Section 11; the Danish Law of March 29, 1924, Section 11; and the Swedish Law of May 29, 1931, Sections 3-5.

Belgium has a special Arrêté Royal of December 23, 1934 which provides in Article 2 for a summary remedy by the President of the Tribunal, akin to an injunction, in certain cases of unfair competition, and these cases specifically include "the unauthorized use of models, specimens, technical combinations and formulae of a competitor and generally of all information or documents entrusted to another." Here again, misuse or unauthorized use of know-how is dealt with by analogy to other acts of unfair competition. This is in addition to the action for damages available under the broad provision of Article 1382 of the Civil Code which is the foundation of all law of unfair competition.

In other civil law countries, such as France, Italy and the Netherlands, the basis of protection of know-how is also unfair competition law,[6] as the foundation of all law of industrial property to which know-how is generally assimilated. Know-how is deemed a combination of things organized toward an industrial purpose which constitutes a new value that the law protects against interference, and such protection is the proper function of the law of unfair competition.[7]

Articles 1382–1383 of the French and Belgian Civil Codes which

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[6]See Bouvier, *Le Droit de la Propriete Industrielle,* Vol. II, pp. 368 *et seq.*

[7]Mario Rotondi, "Unfair Competition in Europe," *American Journal of Comparative Law,* 1958, Vol. 7, No. 3, pp. 327, 333.

are the basis of the unfair competition law in these two countries find their counterpart in Article 2598 of the Italian Codes, and Articles 1401–1402 of the Dutch. In Italy, there is also a special provision in Article 2105 which affords protection against the divulging of "information relating to the organization or methods of production of an enterprise, or the making use thereof in a manner that may prejudice it." Thus, for the purpose of this action, it is quite immaterial whether the secret information which is abused is directly misappropriated by someone concerned with it or has been acquired through third parties. In the Netherlands, injunction may be issued by the Courts against the unauthorized use of know-how.

All four countries also contain specific provisions in their Penal Codes. Article 309 of the Belgian and Article 418 of the French Codes provide for criminal punishment of anyone who fraudulently, or with intention to cause harm, communicates manufacturing se-secrets to third parties. In Italy, Article 623 of the Penal Code subjects to criminal punishment anyone who, having had access by reason of his status or profession to information intended to remain secret, communicates such information to others or exploits the same for his own benefit. In the Netherlands, Articles 272 and 273 of the Penal Code contain penal provisions against intentional divulgation of secret information which should be kept confidential because of the actual or previous professional position of the person who divulges, or because a commercial or industrial enterprise had ordered that such information be kept secret.

Cases of dealing with know-how which are not reached by these penal provisions are covered by the law of unfair competition.

In common law countries, the position is somewhat different. Wrongful appropriation, misuse or unauthorized divulgation of know-how, are essentially an equitable wrong against which the Courts will grant a remedy. The Courts will do so under the rules of law and equity of the common law, rather than in application of any statutory law. Thus, the law for the protection of know-how has developed entirely through case law, by the Courts administering relief in cases where they considered that inequitable conduct was involved. Heretofore, there has been no effort to classify and distinguish the various cases, examine the relationships involved and suggest a possible general theory of the nature of the right in know-how.[8] The law in the United States of America and Great Britain

[8]The first such attempt is made in the excellent book by Amédée Turner, *The Law of Trade Secrets,* London, 1962.

is now remarkably similar in essence, although the reasoning, emphasis and legal theory, may not be alike.

In Great Britain and generally in British law countries throughout the world, the notion of a law of unfair competition as such has not found acceptance as yet. In the absence of explicit contractual provisions relating to know-how, in which case the position is defined by the contract, the English Courts look to the relationship and give relief on the basis of a theory of implied contract or breach of confidence or trust.[9]

In the United States, on the other hand, in addition to these theories, there is also applied a doctrine of unjust enrichment concurrently, complementarily or in the alternative.[10]

But while the legal jargon used may be different than that in civil law countries, what the Courts really do is to find a relationship between the parties which makes it unfair for the defendant to appropriate, misuse or make an unauthorized disclosure of know-how communicated by the owner thereof, and in essence they apply the basic principles of the unfair competition law. Indeed, the conduct prohibited involves not so much the revelation, wrongful appropriation, or misuse of know-how as such, but the economic implication of interference with an advantageous competitive position represented by the value of the know-how to the owner thereof.

This appears in a particularly clear light in the cases involving an unrelated third person who obtains disclosure of the know-how innocently and the question is whether such person may be restrained. In *Stevenson, Jordan & Harrison Ltd. v. MacDonald & Evans,*[11] Lloyd-Jacob J. remarked:

> "Counsel for the plaintiff expressly disclaimed any suggestion that . . . the defendants were aware that . . . Mr. Hemming was acting in breach of his duty to the plaintiff. Does this circumstance frank their avowed intention to consummate Mr. Hemming's wrongdoing? The original and independent jurisdiction of this Court to prevent, by the grant of an injunction, any person availing himself of a title which arises out of a violation of a right or a breach of confidence, is so well established as a cardinal principle that only a binding authority to the contrary should prevent its application by this Court."

In the United States,[12] the decisions of the Courts have established the position which the Restatement of Torts (Section 758(b)

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[9] *Ibid.*, p. 235.

[10] *Ibid.*, p. 265.

[11] 68 R.P.C. 190 and on appeal 69 R.P.C. 10. On appeal, the judgment was reversed on the ground that the confidential nature of the subject matter was not substantial enough to warrant protection.

[12] Turner, *op. cit., supra,* pp. 414, 417.

comment (e)) summarizes to the effect that the answer depends upon weighing the loss to the innocent party against the benefit of the plaintiff. It would be wrong to charge the defendant with damages or profits for the period after he knew the facts of the disclosure in the case when he has changed substantially his position by exploiting the disclosures beforehand. Otherwise, an innocent recipient of a disclosure becomes liable for any use he makes after he learns the facts of the disclosure. This is an obvious case of application of unfair competition law principles.

From the point of view of taxation of this asset, it is of interest to consider two decisions of the House of Lords. In the first case, *Moriarty* (Inspector of Taxes) *v. Evans Medical Supplies Ltd.*,[13] a British Company, carrying on business as manufacturers of pharmaceutical products and as wholesale druggists, made an agreement with the Government of Burma to supply information as to certain secret processes relating to the manufacture of pharmaceutical products and technical data, drawings, designs and plans for the erection of a factory and the installation of machinery therein. The consideration to be received in return was £100,000. The question arose as to whether this sum was ordinary income or a capital gain. The Court of Appeal held that, insofar as the consideration was in respect of the imparting of information as to secret processes, the receipt was a capital receipt, such secret processes and formulae being in this respect akin to patents. On the other hand, insofar as the consideration related to the drawings, designs and plans and information relating to the supply of prototype machinery, laying out and installation of such machinery, etc., it was a payment for services and therefore an income.

The House of Lords held that there was no case for apportioning the sum in the manner directed by the Court of Appeal, and held that the whole sum was a capital profit and therefore not taxable. Viscount Simonds and Lord Tucker pointed out that the ownership by this company of these secret processes and know-how had enabled the company to acquire a substantial share of the market for pharmaceutical products in Burma. Even though the whole value of these secret processes and know-how might not be lost at once to the company as the result of the agreement, their value would be greatly diminished and it was doubtful whether they would, within a measurable period of time, have any value at all remaining to the company.

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[13] (1957) 3 All E. R. 718.

In the more recent decision in *Rolls-Royce Ltd. v. Inland Revenue Commissioners,*[14] the House of Lords upheld the decision of the Court of Appeal that lump sum payments made by certain foreign governments and companies to Rolls-Royce in return for technical knowledge, plans and a license for an interchange of staffs to enable them to manufacture specified types of aircraft engines did not represent the value of a capital asset and was assessable for income tax. The taxpayer's position was that its know-how was part of its fixed capital. The House of Lords, particularly Lord Radcliffe, looked into the nature of know-how[15] and admitted that this was a capital asset so long as the manufacturer retains it for his own productive purposes. It is the kind of intangible entity that can very easily change its category according to the use to which its owner himself decides to put it. Rolls-Royce turned the know-how to account by undertaking for reward to impart it to the others in order to bring about an alternative way of deriving profit in lieu of manufacture and sale of their own engines to the governments or companies with whom they entered into license agreements. The case was distinguished from the *Moriarty v. Evans* case in that in the latter the company had sold to the Burmese Government a secret process on which the success of its business in Burma had to depend, and it had, in effect, disposed altogether of its Burmese trade.

Indeed, the reconciliation of the two decisions is possible on the facts of each case: more or less total loss of the asset in the first case, and a more or less limited dilution of the asset in the second case, particularly since the information disclosed was only that bearing on the production of a single type of engine.

IV

The general conclusion resulting from an analysis of legislation and Court decisions being that the competitive relationships involved in know-how are governed by the broad principles of the law on unfair competition, it should then follow that in the international field the stipulations of Article 10bis of the International Convention are applicable. This Article reads as follows:

> "(1) The countries of the Union are bound to assure to persons entitled to the benefits of the Union effective protection against unfair competition.

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[14] (1962) 1 All E. R. 801.
Similar holding by the Court of Appeal in Musker (Inspector of Taxes) v. English Electric Co., Inc. (not published yet).

[15] See *supra.*

(2) Any act of competition contrary to honest practices in industrial or commercial matters constitutes an act of unfair competition.

(3) The following in particular shall be prohibited:

1. all acts of such a nature as to create confusion by any means whatever with the establishment, the goods, or the industrial or commercial activities of a competitor;

2. false allegations in the course of trade which are of such a nature as to discredit the establishment, the goods, or the industrial or commercial activities of a competitor;

3. indications or allegations the use of which in the course of trade is liable to mislead the public as to the nature, the manufacturing process, the characteristics, the suitability for their purpose or the quantity of the goods."

The general principle announced by this Article is that any act of competition contrary to honest practices in industrial and commercial matters is prohibited, and this should apply to unauthorized disclosure or misuse of know-how.

The International Chamber of Commerce in 1955 undertook to study the problem of protection of know-how on an international basis. After long investigation of the law and practice of the various countries, it adopted a Resolution in 1961[16] setting forth rules for the protection of know-how. This Resolution reads as follows:

"Technological improvements developed by business enterprises whether patentable or not, commonly referred to as know-how, have become in recent times tremendously valuable subjects of industrial property supplementing patents and other rights, have assumed a great economic importance, and are the subject matter of an increasing number of very important agreements between business enterprises.

"The protection of know-how on an international basis is therefore a keenly felt need if the communication of know-how between enterprises to promote economic and technical progress is to be encouraged.

"Hardly any country so far has dealt in an adequate and comprehensive way with the protection of industrial know-how, although existing national laws on contract, breach of trust and unfair competition are sometimes applicable to the subject.

"Accordingly, the International Chamber of Commerce has set out hereunder in a summary form provisions which are highly recommended for incorporation in national legislation:

1. Industrial know-how means applied technical knowledge, methods and data necessary for realizing or carrying out in practice tehniques which serve industrial purposes.

2. Where such know-how is of a secret character it constitutes a valuable business asset and should be protected in law.

3. Know-how should be regarded as secret in character if it has not been published in a form available to the public and the undertaking which has developed it or lawfully acquired it takes all reasonable steps to prevent its unauthorized disclosure. Such know-how is hereinafter referred to as 'secret know-how'.

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[16]International Chamber of Commerce, Statements and Resolutions 1959-1961, pp. 98 and 99.

4. It should be unlawful for an undertaking to use industrial know-how which it knows or ought to have known to be the secret know-how of another undertaking, without the consent of that undertaking.

5. It should also be unlawful to divulge the secret know-how of an undertaking, or to transfer it to others, without the consent of that undertaking.

6. Nothing in these provisions should affect the right of an undertaking to use, divulge or transfer any industrial know-how which it has itself originated and developed by its own independent means or to use any such know-how which has been published in a form available to the public.

7. An injunction or an order to pay damages or both should be available to respect of the unlawful use, divulgence, or transfer of secret know-how.

8. In addition to the above provisions, it should be possible, even in the case of a bona fide use of the secret know-how of another, to order the user to compensate that other, if the circumstances make it equitable to do so."

The following comment is suggested on this Resolution.[17] It will be noted that it is limited to industrial know-how. Thus, it does not deal with commercial, financial or other know-how. The reason for this is one of practical expediency. It was felt that the need for protecting other types of know-how may not be as great as that for protecting industrial know-how, and attention should primarily be directed to the latter. Then the resolution is limited to know-how of a secret character used for industrial purposes. "Secret know-how" is that which has not been published in a form available to the public and which the owner thereof has taken all reasonable steps to prevent from being published. This means:

(*a*) that the owner thereof ensures that non-licensed third parties do not use, publish or transfer it to others;

(*b*) that know-how which has been divulged or transferred to others without the authorization of the owner may still be considered "secret" if the owner has taken all adequate measures to prevent its disclosure;

(*c*) if the know-how has been published in such a way that not only an unauthorized third party has obtained knowledge of it but it has become available to the public generally, the know-how is no longer revocable and the only remedy may be damages by the person who published the know-how.

Ex contrario, paragraph 6 of this Resolution clarifies that secrecy does not imply exclusivity. Therefore, if another party should develop or possess similar know-how or acquire such from another owner or come to know of it from a publication available to the public, it is free to use it, divulge it or transfer it without regard to the fact that another enterprise has a secret know-how of its own.

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[17]See Document No. 450/198 dated December 27, 1960 of the International Chamber of Commerce.

The Resolution then proceeds to suggest a system of protection of know-how. Paragraph 4 deals with unlawful use of know-how and this is deemed to exist in all cases of bad faith. If the user knows or ought to know that the know-how is the secret know-how of another, and uses it without the consent of the owner, the use is unlawful.

Paragraph 5 deals with unauthorized divulgation or transfer of secret know-how. Both are deemed unlawful when there is no consent by the owner of the know-how. No requirement of bad faith is included in this provision. The transferee may have received the know-how in good faith, for instance, as a licensee or sub-licensee or employee thereof, or may be an independent third party who paid value for the same. The act of transfer by such person and particularly the act of publication constitutes a serious damage to the owner. If the latter asserts his rights before such transfer or divulgation, the act by the transferor is unlawful.

Paragraph 7 of the Resolution recommends that the remedies against unlawful use, transfer or divulgation should be an injunction or an order for payment of damages, or both. The International Chamber of Commerce would have recommended the remedy of injunction generally but it had to take note of the fact that this is not known in the legal system of a number of civil law countries.[18]

Finally, paragraph 8 provides that even in the case of a bona fide use of secret know-how by an independent third party distinguished in paragraph 4, the law should provide for an equitable compensation of the owner of the know-how. In other words, no unjust enrichment should be allowed in the case where one in good faith obtains knowledge of secret know-how and uses it for his purpose.

V

It is as a result of this Resolution that the International Chamber of Commerce insisted on the Commission of the European Economic Community for the inclusion of know-how, together with the other rights of industrial property, in the special dispensation from notification of agreements relating to industrial property.

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[18]Because of the basic need of preserving the secrecy of know-how, the Courts may adopt procedures to prevent publication as a result of litigation. Thus, in Amber Size & Chemical Co. Ltd. v. Menzel (1913) 2 Ch. 239; 30 R.P.C. 433, where it was obvious that the question of the aspects of plaintiff's processes which were claimed to be secret had to be disclosed to someone on behalf of the Court, the Court's solution was for the parties to agree on an expert or experts to whom disclosures could be made on behalf of the Court, or to a small list of experts from whom the Court could make a selection.

It will be recalled that the first draft of the Regulations submitted by the Commission to the Council of Ministers of the European Economic Community provided for compulsory registration of all agreements containing restrictions prohibited under Article 85 (1) of the Treaty. As an exception to this rule, no registration was required in respect of agreements imposing on the transferee or licensee of patents, designs and trademarks limitations in the exercise of these rights. Thus, the exception was limited to patent, design and trademark agreements. As a result of strong representations on the part of the International Chamber of Commerce, the final text of Regulation No. 17 extended this particular exception to know-how agreements as well.

Indeed, this Regulation which now requires notification of agreements for the purpose of obtaining the benefits of Article 85 (3) of the Treaty dispenses from such notification, under Article 4 (2) (ii) (b) of Regulation No. 17:

> "agreements to which two enterprises only participate and which have the sole effect
>
> to impose upon the purchaser or the user of rights of industrial property—namely, patents, utility models, designs or trademarks—or upon the beneficiary of contracts involving the transfer or licensing of manufacturing processes or knowledge relative to the use and application of industrial techniques, limitations in the exercise of these rights."

This is a recognition, by what constitutes a legislative act of the European Economic Community, of know-how as a right equivalent to industrial property. The Regulation recognizes the *right* in know-how, since it speaks of limitations which may be imposed in the exercise of the right in know-how as they may be imposed in the exercise of the patent right, the design right or the trademark right.

The terms used in this provision are:

> "manufacturing processes or knowledge relative to the use or application of industrial techniques."

It is interesting in this connection to compare these terms with those used in the German Act of 1957 Against Restrictions of Competition. This Act in Section 20 deals with permissible restrictions in agreements relating to patents, utility models and rights relating to varieties of plants. Section 21 applies, so far as applicable, the provisions of Section 20 to agreements involving the transfer or exploitation of:

> "legally unprotected inventions, manufacturing processes, technical designs and other technological achievements . . . if such achievements constitute business secrets."

The terms describing know-how in Regulation No. 17 are broader than those in the German Act of 1957 and do not even include the requirement of secrecy contained in the latter.

Thus, the German law not only recognizes and protects, under the law of unfair competition, business and manufacturing secrets but it also permits, so far as applicable, the same restrictions in agreements relating to such secrets as in the case of agreements relating to patents.

Since, then, both Section 21 of the German Act of 1957 against Restriction of Competition and Article 4 (2) (ii) (b) of Regulation No. 17 of the Common Market deal with limitations in agreements relating to know-how, it is of interest to first consider the effect of the German antitrust law, before proceeding to consider the provisions of the Common Market antitrust law.

To understand the scope of the exemption of restrictions in know-how license agreements under Section 21 of the German law, we must relate them to the restrictions permitted in patent license agreements under Section 20 of the German law.

First, is the restriction relating to the character, the extent, the quantity, the area or the time of the use of a patent. Certainly, this is applicable to know-how. The owner of the know-how may dispose of his right by transfer or license for a limited purpose or application only, for a limited area or for a limited time.

Second, are the restrictions imposed on the acquirer or licensee of a patent justified by the interest of the owner or licensor in the technically unobjectionable exploitation of the object protected by the patent. It is difficult to conceive how this restriction may be generally applicable to the grant of know-how, except in two cases. The first is where the licensee of the know-how uses a marking on his goods referring to the name of the licensor. In such case the interest of the licensor in the reputation of his name justifies his right to insist on technically unobjectionable exploitation of the know-how. Another case is where the licensor of the know-how also licenses the use of his trademark. In such case the validity of his trademark as well as the interest in its reputation and goodwill may justify the same restriction.

Third, is the obligation assumed by the acquirer or licensee regarding the pricing of the patented article. The object of the restriction is to prevent the licensee from underselling the patentee and competing unfairly with him. It does not seem possible to permit such a restriction in the case of the licensing of know-how.

Fourth, is the obligation imposed on the acquirer or licensee for the

granting back of information or of a license for the use of inventions relating to improvements on condition of a reciprocal obligation by the seller or licensor. It is not seen why this obligation would be objectionable with respect to grant of know-how. Subject to the condition of reciprocity and to the condition that the license back to the licensor should not be exclusive to the latter, this tends to encourage the sharing of knowledge and promotes rather than restricts competition.

Fifth, is the obligation on the acquirer or licensee not to challenge the licensed patent. It is not seen why this obligation on the communicatee of know-how would be objectionable when it is not on the patent licensee. Contesting the right of the licensor in his know-how is violation of the basic foundation of the contract. However, it must be understood that the licensee should have the right to show that the know-how furnished by the licensor has become public property without the fault of the licensee.

Finally, there is the obligation imposed on the acquirer or licensee relating to regulation of competition outside the area of applicability of the law. This provision in the German law meant that the licensee might be restricted with respect to competition outside Germany. The same restriction could apply in Germany with respect to the grant of know-how. However, this provision is no longer applicable insofar as interstate trade in the Common Market countries is concerned, and the same would be true with respect to know-how.

VI

Coming now to the Common Market Antitrust Law, we have before us Article 4(2) (ii) (b) of Regulation No. 17 that dispenses from notification agreements relating to know-how and containing "limitations in the exercise of the right" in know-how. What are these limitations which are presumably outside the prohibition of Article 85 (1) of the Treaty?[19]

The Commission of the EEC in its "Communication" on patent license agreements published December 24, 1962 has specified certain restrictions which it deems as not included within the scope of the prohibitions of Article 85 (1) of the Rome Treaty. In this "Communication", the Commission explains why it has not attempted to specify restrictions in agreements relating to know-how which may

[19]See discussion in Van Notten, *op. cit.*, pp. 531 ff.

also be deemed outside the scope of prohibitions of Article 85 (1), and states:

> "The question of application of Art. 85 (1) of the Treaty . . . to agreements relating to the exploitation . . . of creations not protected by law which represent technical improvements ... must be the subject of a further decision."

The words in this statement "not protected by law" are unfortunate since it is obvious from the above exposition that know-how is protected by law. Obviously the Commission refers only to the fact that there is no full statutory law governing the relationships involved in know-how, and indicates its uncertainty as to how far it may consider applicable to know-how agreements restrictions analogous to those in patent license agreements deemed outside the scope of prohibitions of Article 85 (1). But whether or not the Commission determines to issue a statement of interpretation with respect to restrictions in know-how license agreements, it is undeniable that restrictions "within the exercise of the right" in know-how are permissible. Not only is this true because of the inclusion of know-how in Article 4(2) (ii) (b) of Regulation No. 17, but also because of the saving clause of Article 222 of the Rome Treaty which provides that "the Treaty shall in no way prejudice existing systems and incidents of property." Certainly the right in know-how is an existing system and incident of property.

Indeed, precisely because the right in know-how is not fully defined by statutory law and is broadly governed by the protection of the law of unfair competition, it becomes essential for the parties concerned to at least define their respective rights and duties in the license agreement. This fixes the limits for which the use and application of the furnished know-how is granted or authorized.

It follows that a know-how license agreement may contain the following restrictions as outside the scope of prohibitions of Article 85 (1) of the Treaty:

> (*a*) Restrictions calculated to protect the know-how against unauthorized disclosure or transfer to third parties. This is necessary to preserve the secrecy of the know-how and the right of the owner in the know-how.
>
> (*b*) Restrictions against the use of the licensed know-how beyond the use or application for which it is being licensed. This is a limitation within the scope of the right in the know-how.
>
> (*c*) Limitations on the use of the know-how with respect to time. This means that the license to use the know-how may be limited for a certain term only, and therefore the licensee may be required not to use such know-how after termination or cancellation of the agreement. This is,

of course, subject to the qualification that the know-how has not become available to the public.

(*d*) Limitations with regard to area. This refers to the *use* of the know-how and not the marketing of merchandise made by the use of such know-how. It is not possible, with respect to know-how, to conceive of separate rights in know-how granted by separate States as independent rights. The right in know-how is a single right and it may be enforced under the law of any country. But once this right has been licensed and products have been made by the use of such know-how, it is not possible to limit the sale of such products to a particular country.

(*e*) Limitations with respect to person. The owner of the know-how may provide that the licensee shall not assign the license or grant a sub-license to another. This is both a limitation inherent in the right in the know-how, and also a means of protecting the secrecy of the know-how.

(*f*) An obligation on the licensee to affix on the product a legend referring to the owner of the know-how. This is a means of promoting the reputation of the licensor of the know-how and involves no restriction on competition.

(*g*) The license of the know-how may be granted on an exclusive or non-exclusive basis. The former means that the owner of the know-how undertakes not to furnish such know-how to any other party. This involves no more of a restriction than an exclusive license under a patent does. Indeed, it is of lesser importance, since the exclusivity under a patent may endure for 15 to 20 years, whereas ordinarily the value of the know-how has a commercial value of a much more limited time.

Finally, the restrictions discussed above in Section V as permissible under the German Antitrust Law in know-how license agreements should be deemed proper "limitations in the exercise of the right" under Article 4 (2) (ii) (b) of Regulation No. 17.

Comments on Selected Japanese Laws Bearing on United States Trade With And Investment in Japan

HAJIME WILLIAM TANAKA*

I. INTRODUCTION

JAPAN HAS A POPULATION of 95.2 million with a surprising low annual increment of 1.0 percent. In 1962, its gross national product was 51.9 billion or less than 10 percent of our GNP of $554 billion.

Because of the lack of natural resources and the high population density, the Japanese economy is dependent upon maintaining an increasingly higher level of foreign trade. In 1962, Japan's total foreign trade was valued at $10.65 billion or approximately 20.7 percent of its GNP. In contrast, total U.S. foreign trade in 1962 amounted to approximately $41.1 billion or only 7.4 percent of our GNP. Total U.S. imports amounted to less than 3 percent of our GNP, while in the case of Japan, total imports amounted to approximately 10 percent of its GNP. In terms of trade with the United States, Japan's exports to the United States accounted for approximately 28.5 percent of its total exports while imports from the United States accounted for 32.1 percent of its total imports. In recent years, Japan has had an unfavorable balance of trade with the United States except for the year 1959. In 1961, Japan had a deficit in merchandise trade amounting to $655 million. However, owing to tighter credit controls, this deficit was reduced to approximately $55 million in 1962. 1963 has seen the spawning of a new growth period. Imports, exports, production, employment, and workers' take-home pay have risen and new highs are being registered.

In the foregoing economic contexts foreign investment barriers are being dismantled though some are being replaced by modified forms of restrictions. Waiting period for repatriation of capital has been abolished. Investment approvals appear to be moving inexorably in the direction of liberalization despite criticism that investments are running up against new and more ingenious obstacles. Licensing procedures have been simplified to cut approval time. In connection with the coming tariff negotiations, Japan is reported to have given indica-

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tions that it is preparing to negotiate a 50 percent reduction on 65 percent of its imports over a five-year period with a 30 percent reduction on an additional 15 percent of her imports.

These developments presage a sharply increased commercial interest in Japan. With these introductory remarks, attention will be focused on some of the relevant laws of Japan governing our commercial relations with this country.

II. Investment Procedures

Of overriding primacy in considering an investment in Japan is the fact that its economy is probably the most highly planned and controlled national economy in the Free World. It is subject to strict fiscal, monetary, trade and exchange controls. Anyone desiring to invest in Japan in a manner which will assure profit remittances and capital repatriation must obtain Government approval of the investment. Under the Foreign Investment Law No. 163 of 1950, as amended, certain classes of foreign investments determined to be desirable and necessary for the rehabilitation of economy, economic growth, and improvement of the balance of payments position are preferred in obtaining approval. Another consideration entering into the approval of investment is that the product or process must be novel and should not be "unfairly" competitive with existing firms, that is to say, it must not be so seriously disruptive of the industrial and marketing order as to compel an immediate readjustment of supply and demand patterns or adversely affect the planned growth pattern.

The consideration that the investment must not be "unfairly" competitive with existing firms appears to reflect the Government's concern over the plethora of inadequately financed and highly unstable but politically vexatious smaller business concerns. In 1958 these smaller manufacturers, termed "medium and small enterprises," which are defined to consist of those with less than 300 employees accounted for 52.7 percent of total product output of Japan. A great majority of these establishments are inefficient producers who because of this very inefficiency somehow absorb and provide employment for a surprisingly large sector of the labor force. Because of the inability to lay off workers and the consequent immobility of the labor force, the introduction of any automation or competition from an efficient firm would tend to create a broad-based, socio-political problem. In the light of these considerations, any equity investment in any particular product or service line should be studied in the context of its implications with respect to the medium and small enterprises.

In recent years, adherence to the literal terms of the criteria regarding foreign investments has been relaxed with the result that approvals have been granted for an increasing number of consumer goods not involving novel technical aspects. Thus, the principal consideration involved in granting approval is increasingly becoming one of whether or not the proposed equity investment or licensing would seriously disrupt industrial production and marketing. Less specific but underlying resistance to investments of a seriously disruptive nature appears to be inherent in the high degree of planning and control exercised over the operation of the total economy.

In the case of equity investment, the rule of thumb is that not more than 50 percent of foreign equity participation will be approved. While the maximum equity participation approved in the past, in the main, did not exceed 30 percent to 35 percent, the approval policy appears to be moving toward approving more fifty-fifty joint venture applications.

In the case of licensing a technological agreement with a Japanese company, the license agreement is subject to Government approval without which there would be no guarantee of remittance in dollars. While theoretically all foreign licensing agreements require government approval, in practice it is possible to conclude such arrangements without obtaining approval where the foreign licensor agrees to acceptance of payment in the form of blocked yen. As to royalty payment rates and terms of agreements, the average maximum approved has been not more than 2.5 percent royalty on an agreement not to exceed five years. Here again, the recent trends have been in the direction of approving rates of 5 percent or more for a term not exceeding ten years.

III. Foreign Exchange Controls

All foreign trade and foreign exchange transactions are regulated by the Foreign Exchange and Foreign Trade Control Law[1] enacted in 1949. This law subjects all imports to foreign exchange allocation and licensing through a control system administered by the Ministry of International Trade and Industry (MITI). Under this system import quotas are announced semiannually in April and October of each year. Likewise the foreign exchange budgets for imports are fixed semiannually in April and October of each year. Import licenses are issued without delay and as a matter of course upon receipt of the foreign exchange allocation for an import. Under the import license system there are three categories of licenses; namely, automatic approval

[1]Law No. 228 of 1949, as amended.

(AA), fund allocation (FA), and automatic fund allocation (AFA).

Under an AA license, an importer may purchase from any country in any amount the commodities listed in this category until the overall fund allocation is exhausted. However, this overall fund allocation has considerable flexibility in that payment for imports in excess of the overall allocation may be drawn against a reserve fund on a case by case basis. In any event, since the import budget is decided upon every six months with the overall amount subject to periodic review and adjustment in the light of past experience and projected requirements, any import deterrent effect appears to be minimized.

Within the past year Japan has raised its import liberalization rate to 92.2 percent, as a percentage of the liberalized items to Japan's total imports in the base year 1959. In practical effect, this involves a shift of an import item from the FA list to either the AA list or the AFA list. The FA list is comprised of low priority commodities for which a certain amount of foreign exchange is earmarked for each type of product. For imports of FA list commodities, a special application must be filed by the importer with MITI. When approved the FA licenses are usually valid for three or four months. In view of the unfavorable balance of trade with certain countries and the desirability of bringing the trade with such countries into balance, MITI may suggest that the importer under a FA license purchase from a specified country.

The AFA or the third type of license has no quota but requires that each application for imports be submitted and approved by the appropriate Ministry. In general, such approvals are obtainable without delay.

Exports of Japan are also subject to government control through the licensing procedure administered by MITI. The principal considerations compelling regulation of exports, which are commonly cited, include: the necessity to maintain continuing surveillance over the foreign exchange balance, the prevention of the flight of capital, the prevention of dumping and other unfair trade practices which may arise from unrestrained competition, regulation of export prices and quantities so as to maintain a level of prices and quantities which would inhibit the erection of tariff barriers and other impediments to Japan's exports.

IV. Export Trade Association Law

In addition to the Foreign Exchange and Foreign Control Law, exports are subject to various controls instituted under the Export-Im-

port Transactions Law.[2] This law was enacted for the purpose of enabling exporters to stabilize prices and regulate the volume of exports so as to forestall complaints, particularly from industries in the United States alleging unfair and injurious price competition from Japan. Article I of this law states that the principal objectives are, "to prevent unfair export transactions, establish order among export and import transactions and thereby provide for sound development of foreign trade." This law, which was enacted probably not entirely without the approbation of the United States, authorizes exporters and importers under specified circumstances to enter into price agreements, and to impose quantitative restrictions on exports.[3] These agreements become effective 10 days after registration and approval by MITI. This law also permits the formation of export associations for the purpose of entering into price agreements or imposing quantitative restrictions on exports. Coincident with the growing concern of our industries over imports from Japan, there has been an increase in the number of export associations established pursuant to this law.

Unilateral export restraints in one form or another are in effect with respect to virtually all of the sensitive commodities destined for the United States, including stainless steel flatware, sheet glass, chinaware, earthenware, ceramic mosaic tile, canned tuna, among others. These export association controls appear to be on the increase in the face of the risk that they may raise antitrust implications under United States laws. American firms engaged in the manufacture of products in Japan for exportation to the United States may wish to examine the antitrust implications before they decide to participate in the implementation of Japanese export controls. If participation in such export arrangements is mandatory under the applicable laws of Japan, such as in the case of compliance with minimum export price, and quantitative restraints imposed under the Foreign Exchange and Foreign Trade Control Law, it is clear that the otherwise questionable conduct of American companies under these circumstances would be exempt from the application of antitrust laws. However, if participation in any such arrangement is deemed to be permissive under the Japanese law, as in the case of MITI-validated private export controls to regulate competition, the American companies involved may risk antitrust exposure. However, United States antitrust enforcement policy under these circumstances is not clear, particularly where the Japanese Government and industry are apparently persuaded into "stabilizing" their prices

[2]Law No. 299 of 1952, as amended by Law No. 188 of 1953.
[3]Article 5, 7-2.

for exportation to the United States and promoting "orderly marketing" of their products in the United States. In this context it is obvious that the result desired by the domestic industries concerned and the United States Government can be achieved by Japan only through the imposition of restraints on competition which are completely at odds with our basic antitrust philosophy of free competition. In view of the antitrust risk outlined, the U.S. company desiring to export from Japan a commodity subject to any association controls would be well advised to exercise caution. On the other hand, it is relevant to note that neither the Department of Justice nor the Federal Trade Commission has seen fit to prosecute these arrangements where no activity pursuant to such arrangements has been carried out in the United States. Lack of in personam jurisdiction, the possibility that any action taken would be challenged as unwarranted interference with domestic policy, and the ambivalence of United States foreign economic policy might be advanced as possible reasons for the reluctance of our Government agencies charged with the responsibility to enforce the antitrust laws to take any action. However, a private triple damage antitrust claimant would not be subject to these policy inhibitions.

In addition to price and quantitative restrictions, exporting from Japan may involve other restraints such as quality control. Quality controls applicable to certain exports may prevent the American manufacturer or exporter in Japan from shipping merchandise out of the country. As Japan moves in the direction of dismantling its export and import controls, it may shift to a more extensive use of quality standards and other inspection devices as an indirect means to continue price and quantitative controls, so as to enhance the image of the Japanese product and increase its acceptance in the international market.

V. Antimonopoly Law

This history of the Japanese Antimonopoly Law goes back to the Allied Occupation of Japan. Under the *aegis* of the Occupation for the first time in its history, a law to regulate private monopoly and competition was enacted on April 14, 1947, and made effective on July 20 of that year. This elaborate Antimonopoly Law codifies into a single law, the Sherman Act, the Clayton Act, the Federal Trade Commission Act and the resale price maintenance laws. Thus it proscribes "combinations or agreements" tending to create "private monopolies," "unreasonable restraint of trade," and "unfair business practices," but exempts certain vertical price arrangements.

In addition, it codifies some of the United States court decisions in

defining proscribed conduct such as "excessive concentration of power over enterprises" and "undue restriction of production and prices." Private mergers resulting in "substantial restraint of competition" are also condemned.

Article VI of the Antimonopoly Law provides that, "no entrepreneur shall enter into an international agreement or an international contract," which shall have the effect of unreasonable restraint of trade or unfair business practices. A recent survey indicates that 53 percent of the foreign licensing agreements restrict export market scope in some manner, 16 percent refuse export rights entirely, 73 percent permit export to Southeast Asia and only 20 percent permit export to other areas. In the light of increasing pressure to promote exports with continuing relaxation of import controls, it appears that export restrictions contained in licensing arrangements might be scrutinized more carefully in the future with the above provision in mind. In this connection, it might also be noted that resort to Article XVIII of the FCN Treaty between the United States and Japan which provides for consultation between the parties where trade restraints and monopolistic practices produce harmful effects is an alternative which Japan has available in resolving this problem of private restraints on exports to the United States found to be undesirable.

Specifically, with regard to patents, Article 100 of the Antimonopoly Law, contains a provision empowering the Fair Trade Commission to order cancellation of a patent where the patentee has abused his patent right with intent to create a proscribed monopoly. So far as is known, this provision has never been invoked.

Notwithstanding the elaborate law, there have been relatively few prosecutions to date under the Japanese Antimonopoly Law. One reason might be the fact that the doctrinal emphasis in enforcement is upon regulating the exercise of power through continuing administrative guidance rather than imposing a limitation upon the possession and accumulation of the power as under the United States antitrust laws. Like the Europeans, the Japanese authorities place faith in administrative control over the exercise of market power. The second reason may be found in the fact that the Antimonopoly Law has been subjected to successive amendments which have carved out substantial exceptions. Depression cartels, rationalization cartels and export-import trading associations are illustrative examples wherein specific economic sectors are withdrawn from exposure to antitrust proscriptions. Because of the multitudinous exceptions to the Antimonopoly Law, some observers view the present day "residuum" as a legacy of the Al-

lied Occupation. On the other hand, it must be pointed out that Japan is a country with a long history of reliance upon informal administrative supervision as a means to carry out the functions of government. In the light of this practice, the relative absence of prosecutions by the FTC may not necessarily be an accurate indicia of the influence of the Antimonopoly Law in molding the economy. Further, it should be pointed out that the philosophy of competition is entirely different from that existing in the United States. Combinations and agreements tending to vitiate free competition may be considered essential to the sound economic growth of Japan. In the context of international trade, Japan has been compelled to regard free competition as undesirable.

VI. Taxation

Since revamped by the Allied Occupation authorities early in the post-war years, the Japanese tax system has been transformed into something substantially similar to that of the United States. Like that of the United States, tax assessment is based on the declaration system and withholding at the source is applied with respect to wages and salaries. Generally speaking, the tax rate is higher than that in the United States.

With regard to the personal income tax, foreigners in Japan fall into three categories; namely, non-resident, non-permanent resident and resident. A U.S. citizen is not taxed as to his income received in Japan for services rendered in Japan, provided he is employed in Japan by a U.S. corporation for less than 180 days in any taxable year, does not stay in Japan for more than 90 days continuously, and does not earn more than $3,000.00 during any 90-day period. However, if he should be employed by a Japanese entity during the first calendar year in Japan, 20 percent of his salary is subject to withholding by the payer as income tax. In theory, his income earned outside of Japan would be taxable if remitted to Japan.

Non-permanent residents are foreigners domiciled for more than one year, but not exceeding five years. Persons falling within this class are taxed as to all income received for work in Japan irrespective of the place of payment, and all income earned abroad remitted to Japan.

Residents for tax purposes are persons residing in Japan for not less than five years. Taxpayers falling within this category are subject to tax liability on their total income irrespective of where or how earned or paid.

The Japanese income tax rates are sharply progressive as the following table indicates.

Taxable Income	Rate
Up to $ 416.66	10%
Next $ 694.44	15%
Next $ 833.33	20%
Next $ 833.33	25%
Next $ 1,388.88	30%
Next $ 2,777.77	35%
Next $ 4,166.67	40%
Next $ 5,555.56	45%
Next $11,111.10	50%

Deductions from the gross income to arrive at the appropriate taxable income are nominal: basic personal deduction—$250; wife's deduction—$250; dependent children under 15 years—$139.00; children under 15 years—$83.00; life insurance premiums *not* in excess of $63.00; and earned income allowance not to exceed $333.00. In addition to the national income tax, there are further personal taxes payable to the prefecture and municipality which for a Tokyo resident would amount to over 28 percent of the regular income tax.

Insofar as corporation taxes are concerned, there are again three general levels of taxation. The first is the national tax which is 33 percent on corporate income not exceeding $5,500.00 and 38 percent on such income in excess of this figure. Secondly, the prefectural authorities exact an *enterprise* tax which is 12 percent on income in excess of $2,777.00. The local municipal tax is assessed as a percentage of the national corporation income tax so that the composite tax rate for the corporation would be in excess of 55 percent.

The tax rate on royalty payments is set at 20 percent for ordinary licensing agreements but a rate of 10 percent is applicable to certain preferred technical licensing arrangements which are encouraged by the Japanese Government. The ordinary tax rate of 20 percent required to be withheld by the Japanese licensees can be reduced to 15 percent by taking appropriate procedural steps pursuant to the Tax Convention between the United States and Japan.

Finally, it may be noted that dividend payments on equity holdings in Japan are not taxable by virtue of the Tax Convention between the United States and Japan.

Access to the European Patent System

RALPH E. BUCKNAM*

THE TIME HAS COME FOR A SIMPLE AND CLEAR EXPLANATION OF WHY the United States cannot properly be denied full and immediate access to the proposed European Patent System:

This is *vital* to United States industry. If we do not have full access, American companies will have to limp along with "second-class" patent protection in Europe and will find themselves outdistanced at every turn by European competitors who have the benefit of the proposed European patent.

When the "Draft Convention"[1] was prepared, careful groundwork was laid by those[2] who most desired to exclude us from full access. They correctly[3] foresaw that the obvious objection we would raise is violation of the requirement in Article 2(1) of the Paris Convention[4] that "Nationals of each of the countries of the Union shall, as regards the protection of industrial property, enjoy in all the other countries of the Union *the advantages that their respective laws now grant, or may hereafter grant, to their own nationals. . . .*"[5] The "Draft Con-

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[1]See "Draft Convention Relating to a European Patent Law" prepared by a committee of representatives of the six countries of the European Economic Community, *Journal of the Patent Office Society,* March, 1963.

[2]The main protagonists are reportedly the French and Italians. The Germans have come out in favor of full access.

[3]The work group was probably led to establish its position by an article in *La Propriété Industrielle* of May 1962 entitled "The EEC (Common Market) Patent and the National Treatment Principle" by Gabriel Frayne which attempts to establish that the "national treatment" principle of Art. 2 (1) of the Paris Convention will be violated if third parties are not given full access to the proposed Convention. Since the "draft convention" was made public, various speakers and writers in the United States have brought forth the "national treatment" concept as the basis for our insistence on full access, not realizing that the groundwork had been well prepared to answer such contention.

[4]Union Convention of Paris of March 20, 1883 as amended (last amendment Lisbon, October 31, 1958).

[5]The emphasis has been added. The complete text of Art. 2 (1) reads: "Nationals of each of the countries of the Union shall, as regards the protection of industrial property, enjoy in all the other countries of the Union the advantages that their respective laws now grant, or may hereafter grant, to their own nationals, without prejudice to the rights specially provided by the present Convention. Consequently, they shall have the same protection as the latter, and the same legal remedy against any infringement of their rights, provided they observe the conditions and formalities imposed upon nationals."

vention" proposal itself was carefully provided[6] with "answers" to the expected contention on our part that denial of full access constitutes failure to accord the above "advantages."

Two Frenchmen, the late Albert Colas[7] and André Armengaud[8] have recently published articles which set out to establish (*1*) that the United States is not entitled to full access to the new convention and (*2*) that we should in some way find a measure of happiness in being denied this right.

Mr. Colas played the "ace in the hole" held by those who oppose our having full access. His article explains that the "respective laws" intended by Article 2 (1) mean the local laws of each country, and any advantage the French, for example, can achieve for themselves through a treaty or "special arrangement" does not come within the term "respective laws" as contemplated by the Paris Convention.

Actually, there is an overpowering reason why the United States *must* be granted immediate and full access to any such "supranational"[9] patent system. Mr. Armengaud, obviously without intending to do so, put his finger on the crux of the matter. In explaining[10] what a nation must do to accede to the proposed convention, he observed that such nation must make "a delegation—as limited in scope as it may be—of their sovereignty to the benefit of a supranational authority." Here is the keynote— surrender of sovereignty.

The proponents of non-access to the proposed convention have re-

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[6]For example, the "Preamble" carries a "note" that the Preamble in final form should indicate that the Convention constitutes between the Contracting States "a special arrangement in the sense of Art. 15 of the Paris Convention." Art. 8 provides "This Convention shall be without prejudice to any commitments entered into by the Contracting States by virtue of other international agreements." Elsewhere, also, the draft pays lip-service to compliance with Paris Convention obligations.

[7]See Albert Colas, "Would Non-Accessibility of the Benefits of the European Patent Convention to Nationals of Third Party Countries be Contrary to Article 2 of the Paris Convention of 1883?" *La Propriété Industrielle,* March 1963.

[8]See André Armengaud, "Political Aspects of Accessibility to the European Patent," *PTC J. Res. & Ed.,* Vol. 7, No. 3 (Fall 1963), pp. 314-320.

[9]The term "supranational" has become identified with the Common Market arrangement but, as yet, appears to have no clearly established meaning.

[10]At the foot of page 318 of his article Mr. Armengaud (*op. cit., supra,* note 8) resorts to acknowledgment that there must be a surrender of sovereignty when discussing possible accession of the United States as a treaty member of the proposed European Patent System. It is significant that he carefully avoids language of this type when discussing France's adherence. Instead, at the foot of page 314, he states "As long as these Europeans do not build Europe as one country economically and politically, they will remain the nationals of different independent states and they will be subjected to the laws of these respective countries."

lied heavily on Article 15 of the Paris Convention.[11] This Article has provided the basis for several "special arrangements"[12] in the past; and Article 4 (2) of the Paris Convention explicitly provides for "bilateral or multilateral treaties concluded between countries of the Union" in establishing what is a valid filing for priority purposes.[13] Clearly, none of these "special arrangements" has involved a surrender of sovereignty. Surrender of sovereignty could well have been one of the "arrangements" the drafters of the Paris Convention had specifically in mind when they included the proviso that special arrangements must not "contravene the provisions" of the Paris Convention.[14]

The fact that a surrender of sovereignty accompanies establishment of the proposed European Patent System breaks down the careful position prepared by the proponents of non-access. The United States became party to the Paris Convention on the understanding that and at a time when each participating nation had complete sovereignty over patent matters within its boundaries.

If left only to the legal theorists,[15] the question of surrender of sovereignty will be discussed for years. The real question, however, is one of fact. The American company which applies for a national patent, say in France, and finds it is barred from obtaining valid French patent protection[16] because an earlier "European" application

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[11] Art. 15: "It is understood that the countries of the Union reserve the right to make separately between themselves special arrangements for the protection of industrial property, *in so far as these arrangements do not contravene the provisions of the present Convention*" (emphasis added).

[12] Typical "special arrangements" are Arrangement of Madrid of April 14, 1891, for Prevention of False Indication of Origin; Arrangement of Madrid of April 14, 1891, concerning International Registration of Trade Marks and Arrangement of the Hague of November 6, 1925, concerning the International Deposit of Industrial Designs or Models.

[13] The United States Boykin Act, Public Law 690, 60 Stat. 940, and The Arrangement of Neuchatel of February 8, 1947 exemplify the type of arrangement contemplated by Art. 4 (2) of the Paris Convention.

[14] Art. 15 has not been amended since the initial drafting of the Paris Convention. See *La Propriété Industrielle*, Vol. 1, January 1, 1885, page 4. It must be clear even to those who are contending that the "draft convention" is within Art. 15 that there are obviously *some* types of arrangements which are prohibited by this Article. While the earliest issues of *La Propriété Industrielle* contain comments regarding the intent behind many of the original provisions of the Paris Convention, these is no comment regarding Art. 15.

[15] In the March 1963 issue of *La Propriété Industrielle*, Professor Eugen Ulmer in his article "The Availability of European Patents and the Paris Convention" recognizes that the proposed convention involves "the transfer of certain sovereign rights to a community of states" (page 53) and provides a careful analysis of the position of European legal authorities on this point.

[16] Art. 18 of the "draft convention" provides that the European patent "shall

has been filed by someone else in the European Patent Office in Germany[17] will be in a strong position to attest immediately to the fact that France has surrendered a part of her patent-granting sovereignty.[18]

The important new factor, which has not been mentioned by those who would deny us access is that such surrender of sovereignty diminishes the ability of each participating nation to fulfill its present commitments under the Paris Convention. The question presented is somewhat akin to a contract problem in which one or more participants have, through their own acts, become incapacitated to fulfill their contract commitment. The United States and other Paris Convention participants will be fully justified in refusing the benefits of the Paris Convention to nations who have thus incapacitated themselves, and, if need be, our United States patent laws can easily be revised[19] to put teeth into any such refusal.

This should not be necessary. It can be assumed that the work group of the "Draft Convention" believed in good faith that Article 15 of the Paris Convention provided a valid basis for excluding us from such full participation. It is also hoped and believed that these people are of sufficient stature that, having seen the fallacy in their approach, they will organize their new supranational system in a form which is not in derogation of their treaty obligations, with the result that the United States and other parties to the Paris Convention will be given full and immediate access to the new European Patent System.

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have effect over the whole of the territories of the Contracting States." Art. 19 makes it clear that a "national" application will prevail only if it has a priority date earlier than that of the European patent.

[17] It appears at present that the European Patent Office will be located in Munich.

[18] *Op. cit., supra,* note 10.

[19] For example, we could deprive foreigners of the benefit of the "one-year" rule and provide that, on an invention made outside the United States, any publication or public use before the actual United States filing date will constitute a bar.

Rewards And Incentives To Employee-Inventors

JOSEPH ROSSMAN*

INTRODUCTION

THIS IS A PRELIMINARY REPORT OF THE DATA obtained from questionnaires sent to selected companies and inventors relating to rewards and incentives to employee-inventors.

The importance of bringing about, through industrial research, an uninterrupted flow of new inventions is essential to our economic health and progress and the need to stimulate inventors into activity can scarcely be overemphasized. In Congress and among the Federal agencies, as well as in industry, there is some difference of opinion on the effect of the rewards and incentives which are currently offered to employee-inventors. Proposals have been made from time to time that legislative action be taken, similar to that in effect in some foreign countries, to assure that employee-inventors are adequately compensated by their employers.

The importance of research in our economy is now generally recognized not only by industry but by our legislators. For example, the *Twelfth Annual Report of the Select Committee on Small Business of the U.S. Senate,* May 15, 1962 states:

> "Just as the industrial revolution, beginning in the 18th century, changed our way of life, the present revolution—the scientific revolution, or the research revolution of the 20th century—will also change our way of life. This revolution consists of the systematic and large-scale application of science to industry. Since World War II it has pervaded almost every phase of our daily lives. The changes going on in the areas of electronics, atomic energy, and automation are in many respects different in kind from any that have occurred before, and will change the world much more. The needs of World War II stimulated organized scientific research. The results were an atomic bomb, synthetic rubber, and great technological achievements in radar and antibiotics.

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"Many new products, the results of research, helped push the economy upward during 1948-58.[14] Transistors, power steering, power brakes, antibiotics, polyethylene, styrene plastics and resins, vitamins, synthetic detergents, grew more than 40 percent per year during that decade. Synthetic fibers, room air conditioners, tape recorders, grew from 30 to 40 percent per year.

"This list can be expanded almost indefinitely. The impact of research and development is obvious. Technological progress has been playing a major role in propelling the economy forward, especially since the middle of the 18th century.

"The new element in our society is the growing recognition that new products and new processes are the key to a company's growth, an industry's growth, a nation's growth—and these are dependent on the continuous development of innovations to keep the economic system expanding.

"Small business, in particular, has a stake in this issue, because, unless the new, dynamic areas of our economy are open to small- and medium-size firms, their role in tomorrow's economy will, undoubtedly, become competitively untenable.

"As research has grown, its influence on profitability has also grown to the point where it now either determines or strongly influences profit performance of many segments of industry. One oil company has made as much as $1.45 of annual return per research dollar in some projects, and another estimates that each research dollar yields a total return of $15.40. A paper company estimates a net return of $10 in a typical year from each research dollar. This should be compared with annual return of 20 cents, or less, per dollar of investment in other kinds of projects.[15] It is not surprising that there is a good correlation of percentage of sales devoted to research and development and profits as percentage of net worth.[16] In other words, the higher the percentage of gross receipts spent on research, the higher the rate of return on net worth."

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[14] Leonard S. Silk, "The Research Revolution," New York: McGraw-Hill Book Co., Inc., 1960, pp. 56-57.

[15] Industrial Laboratories, issue of December 1953, p. 5.

[16] Yale Brozen, "The Future of Industrial Research and Development," paper delivered at the National Bureau of Economic Research, May 12-14, 1960, pp. 15-16.

The latest 1960 survey published by the National Science Foundation *Funds for Research and Development in Industry* (NSF 63-7) shows that U.S. industry funds for R&D performance averaged $35,500 per R&D scientist or engineer. There were 307,300 scientists and engineers employed in R&D, the aircraft and missiles employing 85,500, electrical equipment and communication 72,200, chemicals and allied products 34,400, and machinery 31,700. The distribution of the funds was 4 percent for basic research, 20 percent applied research, and 76 percent development. Funds for R&D performed by industrial firms totaled $10.5 billion in 1960 which is three times the total for 1953. Total industrial R&D performance comprised about three-fourths of the $14.0 billion for the economy as a whole.

The patent statistics for the same 7-year period do not reflect a comparable increase in the number of patent applications which totalled 70,343 in the fiscal year 1953 and 79,331 in 1960. The number of patent applications per $1 million R&D expenditures has been steadily declining, in the period 1941-43 it was 53.10 and in 1957-59 it was 9.36.[1] Dr. Brode points out our gross national product increases at 3.5 percent per year while our R&D rate is 15 percent per year and at this rate it will exceed our gross national product before the end of the century.[2]

The question arises are existing company policies in relation to their R&D employees sufficiently effective to stimulate the production of patentable inventions, especially since 96 percent of all current company R&D performance is in the area of applied and development research which is the area in which patentable inventions fall.

In order to obtain current information regarding existing practices in industry, it was decided to send a questionnaire to a random sample of companies to whom U.S. patents were issued during the fiscal year beginning June 7, 1960.

The published abstracts of patents issued from June 7, 1960 to June 27, 1961 starting with patent No. 2,943,327 up to patent No. 2,990,548, and ending with numerals –42, –52 and –61 were cut out and mounted on cards which constituted a systematic 3 percent sample for this period. The patents assigned to U.S. and foreign companies were segregated. The patent numbers were listed in each letter sent to U.S. companies and the last 6 digits of the patents were listed on each inventor questionnaire. The foreign questionnaires were sent on aerogramme letters without any inventor questionnaire cards. This sample contained 837 patents issued to U.S. inventors which were assigned to 495 U.S. companies. A total of 447 questionnaires were mailed to companies with known addresses (48 had no known address) (See Appendix C) with1118 inventor cards (See Appendix D). In the 3 percent sample there were 118 patents assigned to 100 foreign companies to whom questionnaires were mailed. An additional 120 foreign companies were selected at random in order to increase the size of the foreign sample (See Appendix B). The sample included 312 unassigned U.S. patents, 46 patents assigned to the Government, 6 assigned to partnerships, 29 assigned to foreign individuals, and 40 unassigned patents to foreign inventors. The total U.S. patents assigned to all com-

[1] See Machlup, "Patents and Inventive Effort," *Science,* Vol. 133, May 12, 1961, p. 1463.

[2] *American Scientist,* Vol. 50, March 1962, p. 1.

panies during the fiscal year 1960 was about 70 percent of all issued patents.

A total of 110 (24 percent) replies were received from the U.S. companies. There were 385 (33 percent) filled in cards returned by the inventors. Out of a total of 220 foreign questionnaires sent, 84 (38 percent) replies were received (See Appendix A).

Questionnaires were also sent to 74 Research Institute members and 40 (54 percent) replies were recived (See Appendix E).

The replies to each of the questions in the questionnaires are summarized in this report.

I. Company Policies in Encouraging Employee-Inventors

The following questions were submitted in our questionnaire to obtain information regarding current company practices:

It is often contended that industry could do more to encourage employee-inventors by changing its policy with respect to their conditions of employment (e.g., by way of cash rewards, promotions, salary increases, honors, publicity, retention of title to invention by employee, etc.).

(1) What is your present policy?

(2) How long (years and months) has your present policy with respect to conditions of employment of employee-inventors been in effect?

(3) If a *different policy* was previously in effect, please state:

- (a) What the previous policy was.
- (b) Date it was changed.
- (c) How the change in policy has affected the inventive productivity of your company's R&D employees.
- (d) *Also* please give the following (or equivalent data), if possible:
  - (*a*) Number of ideas submitted for consideration for patenting per capita R&D employee *before* and *after* change in policy.
  - (*b*) Number of patent applications filed per capita R&D employee *before* and *after* change in policy.
  - (*c*) Number of patents issued per capita R&D employee *before* and *after* change in policy.

There were 106 replies from U.S. companies in our 3 percent sample which indicated the following payments are made to sole employee-inventors upon execution of their patent applications and assignment:

ON FILING SOLE PATENT APPLICATION

Number of Companies	Amount
62	$ 0 or nominal $1.00
5	5.00
2	10.00
5	25.00
16	50.00
1	60.00
10	100.00
1	125.00
1	150.00
1	200.00
1	250.00
1	300.00

One company makes the following payments for each patent application filed:

Number of Inventors	Amount to Each Inventor
1	$200.00
2	175.00
3	150.00
4	125.00
5 or more	500.00 (pro-rated)

When joint applications are assigned in general the same amounts are generally paid to each inventor, but payments over $100.00 are usually pro-rated. In some cases joint inventors are paid $75.00 each where $100 is paid to a sole inventor.

When the patent is issued most companies make no further payments. The following payments to sole inventors when a patent issued were reported. Joint inventors were generally paid similar amounts and in a few cases are pro-rated. In one case maximum total payments to joint inventors was $300.00.

PAYMENTS WHEN PATENT ISSUED

Number of Companies	Amount
1	$ 25.00
1	35.00
5	50.00
2	75.00
9	100.00
1	150.00
1	500.00

The replies thus indicate that it is the general policy of most companies to regard the salaries paid R&D employees as full consideration for the assignment of inventions made during their employment using the time and facilities of the company. Only a few companies pay any substantial amounts or make special awards. Two companies reported

that they may pay as much as $5,000 as an annual special company award. Some companies have set up suggestion systems and special awards as high as $25,000 for employees who not engaged in R&D.

One company pays the inventor in any one calendar year a share of royalties received from licensees or a share of sale of a patent as follows:

40% of first $1,000
30% of next $2,000
20% of next $2,000
15% of next $15,000
10% of all further sums collected

One company reported that one of the best ways to encourage R&D employees to produce inventions is to make it possible for them to have some return from their inventions by sharing with the employee any monetary income through the sale or licensing of his assigned patents. By giving the employee, say a 15 percent of such return, important inventions can become lucrative to him and yet the company itself has no "out-of-pocket" expense in remunerating the employee. This company believes that these ties are strengthened by arranging the agreements so that such income is payable to an individual even under post-employment situations. This not only gives the R&D employee greater encouragement to produce inventions, but creates a sufficient tie should he leave the company to be more than willing to help the company should it become involved in litigation involving a patent.

The 40 replies received from Research Institute members indicated the following payments are made to sole inventors when the patent application is filed:

SOLE INVENTOR WHEN PATENT APPLICATION FILED

Number of Companies	Amount
27	No payment or nominal $1.00
2	$ 25.00
4	50.00
4	100.00
1	150.00

In the case of joint inventors, two companies pay $25.00 to each joint inventor upon filing; four pay $50.00; two pay $100.00; and one pays $150.00 to each joint inventor.

When the patent is issued four companies pay $50.00 to the sole inventor; one pays $100.00. In the case of joint inventors each may be paid the same amount or payments may be allocated.

It is interesting to compare other recent surveys made with our results. The Industrial Research Institute made a study in 1957 of 104

companies regarding awards for inventions made by employees. The results given were:

Number	Amount paid
17	$1.00
10	$ 2—$25.00
14	$26—50
11	$51—100
5	above $100
Special Bonus Awards if Given	
7	$1,000 or less
6	1,001—5,000
2	Royalty

The National Industrial Conference Board published a report in *Business Management Record,* August 1952, "Patent Policies for Employees" which gave information obtained from 48 companies. Seventeen of these companies pay a fixed amount per invention: one company pays $150; six companies pay $100; six pay $50; and four pay $1. The latter sum, of course, is more in the nature of a legal consideration than additional compensation. The thirteen companies which pay more substantial sums generally split the amount, paying part on application for the patent, and the balance when the patent is issued.

Eleven of these companies also give additional compensation through more liberal salary increases. Three companies recognize meritorious inventions by bonuses: one includes it in the semi-annual discretionary bonus, and two arrive at the amount by bonus plans already in effect for such purposes.

One company gives the employee-inventor 10 percent of income derived by the company from use of the invention by others. Three aircraft companies are the only ones participating in the survey that grant royalties from issuing licenses under the patent. These three royalty plans pay as follows:

Company A

30% on first $1,000
25% on second $1,000
20% thereafter
(no % on company use)

Company B

30% of first $10,000 net
20% of next $10,000
10% of next $50,000
5% of all above $70,000

received by company after cost of exploiting and protecting the invention has been deducted.

Company C

After all expenses,

50% of first $1,000

30% of next $1,000

10% thereafter

"Special award plans are in effect in several companies to stimulate employee-inventors and to give recognition to specially meritorious disclosures.

"One company, through a committee, selects the two best inventions made each year and pays the respective inventors $500 each as awards of merit. (The sum is divided equally in the case of joint inventors.) The committee further chooses the most beneficial invention during a five-year period for a grand award of merit of at least $1,000.

"Another company's plan provides that from every fifty inventions received each year, a patent disclosures committee will select the "most meritorious," whose inventor will be awarded $200. (Where two or more inventors are involved in the same disclosure, a total of $300 is divided equally among them.) In this company, too, special awards, as high as $5,000, are made for inventions that have proved of outstanding commercial value.

"Other companies make special awards for inventions through bonus plans which recognize outstanding service."

A recent survey made by the National Industrial Conference Board published in the August 1963 issue of *Business Management Record* states the following:

> "Three fourths of the sixty-two respondent companies that pay cash awards for employee inventions grant fixed amounts. These range from $5 to $350. Occasionally the payment is in savings bonds or shares of stock.
>
> "Payments are usually made in two installments, part on filing of the application and the balance on issue of the patent. A number of companies have adopted each of the following award schedules:
>
> - $50 on filing, $50 on patent issue
> - $50 on filing, $100 on issue
> - $100 on filing
>
> "Some other award schedules reported by cooperators include:
>
> - $10 on filing, $100 on issue
> - $25 on filing
> - $50 on filing, $150 on issue
> - $10 on disclosure, $100 on filing
> - $50 on filing, $300 on issue
> - $250 on assignment, $50 on issue
> - $50 savings bond on filing, $200 cash on issue
>
> "Companies that pay fixed awards for employee patents generally provide for awards to each of two or more coinventors. A few companies divide fixed awards equally among all the coinventors, but

more often a system like that established by a motor vehicles company is in force:

a. $50 to an applicant who is the sole inventor

b. $40 to each applicant in the case of a joint application where there are only two inventors

c. $35 to each applicant in the case of a joint application where there are three or more inventors

"A petroleum company gives each inventor $50 on filing of a patent application, with a proviso that if there are more than four coinventors they will share a maximum of $200. A further payment of $100 is made to the inventor or each coinventor upon issuance of the patent. An instruments company, which pays $100 to an individual inventor at the time of filing a patent, divides a total of $200 among all employee coinventors when a joint patent of theirs is filed.

"A fourth of the respondent companies that compensate employee inventors make awards according to an estimate of the invention's worth. Thus a textile company writes that a typical award based on patent value is around $1,000, 'although much smaller awards are sometimes made.' A manufacturer of electrical industrial equipment, in addition to paying a cash award of $50 on acceptance of a disclosure and $50 on filing of the application, makes a 'most meritorious award' to the best disclosure in each block of fifty, the award being $200 for a sole inventor and $300 for a joint invention. This company also provides a special patent award that may be granted on a commercially successful invention. According to the company, these three awards may total as much as $5,000 per inventor.

"To emphasize the importance of being first in developing new ideas and to insure a continued high level of inventive activity, an office equipment manufacturer recently devised a three-point patent award system. The first part of the program rewarded employee inventors for work already done at the time the award system started in 1961. Two hundred and twenty-five employees received awards ranging from $1,000 to $3,000 for inventions on which patents had already been filed or issued.

"Part two of the company's award program provides awards of from $1,000 to $5,000 or more for outstanding individual inventions. When an invention is judged 'outstanding,' the inventor receives $1,000 in cash. When a corporate special awards committee determines that any invention is 'special' the company pays the inventor $5,000 or more. The third part of the award system pays employee inventors $1,000 and up for a consistent output of significant inventions."

Several companies indicated that in some instances they may release rights to inventions made by their employees when requested. In such cases the company may at its expense obtain the patent for its employee and retain a royalty-free shop right.

II. Results of Company Policy Changes

We sought to obtain data regarding policy changes in rewarding employee-inventors which might offer some clues how effective rewards

may be increasing productivity. There were 27 companies in our sample which stated that they made changes in their policies. Also a total of 9 Research Institute member replies indicated policy changes were made. The combined replies indicated that 9 companies increased their payments to inventors which resulted in some increased production of inventions. No significant increase was found by 14 companies. Thirteen made no reply or had no data available for making any judgment. Two companies dropped all cash payments previously made. One company had a policy established for 20 years which provided for cash awards to inventors after issuance of the patent. It recently decided to cancel such policy and require assignments of all in ventions without any cash awards for the following reasons. The explanation given to its employees stated:

"Since we entered into an invention award agreement with most employees at the time of their employment, some employees can be expected to ask why a different agreement and related policy are being established now. It will be recalled that the original Agreement provides that the Company will pay employee inventors a cash 'award' for each invention that is patented and retained exclusively for use in the Company's business. Our experience shows that this procedure is impractical and is detrimental both to the Company and to employee inventors. Because of the award provision, in each instance in which a possibly meritorious idea has been submitted to the Company it has been necessary to determine if a rather large cash outlay can be justified before decisions can be made to patent and ultimately exploit it. This has presented a virtually insurmountable obstacle since many inventions have little or no obvious practical value and in most cases the dollar value of an invention is speculative unless there has been a considerable period of costly development, experimentation and actual application of the invention. Consequently, the invention award Agreement has caused unfortunate delays and the abandonment of many employee inventions which had at least some potential. As a result, employee inventors have been denied appropriate Company recognition for making useful inventions and the Company has been denied the benefit of these inventions. The depressing effect of our past practice can best be demonstrated by pointing out that during the past twenty years the Company only has pursued invention cases sufficiently to have paid employee invention awards three times.

"Because of the highly complex and technical nature of our industry, our success, and consequently the success of her personnel.

depends to an ever increasing extent on the inventiveness and creativeness of employees, many of whom are highly trained technical professionals who specifically are expected to invent as a normal part of their assignments. Recognition of performance in this area can most appropriately be provided by the personal commendation, formal announcement, salary consideration and other means which may be expected to contribute to employee prestige and satisfaction and which commonly are used to recognize other types of meritorious job performance.

"It is hoped sincerely that the changes being effected in the Company's policies and practices covering inventions, discoveries and improvements by employees will result in making available to our company in greater abundance the new and improved products, processes, methods and equipment that are essential to the continued success of the Company and of her personnel."

III. Standards and Procedures for Evaluating Inventive Productivity

The rising cost of research in industrial enterprises can be attributed to increased expenditures for research facilities and salaries of research personnel. Assuming all possible action is taken by management to stimulate employees to invent by giving them ample rewards and incentives, by affording them ample research facilities and a favorable creative environment, the question arises, how can the inventive productivity of individual research employees be evaluated so that they may be recognized for their contribution to the company, as well as for comparison with other employees in the same organization? It is generally recognized that not all research activity is necessarily productive because creativity cannot be turned on or off as desired. Furthermore, the production of inventions is often a matter of serendipity or the unlooked for by-product of research. Arthur Bakalar, director of the patent division of Shell Development Company, reported that 5 percent of the research staff of about 1300 research employees made more than half of the patented inventions during 1937-1954. He quotes the president of Bell Telephone Laboratories as saying: "It has been our experience that invention is not an automatic result of engaging in systematic research and development. . . Actually, only about four percent of them [the research workers] make half of all the inventions."[3]

[3] *Journal of the Patent Office Society,* Vol. 41 (1959), p. 592.

We sought to obtain information from the questionnaire mailed to 447 United States companies selected from the *Official Gazette* of the U.S. Patent Office for the fiscal year beginning July 1, 1960, as previously described. The following question was asked:

"What standards and procedures do you employ to evaluate the productivity of R&D employee-inventors?"

We received 92 replies to this question. Several respondents interpreted this question to refer either to judgments whether a submitted idea was patentable or whether it was desirable to file a patent application. Most of these respondents indicated that submitted ideas were referred to their patent department for patentability evaluation. The present study did not explore how company decisions are made when to file or not to file a patent application on ideas submitted by R&D employees.

It appears that many factors must be considered before any judgment can be made regarding the output of any individual R&D employee. The nature of the specific projects he is assigned to work on, the facilities available to him, the technical character of the problems involved, whether the project involves basic or applied research, the time spent on the project, prior successes or failures by others, the value of the project to company business, etc. are just a few of many more factors involved. Thirty-seven replied that no attempt at evaluation of inventive productivity is made. However, in practice some factors are informally considered in assessing the value of R&D employees to their company for salary increases and promotions. The evaluation is generally made by immediate supervisors who are in frequent contact with the R&D employees, consideration being given to their entire performance and over-all contribution to the company's growth. Twenty of the responding companies consider the number of applications filed or patents obtained as at least one factor to be considered. In general, R&D people are expected to invent because they are employed to do so but the number of inventions they make does not necessarily measure the extent of their value to the company.

A questionnaire was also sent to 74 Research Institute members who were not included in the sample selected as previously described containing the same question regarding evaluation of the productivity of their R&D employees. Of the 35 replies received to this question, 17 indicated no direct attempt to evaluate productivity is made, 7 considered the general over-all performance of their R&D personnel, 9 took into consideration the number of patents issued and patent applications filed.

The following selected comments made by the respondents reflect various approaches made in evaluating the productivity of their R&D personnel.

> The number of patents obtained is not the sole criterion, since there may be instances of inventions for which patents cannot be obtained, for one reason or another. Moreover, inventive productivity is itself not the sole criterion of desirable scientific accomplishment in the company, since it may happen that a particular scientist is assigned to a task in which a low incidence of inventions would be expected, e.g. some type of fundamental research.
>
> We consider in reference to each R&D employee the number of ideas submitted in relation to opportunity afforded for creativeness by work assignments; the basic nature of inventions; the number of patent applications filed and patents issued; and the extent to which the submitted ideas solve particular problems without necessarily being patentable.
>
> Also, it is obvious that one invention of unusual sophistication and value (in a commercial sense) must outweigh a dozen inventions of a marginal character. An employee who consistently produces inventions of significant value is recognized and advanced in salary and position.
>
> On an annual basis we prepare a detailed statistical summary on each of our professional employees engaged in R&D indicating numbers of conceptions submitted, applications filed, and patents issued. We also prepare a similar statistical summary for each of our research supervisors, the obvious purpose being to attempt to determine whether a given supervisor or type of supervisor is more or less effectual in creating inventive environment than other supervisors. This report is for use by top R&D management to assist in the over-all evaluation of employee performance.
>
> The inventive productivity of R&D employee-inventors is evaluated not only by the number of times they are identified as the inventor or coinventor of a patentable idea upon which a patent application is filed, but also by the results they obtain in the projects assigned to them, taking into consideration the nature of their activity and various other factors which can be considered to contribute to the expectancy of patentable contributions.
>
> We expect each R&D employee to produce inventions over a period of years at the average rate of one patentable invention every two years. From this base we evaluate an employee's performance by taking into account the field in which he works and the employees with whom he works to determine whether a greater or lesser rate of inventiveness is reasonable.
>
> Not all engineers and scientific personnel are inventors. A relatively small percentage of the engineers make most of the inventions —so that five engineers might come up with more inventions than 50 other engineers. These five should be given the highest incentives, and it is these people who are generally advanced in the company both salary-wise and organization-wise.

As an informal check on the inventive productivity of our R&D effort, we utilize a standard that for every $75,000 expended by our engineering development departments, we should produce one patentable invention. I have found it extremely difficult to measure productivity on a per capita basis and prefer to do it on a dollar basis expended or budget basis.

Various factors, including the quality as well as the number of inventions and innovations are taken into account. Further, work in new fields is usually more conducive to making inventions than research activity in well-worked fields; this factor is also considerd in evaluating the performance of employees.

We do not have any standards and procedures for evaluating the inventive productivity of R&D employees. Because one individual may be working on a particularly difficult project while another less skillful individual may be working on a much easier one, any attempt to compare the inventive productivity of two such people becomes impossible. We believe that the evaluation of an R&D employee by his immediate supervisor and other associates is about the best criterion we have found.

Management, at all levels, is made aware, in a number of ways, of the number and nature of an employee's inventions. For example, whenever an employee makes an invention resulting in the filing of a patent application, his supervision, up to the highest level, is apprised thereof by the responsible Patent Attorney. As another example, issuance of patents to employees is noted regularly in one of the company's journals (which has a wide circulation outside the company). Further, periodically a report is made to top management of the applications filed and patents issued which appear to be of major importance.

Our procedure is to see that the general managers of our various operations know of the patent applications which are filed on behalf of his employees, and that he also knows our opinion of the level of invention involved so that quantity alone is not determinative.

Our standard merit rating and evaluation system, developed for engineering and technical employees, takes into account the factors of originality and creativity and constitutes the basis for salary changes.

The productivity of a chemist or engineer is a primary factor in determining the advancement and annual compensation of the employee. In determining the productivity of a technical man, we give consideration to both his patentable, as well as his unpatentable, technological contributions to the company. As a matter of policy, we have not favored the idea of giving a special award to our technical people because of patentable contributions. It is our belief that this results in a discrimination against many technical contributions which are of substantial value to the company in its day-by-day operations and yet are unpatentable. We have always favored the practice of giving consideration to a man's technical productivity and contribution in determining his annual salary.

Resourcefulness and creativeness in the recognition, analysis and solution of problems are the broad standards employed to evaluate

the performance of R&D employees. Performance reviews are made periodically. Inventive productivity is one of the criteria used in applying these standards and such productivity is measured by (*a*) the volume and character of the material submitted for patent consideration and (*b*) the number and "quality" of patents for which the employee is responsible.

Conclusions

Any attempt to measure the creative output of a research worker should begin with an examination of the products of his work. After an inventory is made of the products, each product would have to be evaluated from the viewpoint of value to the company. The values may be tangible or intangible. Tangible values may be represented by patents, new products, improvements in going products, reduction of production costs, etc. Intangible values may be represented by significant technical and scientific publications based on company research of general value to the industry, development of test devices and methods, etc. J. H. McPherson,[4] of The Dow Chemical Company, lists the following creative products of a scientist which could be tallied to evaluate his creativity:

a. Patents
b. Patent disclosures
c. Publications
d. Unpublished research reports
e. Unprinted oral presentations
f. Improved processes
g. New instruments
h. New analytical methods
i. Ideas
j. New products
k. New compounds

He then points out:[5]

> "We could merely add up the number of products in each of these categories, since many of them must go through some screening to obtain their classification, and make a judgment about the 'creativity' of the scientist. One of the criteria used at the General Electric Company to prove the worth of its Creative Engineering course is the number of patents produced by graduates of the course.
>
> "Most research men would be reluctant to use number of patents

[4] "A Proposal for Establishing Ultimate Criteria for Measuring Creative Output," Chapter 2 in *Scientific Creativity: Its Recognition and Development,* Ed. Calvin W. Taylor and Frank Barron, New York: John Wiley & Sons, 1963.

[5] *Ibid.,* page 25.

alone as a suitable criterion for measuring 'creativity.' These would be some of their arguments:

1. There are many valuable creative acts that might meet some standard of creativity but are not patentable.
2. There is a wide range of quality in patents. (One researcher may, because he feels that it is a 'good thing' to get patents, develop one chemical compound after another and pile up quite an impressive list of patents. Another investigator, less socially motivated to seek patents, may apply for one only after he has done scientific work that meets his own high standards. But, when judges have available the number of patents and patent disclosures that each scientist has, they are inclined, if acting in haste, to make their judgments on this numerical statement, in spite of the realization that the quality of the patents should be considered.)
3. An investigator working in a fertile field where little work has been done may accumulate many patents, whereas a worker in a well-plowed field may find a patent hard to come by.
4. Some investigators may be so motivated to pursue science for science's sake that they neglect to patent a patentable product.
5. Over a long span of time the frequency of patent issue is affected by social conditions and changes in patent laws.

"No doubt many other objections could be raised to the use of the number of patents as a criterion of creativity. If the patents were to be used, each patent would have to be subjected to a qualitative analysis. Similarly, each of the other listed products would have to be analyzed before it could be included.

"What methods could be used to make the analysis of each of these products more exact? The analyses will always be a matter of human judgment, the only gauge for measuring invention, since objective criteria are lacking."

The replies made by the respondents to our questionnaire indicate that the measurement and evaluation of the productivity of R&D is an unexplored field that deserves intensive investigation. McPherson[6] points out:

"Since we will be struggling with the ultimate criteria problem for some time, I should like to make two suggestions:

1. The labor involved in determining analytical methods for looking at each of these products and in developing methods for putting these analyses together would be considerable. Some research people feel that their intuitive quick judgment would be valid most of the time and tend to view such labor as a waste of time. Others feel that the mere adding of products would be sufficient. So I propose that to test these judgments a procedure somewhat like the following be tried:

a. Three sets of criteria should be collected on the same people.
   (*1*) A group of scientists should be rated in the usual fashion —quick judgments on creative level of the subjects.
   (2) A numerical count of products should be made and a ranking established.
   (*3*) An analytical scheme for each product should be devel-

[6] *Ibid.*, page 29.

oped and applied to all the products of each man. Then, all the subjects should be ranked according to these analyses.

b. The relationship between these three rankings should be obtained.

2. The National Science Foundation might invite the Patent Foundation [The Patent, Trademark, and Copyright Research Institute], which also is located in Washington, D. C., at George Washington University, to help with the problem."

IV. Effect of Assignment of Inventions Required by Companies

The following question included in our questionnaire brought many interesting comments:

"Since most companies take title to patented inventions of their R&D employees it is often contended that this practice impairs incentives to invent. *(1)* Do you believe that this is or is not true? *(2)* If true, can you supply one or more specific examples?"

Practically all U.S. companies replying to this question indicated that incentives of their R&D employees were not impaired because the companies took title to their patented inventions. A number of respondents took strong exception to the statement in our question that "since most companies take title to patented inventions of their R&D employees it is often contended that this practice impairs incentives to invent" as being unfounded in fact. The prevailing company approach is that R&D employees are employed to invent and the resulting rights to such inventions are property rights which they are hired to create. The employee incentives therefore should not be impaired since their salary and advancement is dependent upon, among other things, the inventive ingenuity they bring to bear on their assigned problems. Only four companies indicated impairment of incentive might occur under some situations. However, no specific examples were given because obviously where inventions are not forthcoming many reasons may be responsible. Some companies find that taking title may reduce the incentive of R&D employees to make formal disclosures of new ideas and also the preparation of disclosures to the patent department. Some R&D employees also are reluctant to spend time in assisting the company patent attorneys in prosecution of their patent applications or analyzing cited references.

V. Stimulating R&D Employees to Produce More Inventions

Questionnaire cards (4″ x 5″) were sent to 1118 inventors whose names appeared in the selected sample patents as previously described. We received 385 filled in cards. All but 2 of the inventors were em-

ployees who assigned their inventions. Also all but 4 of the inventors stated that they were employees and had signed agreements to assign their inventions to their company.

One of the six questions asked was:

"In your opinion, can R&D employees be encouraged to produce more inventions? Yes ..... No ..... If yes, how?"

There were 28 "no" replies. There were 96 replies indicating cash payments or bonuses would encourage production. There were 20 who indicated a royalty or percentage of sales as desirable; 18 indicated an incentive plan would be desirable. Thus, nearly 35 percent of the inventors thought tangible remuneration would encourage more inventing.

Freedom of research was indicated to be desirable by 18, professional recognition by the company was mentioned by 25, a favorable creative environment by 19, more information regarding patent law and procedure was mentioned by 15, better communication regarding problems to be solved was noted by 14. Various miscellaneous suggestions were made, such as attendance at scientific and technical meetings, permission to publish results of research, better facilities, as factors in stimulating productivity of inventions.

It is interesting to compare the inventor replies with other recent studies. In 1957 a report was published by the Committee on Engineers and Scientists for Federal Government Programs (Government Printing Office 1957) which made a study of the attitudes of scientists and engineers based upon responses made by 17,439 scientific and engineering personnel in Federal Government service and 3,317 similar individuals engaged in industrial research. The factors contributing to job satisfaction in order of importance for industry personnel were as follows:

1. interest potential of work
2. integrity of management
3. opportunity to move up in organization
4. calibre of supervision
5. living conditions
6. pay
7. opportunity to discover and do creative work
8. chance to feel a part of organization
9. congeniality of associates
10. professional recognition
11. security of employment
12. physical facilities for research

13. learning "what makes things go"
14. chance to contribute to basic scientific knowledge
15. social value of work

For Government employees item 7 was third in order of importance and item 14 was eighth. Otherwise, the order was generally close for both.

John Riegel in Report No. 9, *Intangible Rewards for Engineers and Scientists,* Bureau of Industrial Relations, University of Michigan 1958, made a study of 276 non-supervisory engineers and scientists of ten companies. He also interviewed 44 executives, 91 supervisors and 276 employees.

A question put to each executive who was interviewed was, "What does your company do to motivate engineers and scientists to do their best work and to yield them high levels of satisfaction on the job?" In response, many of the executives spoke of salaries and benefits, but there were more references to the treatment of professionals and to the provisions of intangible rewards.

Table XII shows a distribution of references to sources of intangible rewards to engineers and scientists. The first column shows the distribution of the 252 references made by 164 non-supervisory professionals; the second column shows the distribution of 185 references made by 36 executives.

Although the employees and the executives agree to some extent, there are noteworthy differences in the percentages in the two columns. A definitely larger percentage of references was made by the employees to to the recognition of their work. Also, the employees spoke more frequently than did the executives about the challenge and variety of their work as a source of satisfaction.

A study by Dr. Lee E. Danielson, *Characteristics of Engineers and Scientists Significant for Their Motivation,* published by the Bureau of Industrial Relations, University of Michigan Report No. 11 (1960) gives data relating to reasons for job satisfaction given by 277 non-supervisory engineers and scientists in Table V.

Reasons for dissatisfying job activities are given in Table VI.

E. V. Murphee, President of Esso Research and Engineering Company, in a recent talk (*The Chemist,* July 1962, page 241) in referring to Dr. Danielson's study said management must try to understand the needs, goals and behavior of their scientists and engineers.

> "Dr. Danielson concluded that technical personnel, as compared with other employees are more responsible, more objective and more

REWARDS OTHER THAN RECOGNITION

TABLE XII

Distribution of 252 References by 164 Non-supervisory Engineers and Scientists to Various Sources of Intangible Rewards, and Distribution of 185 References by 36 of Their Executives to Similar Sources

Sources	Distribution	
	Employees' References %	Executives' References %
Recognition by supervisors and managers of my (our) contributions	28	16
"I know how I'm doing"	4	
The favorable regard of my colleagues because of my work		4
Challenge of projects assigned to me (us)	12	10
Their variety	4	
Having my ideas accepted and	7	
seeing them put to use	10	7
Being treated as a professional	10	1
Being given responsibility for my projects		3
Being allowed to manage my own work	6	5
Being consulted on technical problems		8
Being given business and technical information		10
Having the privilege to publish		5
Being encouraged and permitted to participate in the activities of professional societies		4
Being allowed to select projects on which I can work part-time		2
Miscellaneous references		1
Competent and understanding supervisors and managers	8	1
Who show interest in me as a person and in my welfare		7
Who give me confidence in the management		1
Opportunities to learn in my professional field	6	4
Prospects for promotion and a professional career	2	
Promotions already received		1
Facilities and environment of the work		6
Services provided by the company: testing, calculating, drafting, clerical, etc.		2
Work schedule not strictly enforced	2	1
Miscellaneous references	1	1
	100	100

CHARACTERISTICS OF ENGINEERS AND SCIENTISTS

TABLE V

EMPLOYEES' REASONS FOR SATISFACTION WITH JOB ACTIVITIES

Reasons*	Times Each Reason was Given
I. Visible Results	
a. I can point to results of *my* effort	42
b. I can see progress toward a goal	9
c. I obtain results that pay off to the company	8
II. Task Completion	
a. I see an idea through from inception to completion	27
b. My predictions or hypotheses work out	10
c. I eliminate problems or "bugs"	7
III. New, Nonroutine, Challenging Work	
a. My work is new, it's pioneering, it requires imagination	38
b. It's nonroutine, there is variety and balance	33
c. It's a challenge, it taxes my ingenuity	35
IV. Personal Satisfaction	
a. My work gives me creative experiences	41
b. I can take personal pride in my job (not related to reward)	20
c. My work satisfies my personal curiosity	10
d. It gives me personal satisfaction and it satisfies the company goals	5
V. Recognition from Others	
a. My supervisor trusts me, lets me work on my own	19
b. As a result of my work, others recognize me as expert	15
c. My supervisor and/or higher management recognizes me for my work	9
d. I perform a service or help others and gain their respect	7
VI. Self-Realization (utilization and extension of abilities)	
a. I am extending my college training (broadening)	29
b. My talents, training and interests are utilized	28
c. I consider my present work training for the future	4
VII. Relations with People	
a. I have contacts with others within and outside the company	31
b. There is teamwork in my work group	9
VIII. Miscellaneous	
a. I have an opportunity to contribute to fundamental knowledge.	11
b. I have an opportunity to work on something immediately useful.	9
c. I have an opportunity to work on something I consider important.	5

* Given by 277 nonsupervisory engineers and scientists.

CHARACTERISTICS OF ENGINEERS AND SCIENTISTS

TABLE VI

DISSATISFYING JOB ACTIVITIES AND EMPLOYEES' REASONS FOR DISSATISFACTION*

Activities and Reasons**	Times Each Activity Was Mentioned
I. Conducting Research or Experiments and Tests	34
a. Inability to solve problem	
b. Lack of end result	
c. Old-product research	
d. Stigma attached to unsuccessful research	
e. Type and scheduling of "research"	
II. Designing and Drafting	12
III. Constructing Models	3
IV. Performing Clerical Tasks (record-keeping, clerical jobs, bookkeeping, etc.)	42
V. Performing Routine or Continuous Tasks (calculator, plottery, etc.)	70
Reasons for dissatisfaction with Categories II-V:	
a. Poor utilization of abilities and skill	
b. Unable to prove oneself	
c. Lesser trained person could do job	
d. Boredom or monotony	
VI. Supervising and Consulting	16
a. Prefer to do things myself	
b. Committee meetings a waste of time	
VII. Preparing and Presenting Reports (written or oral)	52
a. Lack of skill in reporting	
b. Inability to meet various standards	
c. Futility of reports	
d. Frequency of reports	
VIII. Establishing and Enforcing Standards	7
a. Lack of authority to enforce standards	
b. Conflicts that result from trying to enforce standards	
IX. Performing Other Activities (teaching, expediting and service functions)	18
a. Not "engineering" work	
b. Waste of time	
X. Limitations Imposed by Higher Management (procedures, personnel, planning, organization, actions, and relations with other departments)	53

* Order of presentation follows the order in which the items appear on check sheet (see Exhibit B).

** Responses of 277 nonsupervisory engineers and scientists.

deeply involved in their work. They desire greater freedom and more individualized, less routine supervision. They have a greater need for tangible and intangible rewards for their work and ideas. They are more creative, analytical, ambitious, emotional, and introverted. Their goals are broader, higher, and more definite.

"No single pattern of job activity could be singled out as being more or less satisfying by any sizeable portion of the group under study. Apparently it is the 'whole job' that makes work interesting to the technical man—its variety, the balance achieved between laboratory and other technical work, and the sense of responsibility for a project. Reasons given for technical job satisfaction included: Visible results; completed tasks; new, non-routine and challenging assignments; personal satisfaction; recognition by others; utilization and extension of abilities; relations with others; opportunities for growth and advancement. I conclude that we in industrial research must aim at six major targets in providing an environment best suited to these men:

(*1*) A clear definition of their broad responsibilities.
(*2*) Simple, direct lines of communication.
(*3*) Ample opportunities for expanding their knowledge.
(*4*) Sufficient time and opportunity for interchange of ideas and information with colleagues.
(*5*) Recognition of technical achievements.
(*6*) Adequate rewards for accomplishments.

"The future of U. S. industry, in fact the future of our country, rests on accelerated growth of good research by good research men. We face an urgent need to provide the best kind of environment for the research man of tomorrow. He must be a man who is dedicated to the making of scientific contributions. He must be creative and have drive and initiative. He must be an authority in his field with the ability to communicate his ideas to others.

"We in research management also have an obligation. We must provide him with the environment that will make it possible for him to work to the top of his creative ability."

Dr. Robert E. Wilson (*The Chemist,* May 1962, page 176) outlined the obligations of management to the research man as follows:

> "The first and greatest [company] obligation to the research man is to define the company objectives, which should be specific. 'It is not enough to say that the company seeks to make a profit or to improve its products and processes. These are the aims of practically all companies. The research man is entitled to know the specific areas in which he is expected to be creative.' "

He also stressed ten other obligations of management:

(*1*) Good research management with scientific and administrative ability;
(*2*) Adequate compensation for the research man;
(*3*) Good working conditions;
(*4*) "Patient" money, or willingness to spend money without being too impatient for returns;

(5) Relative freedom for the research man within the objectives set up by the company;

(6) Adequate assistance to relieve research men of routine work;

(7) The ability of management to listen to worthwhile developments;

(8) Non-diversion of too many research men to sales technical service or to manufacturing technical service;

(9) A reasonable opportunity for outside technical contacts;

(10) An outlook on research as a long-pull proposition not dependent on how the stock market is behaving. "Often there is greater need for research during depression than in times of prosperity."

Effective stimulation by management of R&D employees to create requires an appreciation of the factors involved in the creative process as well as a sympathetic understanding of the creative personality. Creativity cannot be set in motion at will. The psychological basis of creativity has hardly been explored by psychologists, although in recent years this subject has received more attention by them. Most of available data today is crude and inexact. We do have generalized personality impressions of the creative person. He is a non-conformist, shows a high level of initiative and independence of thinking. He also shows curiosity, self-discipline and a drive for accomplishment. He tends to become totally involved in his work.

The truly creative person is not a good organization man, yet as a company employee he is under pressure to adjust to organization life. The conventional restraints required by organization activities tend to impair his creativity because he loses more or less the freedom of action essential to creativity. He cannot always choose his own problem or satisfy his random curiosity without accounting for lost time to his superior or research director. The problem for management is thus to provide a creative atmosphere taking into account the psychological factors of the inventor and at the same time not to impair the productivity of R&D personnel by requiring too rigid compliance with the work discipline imposed on non-creative employees.[7]

[7] There is scant literature on this subject. See: Hower, R. H., *Managers and Scientists* (Boston: Harvard Business School, 1963); Rubenstein, A.H., "Setting Criteria for R&D," *Harvard Business Review,* Vol. 35 (1957), pp. 95-104; Drucker, P. E., "Twelve Fables of Research Management," *Harvard Business Review,* Vol. 41 (Jan.-Feb. 1963), pp. 103-108; Quin, J. B. and Mueller, J. A., "Transferring Research Results to Operations," *Harvard Business Review,* Vol. 41 (Jan.-Feb. 1963), pp. 49-66; Phelps, E. D., "Help Your Engineers to Get Ahead," *Harvard Business Review,* Vol. 40 (Jan.-Feb. 1962), pp. 125-132.

APPENDIX A

Foreign Questionnaire Replies

A total of 220 air lettter questionnaires was mailed to foreign companies selected from the *Official Gazette* for the fiscal year beginning June 1960. We received 84 (38%) replies as follows:

Australia	1	Holland	4
Belgium	1	Italy	4
Canada	2	Japan	4
Denmark	3	Lichtenstein	1
France	7	Norway	2
West Germany	19	South Africa	1
Great Britain	17	Sweden	10
Hungary	1	Switzerland	7

We received in many instances detailed replies to the question: Does your country have special laws regulating the assignment of patented inventions made by company employees? If yes, how do these laws affect your arrangements with your employee-inventors? Some of the respondents sent copies of their pertinent laws and even included English translations. These replies appear to agree in most instances with a review of various national laws relating to employees' rights in their inventions published by Fredrik Neumeyer, patent attorney in Stockholm, Sweden, *International Labour Review,* January 1961, pp. 1-31, published in Geneva, and also in his recent study *The Law of Employed Inventors,* Study No. 30, published by the U. S. Senate Subcommittee on Patents 1963, and also in an article by William J. Rezac of the patent department of Olin Company, concerning "The Validity of Foreign Contracts Assigning Employees' Inventions to their Employer," published in *JPOS* March 1960, pp. 177-92. A recent book by Christian Englert, *L'invention faite par l'employe dans l'entreprise privee,* Verlag fur Recht und Gesellschaft AG Basel, Switzerland, 1960, p. 239, is a useful comparative legal study of foreign employer-employee law.

No attempt will be made here to summarize or compare the laws in the various foreign countries relating to inventions made by company employees in view of the available publications previously referred to.

Judging from the replies received, it appears that the relations between management and employee-inventors and current problems are very similar to those existing in this country. Since we have only a few replies from each country, no definitive generalizations can be made at this time.

As pointed out by Dr. Neumeyer: "There are three main approaches available for setting up national law provisions regarding rights and obligations of employed inventors: (*1*) creation of a special law (Sweden, Denmark, Germany, and Soviet Union; (*2*) insertion of provisions into the patent law (Austria, Canada, Finland, Holland, Japan, and Italy); or (*3*) insertion of provisions into the law of contracts (Switzerland). Other important countries, such as the United States, Great Britain, and France, are still relying upon the precedents given by the courts or statements made by certain official boards." In these countries inventions made by company employees can be conveniently classified as: (*1*) "Service Inventions," those made by the employee (*a*) within the scope of his employment; and (*b*) within the field of business activity of the employer; (*2*) "Dependent Inventions," those made by the employee (*a*) outside the scope of his employment; but (*b*) within the field of business activity of the employer; and (*3*) "Free Inventions," those made by the employee (*a*) outside the scope of employment; and (*b*) outside the field of business activity of the employer.

"Free Inventions" normally belong to the employer but they may be acquired by agreement with the employee. "Service Inventions" belong to the employer

without extra compensation. "Dependent Inventions" may or may not belong to the employer depending upon the circumstances and country, and also usually entail special compensation in addition to usual salary paid the employee especially if the invention is of exceptional value.

The West German Employee Invention Law of July 25, 1957 is quite complicated. In addition, regulations for the compensation of employee inventions were established July 20, 1959. A detailed explanation of the German law is given by James W. Brennan, "The Developing Law of German Employee Inventions," *The Patent, Trademark and Copyright Journal of Research and Education,* Spring 1962, Vol. 6, No. 1, pp. 41-86. Also see K. E. Laude, "Compensation for Employee Inventions in Germany," 44 *JPOS* 77 (November 1962).

We received a number of statements from U.S. companies indicating that they did not favor any legislation in the U.S.A. such as exists in West Germany or Japan. One company stated:

> "We have wholly-owned subsidiaries in Japan and several European countries where such legislation in various forms now exists. Our experience has been that such legislation complicates employee invention agreement understandings, injects issues between employer and employees which do not exist now in the United States, and in return do not really do anything for the inventor-employee which would not be done anyway."

In regard to the existing employer-employee law in West Germany, the general attorney of a large U.S. company made the following comments:

> "The overall impression I received was that management was unhappy about the fact that the law exercised a disturbing influence on recruiting. The head of the applications laboratory for this company, for example, said he found it difficult to recruit personnel because there is little likelihood that people doing applications work would make patentable inventions. A similar situation exists for the quality control group. Yet, these groups are essential to the successful operation of the company. The recurring thread running through all the comments is that the law made every chemist want to do research—yet research was only one of a large number of fields in which skilled personnel were required.
>
> "The actual operation of the law does apparently raise some problems in that at least one member of the patent group finds it necessary to devote a large part of his time to the original and early appellate procedures involved in fixing the remuneration of the inventors. My overall impression is that most remuneration matters are settled at an early stage in the entire established procedure. I did, however, hear of one case in which this had not proved possible. In the resultant appeal, the inventor requested a very much higher remuneration than he had originally requested on the ground that the appeal would jeopardize his standing in the company so that he should, in effect, receive a reward that would compensate him for a loss of position."

One of our U.S. respondents in the Fall of 1960 visited with Dr. Schade, the Head of the Arbitration Court which is authorized to suggest "reasonable compensation" to dissatisfied employee-inventors. At that time, there were 140 cases on the docket of which one-third were finally disposed of on the following basis:

> A lump-sum settlement was generally preferred (leaving open the question of reconsideration if conditions change later).
>
> Compensations range between DMs 500 and 1000. In some special cases, a compensation of DMs 10,000 was paid, generally a half or one monthly salary.

Compensation was based on a 6-year life time of the patent (general average).

The result of the calculation was checked against the sum the company would have been willing to pay an outside inventor for the same invention. Fifteen percent of this sum (1/5 to 1/8) was regarded as reasonable compensation for employee-inventors.

These cases appeared to indicate that inventors tend to over-rate the compensation expected. Dr. Neumeyer outlines in his study a number of reported rulings and opinions under the German employee law.

One German company reported that in a few cases they reassigned the invention to the employee and merely retain a shop right.

Another comment we received states:

"Legislation to assure the employee-inventors are adequately compensated by the employers would be difficult to administer and necessarily inequitable. Half of the patents are never used. How can compensation be placed on a purely defensive patent? The basic incentive is the pay check with its size depending on the employee's contribution to the business."

Dr. Neumeyer's study contains a good discussion of the arbitration procedure under the German employer-employee law and he gives summaries of about 20 reported cases. He also gives a summary of 17 published Swedish cases relating to employee-inventor awards. He indicates that many disputes are settled amicably between the parties without resort to arbitration or litigation.

APPENDIX B

AIRLETTER SENT TO FOREIGN COUNTRIES

Gentlemen:

The Patent, Trademark, and Copyright Foundation of The George Washington University would very much appreciate your cooperation in the foreign phase of an important research study it has undertaken. The study deals with rewards and incentives to employee-inventors both in American and foreign companies.

As you know, many hundreds of American patents are being currently issued to foreign companies, and because we cannot query all these companies with respect to their inventor-incentive policies and procedures, we have taken a scientific sample of patents issued to them. Since your company originated one of the American patented inventions included in our sample (listed at the end of this letter), we solicit your reply to the following questions. The identity of your company will be held in strict confidence.

A. Does your country have special laws regulating the assignment of patented inventions made by company employees?

Yes..... No..... (please check)

(*1*) If *yes,* how do these laws affect your arrangements with your employee-inventors? (Please comment and include, if possible, one or two examples from your own experience.)

(2) If *no,* what is your present policy?

B. It is often contended that private industry could do more to encourage employee-inventors by its policy with respect to their conditions of employment (e.g., by way of cash rewards, promotions, salary increases, honors, publicity, retention of title to invention by employee, etc.) (*1*) Do you believe this is or is not true? (2) If true, please comment.

C. It is often contended that the practice of companies taking title to patented inventions impairs incentives to invent. (*1*) Do you believe this is or is not true? (2) If true, can you supply one or more specific examples?

We know that we are asking a great deal of you. We realize that the demands on your time will preclude anything but a brief reply, but we urge you to respond promptly to this letter. Because of the scientific sampling plan employed in this study, the cooperation of every respondent is critically important. Our findings will be published in the Foundation's JOURNAL.

Sincerely,

L. James Harris

Patent No.	Date	Inventor	Title

APPENDIX C

LETTER AND QUESTIONNAIRE SENT TO SAMPLE U. S. COMPANIES

Gentlemen:

The Patent, Trademark, and Copyright Foundation of The George Washington University would very much appreciate your cooperation in an important research study it has undertaken. The study deals with rewards and incentives to employee-inventors. Dr. Joseph Rossman, a patent attorney on the research staff of the Foundation, is the Principal Investigator.

The importance of bringing about, through industrial research, an uninterrupted flow of new inventions is essential to our economic health and progress and the need to stimulate inventors into activity can scarcely be overemphasized. In Congress and among the Federal agencies, as well as in industry, there is some difference of opinion on the effect of the rewards and incentives which are currently offered to employee-inventors. Proposals have been made from time to time that legislative action be taken, similar to that in effect in some foreign countries, to assure that employee-inventors are adequately compensated by their employers.

We are asking you to help us establish a body of factual knowledge on vital questions concerning rewards and incentive policies of companies on the productivity of employee-inventors. Such factual knowledge does not now exist.

As you know, many thousands of patents are being currently issued to companies, and because we cannot query all these companies with respect to their inventor-incentive policies and procedures, we have taken a scientific sample of the patents issued to them. Since your company originated one or more of the patented inventions included in our sample (listed at the end of this letter), we would like to draw upon your experience, and we also solicit your further cooperation by asking you to have the inventor or inventors complete the card questionnaire(s) and mail in the enclosed envelope. (The last six digits of the patent number appear in the lower right-hand corner of the card.) The identity of your company and the inventor will be held in strict confidence.

A. It is often contended that industry could do more to encourage employee-inventors by changing its policy with respect to their conditions of employment (e.g., by way of cash rewards, promotions, salary increases, honors, publicity, retention of title to invention by employees, etc.)
   (*1*) What is your present policy?
   (*2*) How long (years and months) has your present policy with respect to conditions of employment of employee-inventors been in effect?
   (*3*) If a *different* policy was previously in effect, please state:
      (*a*) What the previous policy was.
      (*b*) Date it was changed.
      (*c*) How the change in policy has affected the inventive productivity of your company's R&D employees.
      (*d*) *Also* please give the following (or equivalent data), if possible.
         (*a*) Number of ideas submitted for consideration for patenting per capital R&D employee *before* and *after* change in policy.

(*b*) Number of patent applications filed per capita R&D employee *before* and *after* change in policy.

(*c*) Number of patents issued per capita R&D employee *before* and *after* change in policy.

B. What standards and procedures do you employ to evaluate the inventive productivity of R&D employee-inventors?

C. Since most companies take title to patent inventions of their R&D employees it is often contended that this practice impairs incentives to invent. (*1*) Do you believe that this is or is not true? (*2*) If true, can you supply one or more specific examples?

D. Another criticism of industry policies with respect to its employee-inventors is that the established policies have become less and less appropriate as government financial support for industry R&D grows. Please comment on this topic.

We know that we are asking a great deal of you. We realize that the demands on your time will preclude anything but a brief reply, but we urge you to respond to this letter and have the inventor(s) complete and mail the enclosed card(s). Because of the scientific sampling plan employed in this study, the cooperation of every respondent is critically important. Our findings will be published in the Foundation's JOURNAL and should be very useful to industry.

Sincerely,

L. James Harris

APPENDIX D

U. S. Inventor Questionnaire

Date.....

1. Were you an employee of the company to which the invention was assigned at the time you made it? Yes..... No.....
2. Did you sign an agreement to assign your invention to the company?
3. (*a*) Have you received any cash compensation for your invention in addition to your salary? Yes..... No.....
   (*b*) If yes, state basis of payment:.....
   .....
   (*c*) If no, did you receive any other rewards? Please state what:.....
   .....
4. Please state your age:.....Education: grammar.....; high school.....; college..... (no. of years).....; graduate..... (no. of years).....
5. How many U. S. patents have been issued in your name previously?.....
6. In your opinion, can R&D employees be encouraged to produce more inventions? Yes..... No.....
   If yes, how?.....

APPENDIX E

Letter and Questionnaire Sent to Foundation Members

Gentlemen:

The Patent, Trademark, and Copyright Foundation of The George Washington University would very much appreciate your cooperation in an important research study it has undertaken. The study deals with rewards and incentives to employee-inventors. Dr. Joseph Rossman, a patent attorney on the research staff of the Foundation, is the Principal Investigator.

The importance of bringing about, through industrial research, an uninterrupted flow of new inventions is essential to our economic health and progress and the need to stimulate inventors into activity can scarcely be overemphasized. In Congress and among the Federal agencies, as well as in industry, there is some difference of opinion on the effect of the rewards and incentives which are currently offered to employee-inventors. Proposals have been made from time to time that legislative action be taken, similar to that in effect in some foreign countries, to assure that employee-inventors are adequately compensated by their employers.

We are asking you to help us establish a body of factual knowledge on vital questions concerning rewards and incentive policies of companies on the productivity of employee-inventors. Such factual knowledge does not now exist.

As you know, many thousands of patents are being currently issued to companies, and because we cannot query all these companies with respect to their inventor-incentive policies and procedures, we have taken a scientific sample of the patents issued to them. We are also interested in supplementing that study with the experience of the companies which are members of the Foundation. We would like to draw upon your experience, by asking you to answer the following questions. The identity of your company will be held in strict confidence.

A. It is often contended that industry could do more to encourage employee-inventors by changing its policy with respect to their conditions of employment (e.g., by way of cash rewards, promotions, salary increases, honors, publicity, retention of title to invention by employees, etc.).
   (*1*) What is your present policy?
   (2) How long (years and months) has your present policy with respect to conditions of employment of employee-inventors been in effect?
   (3) If a different policy was previously in effect, please state:
      (*a*) What the previous policy was.
      (*b*) Date it was changed, and reason for the change.
      (*c*) How the change in policy has affected the inventive productivity of your company's R&D employees.
      (*d*) *Also* please give the following (or equivalent data) if possible.
         (*a*) Number of ideas submitted for consideration for patenting per capita R&D employees *before* and *after* change in policy.
         (*b*) Number of patent applications filed per capita R&D employees *before* and *after* change in policy.
         (*c*) Number of patents issued per capita R&D employee *before* and *after* change in policy.

B. What standards and procedures do you employ to evaluate the inventive productivity of R&D employee-inventors?

C. Since most companies take title to patented inventions of their R&D employees it is often contended that this practice impairs incentives to invent. (*1*) Do you believe that this is or is not true? (2) If true, can you supply one or more specific examples?

D. Another criticism of industry policies with respect to its employee-inventors is that the established policies have become less and less appropriate as government financial support for industry R&D grows. Please comment on this topic.

We know that we are asking a great deal of you. We realize that the demands on your time will preclude anything but a brief reply, but we urge you to respond to this letter. Our findings will be published in the Foundation's JOURNAL and should be very useful to industry.

Sincerely,

L. James Harris

The Riskiness of Research and Development Performed by Large Firms

CHARLES S. MANSFIELD*

SPECTACULAR INCREASES IN SPENDING ON RESEARCH and development since World War II and an increased emphasis on the role of technical change in explaining economic growth have drawn the attention of economists to the question of the determinants of spending on R&D. Such economic research should contribute to a greater understanding of the impact of public policies in inducing spending for invention and innovation. It is clear that an evaluation of the efficacy of the patent incentive, for example, depends upon a knowledge of what determines allocations to R&D relative to alternative expenditures.

The question of the riskiness of R&D performed by large firms has received surprisingly little explicit attention, in light of its theoretical and practical importance. Empirical analysis of R&D spending on both the micro and macro levels has centered on the question of the returns from R&D relative to alternative expenditures.[1] This type of analysis implicitly assumes that the riskiness of the alternatives being considered does not have an impact on the allocation of funds to these alternatives. Although such an assumption is more or less usual in examining many economic problems it would appear wise to consider more explicitly the question of risk when dealing with expenditures as reputedly "risky" as those on R&D.

It is the purpose of this paper to develop an empirical measure of riskiness and to use this measure to determine whether large firms performing a great deal of R&D (by criteria to be specified) undergo greater risk than large firms performing little or no R&D.

R&D AND RISK-TAKING: SOME GENERAL CONSIDERATIONS

Why should it be considered more risky to devote resources to R&D than to alternative uses? The fundamental answer to this question is

*Member of the Research Staff of the Research Institute. The study was undertaken by Dr. Mansfield as one of a series of studies on Patents in Executive R&D Decisions being conducted by Dr. Jesse W. Markham under the auspices of the PTC Research Institute. The author of this report wishes to express his appreciation to Dr. Markham for his valuable review and suggestions.

[1] See, for example, "The Economics of Research and Development," Jora R. Minasien, in *The Rate and Direction of Inventive Activity*, National Bureau of Economic Research, 1962. See also Yale Brozen, "The Future of Industrial Research," *Journal of Business*, Chicago, July, 1961.

that the output obtained from inputs devoted to research cannot be known. In this respect the production of knowledge differs from the production of other goods and services in the economy.[2]

Risks arising from this peculiarity—that the output from resources devoted to R&D is not known in advance—can be dealt with in a variety of ways. One of the foremost is application of the principle of insurance to R&D; that is, the undertaking of many R&D projects by the same economic unit. Use of the insurance principle is limited, however, by the fact that R&D projects may often be large in size relative to the resources of the firm. One would therefore be tempted to conclude that the firm engaged in the production of research must necessarily be undertaking greater risks than its more mundane neighbors.

In addition to the peculiar risks associated with producing research, however, any firm faces the more ordinary risks associated with the production of any good or service. For this reason it is dangerous to assume that the production of R&D will be riskier than other kinds of production in any particular institutional context. A degree of protection from other risks of doing business may be correlated with the performance of R&D. This could be the case, for example, if performance of R&D were associated with a market structure that protected R&D firms from risks that non-R&D firms were exposed to. *A priori* reasoning regarding the riskiness of R&D should be applied to the present institutional setting only with great caution, because we do not know whether the "inherent" risks of producing R&D are offset by institutional factors tending to make R&D outlays attractive relative to alternative uses of funds.[3] In this circumstance it appears useful to supplement analytical efforts to ascertain the riskiness of R&D by setting up an empirical index of riskiness and measuring the scores of high R&D and low R&D firms on this index.

Government-Financed R&D and Company-Financed R&D

Any discussion of the institutional context within which R&D takes place must take note of the emergence of government as an immense financier of R&D. The impact of government financing has been summarized as follows: ". . . the soundest conclusion is that in recent years

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[2]Problems related to the allocation of resources devoted to the production of knowledge are dealt with in Kenneth J. Arrow, "Economic Welfare and the Allocation of Resources for Industry," in *The Rate and Direction of Inventive Activity, op. cit.*

[3]See the argument on pp. 472-473 that R&D outlays may be attractive to oligopoly firms.

no more than one-quarter to one-half of total inventive activity in the United States is governed by the profit incentive and traditional means of public control as embodied in patent and antitrust policies; until two decades ago the share so governed was significantly greater, probably as much as three-quarters to four-fifths."[4]

The emergence of government as the most important single financier of R&D adds a new complication to the analysis of R&D and risk-taking. It is our task to set up a conceptual framework that will handle the problems of the riskiness of R&D financed both by private firms and by government. A measure of riskiness should allow us to compare the risks involved in each by a common standard.

A Conceptual Distinction

When we speak of the riskiness of R&D expenditures, we are speaking of the risk undergone by firms performing R&D. As noted above, R&D may be financed by the firm itself, or by government.

When R&D is financed by the firm itself, we may conceive of R&D as an input, competing with other inputs for dollars allocated by the firm. Here we are concerned with the riskiness of R&D expenditures relative to the riskiness of alternative expenditures on other inputs. In the case of government-financed R&D we may conceive of R&D as an output, for sale to government. Here we are concerned with the riskiness of investing in facilities to produce for the government "market" for research relative to investing in other sectors of the economy.

It may be helpful to spell out in more detail the conception of R&D as an input. The large corporation has one set of expenditures directly related to production—including such items as wages and salaries, raw materials, and maintenance of plant and equipment. A cut in these items will necessarily entail a cut in production. Another set of expenditures—such as R&D, advertising, and "good will" expenditures—is not directly related to production. A cut here will not directly and necessarily lead to a reduction in output. It is reasonable to assume that R&D competes primarily with other expenditures not directly related to production—that such expenditures are relatively close substitutes for one another. Hence the firm will give close consideration to the riskiness of returns to R&D relative to the riskiness of returns from other items in the "not directly related to production" category.

[4] Jesse Markham, "Inventive Activity: Government Controls and the Legal Environment," *The Rate and Direction of Inventive Activity*, pp. 595-596.

The conception of R&D as an output for sale to government is more straightforward. As noted above, we are comparing the riskiness of a prospective investment in facilities to produce R&D for the government market with alternative investment possibilities.

An Empirical Measure of Riskiness

We are now in a position to consider the problem of setting up a measure of riskiness that would compare the risks undertaken by a large firm performing a relatively large amount of R&D with the risks undertaken by a large firm performing a relatively small amount of R&D.[5]

Two major problems arise in connection with any empirical measure of riskiness. In the first place, riskiness in the sense in which we have been using the word refers to the expectations of decision makers. Since we do not know what these expectations are or have been, we must choose an index using *ex post facto* data which, we assume, reflects the subjective state of riskiness. We assume further that greater historical fluctuations in our profit index reflect a greater inability of decision makers to have foreseen the future at that time. It should be stressed that this connection between the historical index and the true subjective expectations held at the time does not necessarily follow on logical grounds, but rather appears a reasonable assumption.

A second difficulty with any measure of riskiness is its inevitable simplification of the risks of a business. The typical large enterprise is concerned with a variety of objectives, including profits, share of the market, and absolute sales level, as well as the catastrophe of bankruptcy. All of these elements would presumably be present in a judgment of the riskiness of any action. However, the relation between the different elements is not clear, and an index that included all of them would be arbitrary as well as unwieldy. For these reasons, as well as for more practical considerations relating to the accessability of data, we have chosen a measure that relates to fluctuations in profits. A defense of this simplification is that we retain an index based on the single most important long-run element in the firm's overall position.[6]

Given an agreement to consider "fluctuations" in the time series of net income as a percentage of net worth as a measure of risk undergone

[5] The nature of the hypothesis being tested will be stated more completely, and in technical language, in a later section.

[6] It may be noted that stock market analysts use fluctuations in profits as a measure of riskiness. Thus the measure adopted is in line with the thinking of those who judge the riskiness of enterprises as an everyday matter.

by a firm, two distinct statistical measures of such fluctuations may be proposed, each corresponding to a different conception of risk in economic terms.

The two statistical measures of "fluctuations" in the time series are:

1) the standard deviation of the time series of net income as a percentage of net worth.
2) the coefficient of variation $(V \equiv \frac{s}{\bar{x}} \cdot 100)$ of the time series of net income as a percentage of net worth.

The first measure—the standard deviation—regards the same absolute change in two time series as demonstrating that the firms concerned are undergoing equal risk. Using this measure, a firm for which net income as a percentage of net worth fluctuated from three to five to one percent would be regarded as undergoing the same risk as a firm that fluctuated from twenty-three to twenty-five to twenty-one percent, since the standard deviations of the two time series would be the same.

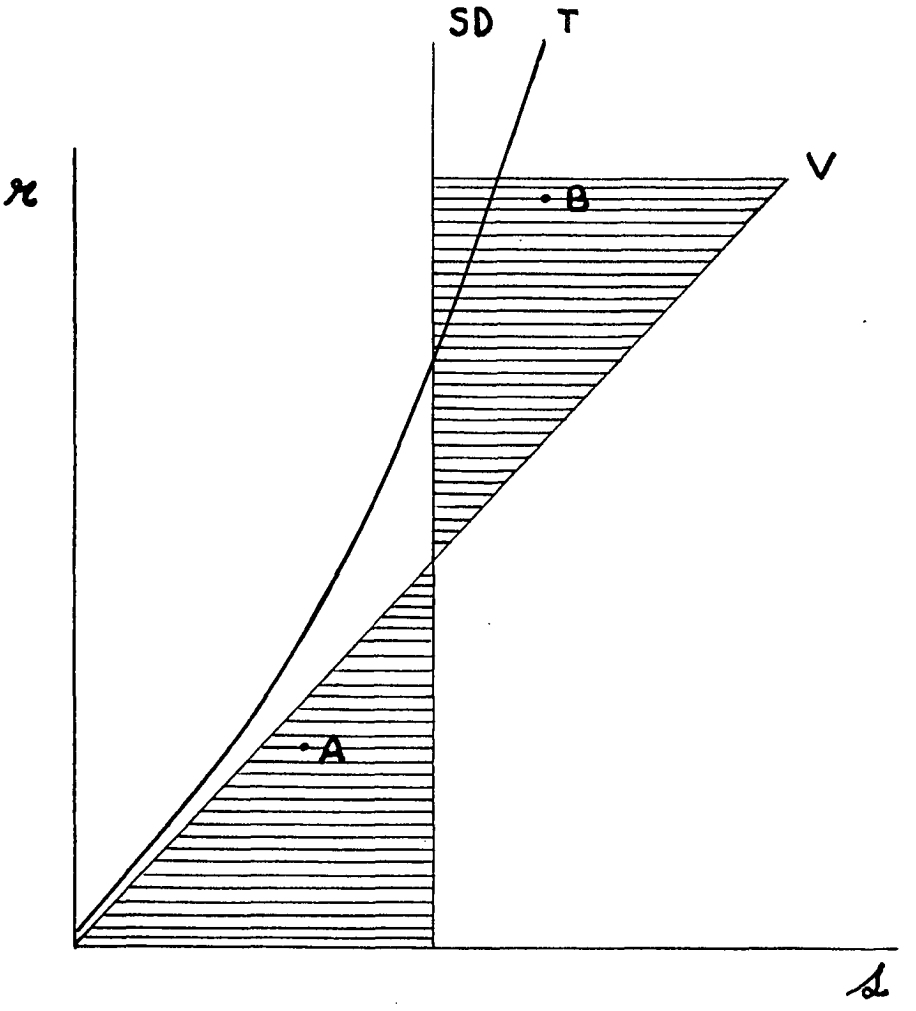
One might object to the standard deviation measure on the grounds that at a higher rate of return a firm is more willing to undergo greater absolute fluctuations in expected profits. Thus the firm operating near the level of zero profits would regard fluctuations from three to one percent in the time series as indicating a greater riskiness than fluctuations from twenty-three to twenty-one percent. In line with this reasoning, the measure of riskiness that ranked the two equally would be incorrect.

As an answer to such a difficulty the coefficient of variation $(V \equiv \frac{s}{\bar{x}} \cdot 100)$ of the time series could be adopted as a measure of riskiness. This measure implies that equal relative changes from the mean imply equal risk. Using the coefficient of variation as a measure, fluctuations in a time series from two to three to one percent would be equal in riskiness to fluctuations in another time series from twenty to thirty to ten percent. This measure takes into account the fact that as a firm earns a higher rate of return, it will not consider that the same absolute deviations in expected rates of return imply equal riskiness.

What we are considering in these alternative measures of riskiness is the rate at which s, representing absolute standard deviations from the mean, changes as r, the expected rate of return, changes. Figure 1 shows a line of constant riskiness, V, using the coefficient of variation

as the measure of riskiness. Along this line the proportion $\frac{s}{r}$ is constant, implying that, for a given increase in r, an equal proportional increase in s will be accepted in order to make the riskiness of the two points along the line equal. Similarly, *SD* is a line of constant riskiness, using the standard deviation as a measure of riskiness. Along this line s is the same for any given r, implying that at higher rates of r, any increase in absolute deviations from r would increase riskiness.

FIGURE 1: THREE MEASURES OF RISKINESS



$r \equiv$ expected rate of return
$s \equiv$ absolute deviation from the expected rate of return

EXPLANATION

1. Points along the line *V* are regarded as equally risky by the measure of riskiness based on the coefficient of variation. This measure implies that equal proportional movements of *s* and *r* imply constant riskiness. Point *B* would be regarded as less risky than Point *A* by this measure, because *r* has increased by more than *s*, in moving from Point *A* to Point *B*.
2. Points along the line *SD* are regarded as equally risky by the measure of riskiness based on the standard deviation. This measure implies that riskiness is the same as long as *s* is constant. Point *B* would be regarded as more risky than Point *A* by this measure, because there has been an increase in *s* in moving from Point *A* to Point *B*.
3. The line *T* shows a hypothetical "true" measure of riskiness, along which points are considered equally risky when *s* is increasing proportionally less than *r*.

A suggested true line of constant riskiness would lie along a line with a shape such as that of *T* in Figure 1. Along this line a firm would accept increasing absolute deviations as implying equal riskiness as the expected rate of return, *r*, rose. However, it would accept increasing absolute deviations at a decreasing rate, as shown by the fact that the curve is convex to the 45 degree line, *V*. This convexity implies that, as expected profits rise, the willingness to accept absolute deviations in expected profits rises less than proportionally. This condition follows from the assumption that the willingness to take risks decreases as income rises, because the utility from gains becomes less and less per unit relative to the disutility per unit from losses.

Hence an ideal measure of riskiness would lie between the two statistical measures actually used. Our results will be given in terms of both measures, and in interpreting the results we will refer to this discussion.

The Hypothesis

In order to test empirically whether firms performing a great deal of R&D undergo more risk than other large firms we will identify two groups of "high" R&D firms and compare them with a group of "low" R&D firms in accordance with the measures of riskiness presented.

For the criterion of "high" and "low" R&D firms we have adopted the measure of R&D as a percent of net sales.

The first "high" R&D group consists of firms for which R&D is predominantly financed by government. The second "high" R&D group consists of firms for which R&D is predominantly company-financed. For each firm in each of the three groups, we have gathered data on the time series, net income as a percentage of net worth, for the years 1946-1961. Each firm, then, has a figure for the standard deviation and

for the coefficient of variation of its time series of net income as a percentage of net worth.

We hypothesize that, for the two groups of "high" R&D firms compared to the group of "low" R&D firms:

1) the mean of the standard deviations of each time series for the firms in the two "high" groups will be higher than the mean of the standard deviations for the corresponding time series of the firms in the "low" R&D group.
2) the mean of the coefficients of variation for each time series for the two groups of "high" R&D firms will be higher than the mean of the coefficients of variation for each time series for the firms in the "low" R&D group.

The Sample

In order to test the hypothesis stated we need three groups of firms—one, high government-financed R&D; a second, high company-financed R&D; and a third, low R&D firms. It is well known that data on expenditures for R&D are not made available by all firms. Therefore, data published by the National Science Foundation ranking industries by the criterion of company-financed R&D as a percentage of net sales and government-financed R&D as a percentage of net sales were used to select industries in the three categories.[7] The largest firms from each industry were then chosen for the sample. The sample consists of 36 low total R&D firms, 30 high government-financed R&D firms, and 32 high company-financed firms.

Some correlation exists between high government-financed and high company-financed R&D firms. Yet the two classifications are in fact quite distinct. (Government-financed R&D is highly concentrated in a few industries. In 1958, for example, forty-six percent of all government-financed R&D went to the aircraft and parts industry.[8]) Therefore it appeared desirable to isolate the two categories of R&D financing for the purposes of this study. In order to separate the two, only industries are used which are "predominantly" one or the other.[9] In practice it was found that there were few industries in which the ratio of company-financed to government-financed R&D is near equality—industries tend to "specialize" in this respect.

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[7] See *Funds for Research and Development in Industry,* National Science Foundation, NSF 61-32.

[8] *Ibid.,* 1958, p. 7.

[9] The criterion used is that over fifty percent of the R&D performed by the industry must be "company-financed" in order for the industry to qualify as high company-financed, and similarly for government-financed R&D.

Some possible difficulties with the sample may be noted. In the first place it could be said that a high industry R&D level does not ensure that the firms chosen from the industry are truly high R&D firms. However, the possibility of this type of error is in practice negligible, because R&D expenditures within an industry are concentrated among its largest firms, and the sample includes only the largest firms. Also it should be noted that not all industries are used—the high R&D classification includes only industries doing the "highest" amount of R&D, and the low R&D classification includes only industries doing the "lowest" amount of R&D. Thus the chance of a low R&D firm being included in a high group, or vice versa, is in practice not a matter of great concern.

Certain non-random features of the sample should be taken into account in evaluating the results. The group of high government-financed R&D firms does not represent a large selection of industries because government-financed R&D is in reality so concentrated. The selection of firms within industries has been biased somewhat by the practicality of obtaining financial information. However, the very great differences between the sums spent on R&D in the low and high groups ensure that the groups reflect a significant difference with respect to the variable, expenditure on R&D. Furthermore, the relatively large size of the sample reduces greatly the possibility that the results obtained may be explained by variables other than R&D.

The Results

Two major findings emerge from the calculations made. First, it was found that firms undertaking a relatively great amount of government-financed R&D have undergone significantly greater risk, by our measures, than firms in either of the other two classifications. Secondly, it was found that firms undertaking a relatively great amount of company-financed R&D had not undergone significantly greater risk, by our measures, than firms in the low R&D category. This latter conclusion depends to some extent on an interpretation of the measures of riskiness chosen. The findings are summarized in Table 1.

Greater detail on the findings and their interpretation is given below:

High Government-Financed R&D Firms Vs. the Other Two Classifications

Firms undertaking a great deal of government-financed R&D undergo significantly greater risk than firms in the other two classifications by both the measures of riskiness. Using the standard deviation of the time series of net income as a percentage of net worth as a measure of

TABLE I

SUMMARY OF STATISTICAL RESULTS

Category	Mean of Standard deviations (s) of Time Series	Mean of Coefficients of Variation (V) of Time Series	Mean Rates of Return
High Company-financed R&D Firms	3.33	20.6%	16.6%
High Government-financed R&D Firms	5.16	38.7%	15.4%
Low Total R&D Firms	2.38	23.5%	11.4%

SIGNIFICANT DIFFERENCES AMONG THE MEANS[1]

Category	Using (s) As Measure of Riskiness	Using V As Measure of Riskiness
High Company-financed *Vs.* Low Total	Yes	No
High Government-financed *Vs.* Low Total	Yes	Yes
High Government-financed *Vs.* High Company-financed	Yes	Yes

[1]A "significant" difference is defined as a rejection, at the 95th percentile level, of the null hypothesis that the means are equal, using the t test for small samples.

riskiness, we find that the mean of the standard deviations of all firms in this category was 5.16. This figure compared with 2.38 for firms doing little R&D of any type and 3.33 for firms undertaking a great deal of company-financed R&D. The difference between 5.16 and each of the other two figures was found significant at the 95th percentile level.

Using the coefficient of variation of the time series of percentage net income to net worth as a measure of riskiness, firms doing a great deal of government-financed R&D are again shown to undergo significantly greater risk than the other two types of firms by our measures. The mean of the coefficients of variation of the above time series for the high government-financed R&D firms was found to be 38.7 percent. The mean figure for the low R&D firms was 23.5 percent; and for the high company-financed R&D firms, 20.6 percent. The difference between the figure for high government-financed R&D firms and each of the other two was found to be significant at the 95th percentile level.

High Company-Financed R&D Firms Vs. Other Firms

The results comparing high company-financed R&D firms with low R&D firms are not straightforward because of the problem of defining a measure of riskiness. As shown in Table I, high company-financed R&D firms rank as more risky than low R&D firms, using the standard deviation of the time series as a measure of riskiness. Using the coefficient of variation of the time series, however, the positions are reversed. By this measure, the sample gives a higher (riskier) figure for the low R&D firms than for the high company-financed R&D firms. The difference between the two is not significant when using this measure, however.

Recalling the earlier discussion of the two measures of riskiness, it is clear how the same data could rank a group of firms "more risky" by one measure and "less risky" by another. The mean rate of return for high company-financed R&D firms is much higher than the mean rate of return for low R&D firms. Thus a larger standard deviation from the higher mean can be consistent with a smaller relative variation from the higher mean. Using the figure presented earlier, the shaded portion of Figure I shows the area in which a given point, when compared to points of equal height along the two lines of riskiness, would be ranked more risky than the corresponding point on one line, and less risky than the corresponding point on the other line. Our sample results for low R&D firms and high company-financed R&D firms could be interpreted on the diagram as, say, points A and B, respectively. The higher point (B) is ranked as riskier than the lower point (A) by the SD measure, but less risky by the V measure.

As noted earlier, a "true" measure of what is considered riskiness would differ from the two statistical measures adopted. The standard deviation measure overstates the "greater riskiness" of high company-financed R&D firms relative to low R&D firms, while the coefficient of variation measure overstates the "greater riskiness" of low R&D firms relative to high company-financed R&D firms. A true measure of riskiness, lying between the two, would rank the two types of firms somewhere between the measures adopted.

Since a true measure of riskiness would rank the two alternatives somewhere between the rankings given by the measures adopted, and since the two measures give results in different directions, we conclude that we do not find a significant difference, or even a "good but not significant" difference, between the riskiness of high company-financed R&D firms and low R&D firms.

Explanation of the Results

What accounts for the results that we have found? Let us deal first with the results relating to government-financed R&D. By our measures, firms with a high ratio of predominantly government-financed R&D to net sales undergo greater risk than other firms.

The explanation for this finding appears to be rather straightforward. Government R&D contracts, and the production contracts often associated with them, come in large lumps relative to total sales of the companies concerned. This fact results in large fluctuations in sales and profits, and thus a high degree of riskiness by our measures.

The second major finding of the study is that firms with high ratios of predominantly company-financed R&D to net sales did not undergo greater risk than low R&D firms by our measures. An explanation for this finding must certainly be more complex and awaits a fuller understanding of the role of innovating firms in our economy. It may be useful to offer certain preliminary comments, however.

The findings may be explained in terms of two different arguments—one relating to size of firms, the other relating to oligopoly markets and the role of R&D in these markets.

It has been noted earlier that the large firm is able to reduce the riskiness of R&D for reasons relating to size and diversity. The number of R&D projects that may be undertaken at any one time is large, thus allowing the firm to pool the risks from many separate efforts. In addition, the diversity of the products sold by the typical large oligopoly firm and the number of different established markets the firm has to its credit allow the results of R&D—which are not always predictable—to be used more completely. These statements hold true when R&D has the aim of yielding new products. For analogous reasons, R&D directed toward improved processes of production is less risky for the large oligopoly firm.[10]

A supplementary explanation may be sought in terms of the market structure of the typical high company-financed R&D firm. This firm operates in an oligopolistic market, and it may be argued that competition in terms of R&D is a rational way of avoiding "more risky" types of competition for such firms.

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[10] It is recognized that the production of R&D in the American economy is centered in large firms. A recent publication of the National Science Foundation states, "The foregoing data . . . highlight the fact that a relatively small number of companies perform the bulk of the nation's industrial research and development." *Funds for Research and Development in Industry,* 1958, National Science Foundation, NSF 61-32, p. 18.

This argument runs along the following lines. R&D expenditures by the firm tend to increase demand not only for the firm, but for the industry as well. Thus the effect of R&D expenditures by a group of firms in an oligopoly industry is to raise total industry demand, and to allow each firm to increase its absolute sales level.

An implication of this kind of model is that success for a firm's R&D program may not spell defeat for its competitor. Because of an outward shift in the industry demand curve, all firms are able to gain by simultaneously pursuing R&D policies. This result may be contrasted with the results of price competition in such a situation. In this case an increase in sales for one firm due to a lower price will be primarily at the expense of sales of competitors. One means of stating this difference is to say that R&D pursued by all firms in an industry is a non-zero-sum game, while other forms of competition may be zero-sum games.

Thus a high level of R&D may be consistent with expanding sales for all firms in the industry and relatively stable levels of profits as a percentage of net worth. By this argument, reliance on R&D may be entirely consistent with a low ranking on a measure of riskiness. R&D is chosen because it is less risky, when pursued simultaneously by all firms in an industry, than alternative means of expanding sales.[11]

The results of this project indicate that the time-honored equation of innovation and risk-taking should be reconsidered in the light of the present-day American institutional setting. The appearance of government as a large-scale demander of huge "lumps" of research introduces a new and unpredictable force into the research market. The apparent attractiveness of R&D for oligopoly competitors raises the question of whether innovation financed by the company is as risky a pursuit for modern-day enterprises (relative to alternatives) as it was for their predecessors. If it is not as risky, we should expect an upsurge of patenting activity. But this factor may be more than offset by the increased research cost per invention patented.

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[11] R&D may also yield a higher marginal return than alternative expenditures, as suggested by the studies cited earlier (see footnote 2). The explanation presented here is supplementary to, and not competitive with, analysis based on the rate of return.

STUDENT PAPERS

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Trademark Registration of Patented Articles—Extension of Monopoly?

DON W. MARTENS*

I. INTRODUCTION

THE PATENT LAWS GRANT PROTECTION to inventors for only a limited time,[1] while the protection given trademark owners under the Trademark Act of 1946 extends for an unlimited duration.[2] The limited term of a patent is a requirement of the Constitution,[3] and is part of the philosophy that a patent is a contract by which the public grants a monopoly for a limited term in consideration for disclosure of an invention and addition of the invention to the public domain after the patent term.

This paper will attempt to analyze the effect which the limited term and the "contract" philosophy of patents have had on trade-

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[1]Applicant may elect a term of three years and six months, or seven years, or fourteen years, in the case of a design patent, 35 U.S.C. § 173 (1958). The term for a utility patent is seventeen years, 35 U.S.C. § 154 (1958).

[2]The term of the original registration is twenty years 15 U.S.C. § 1058 (1958), but the registration is renewable for succeeding similar terms so long as the mark is in use in commerce or nonuse is shown to be excusable, 15 U.S.C. § 1059 (1958).

[3]Article I, Section 8, Clause 8.

marks, particularly in regard to registrability of patented articles as trademarks under the Trademark Act of 1946.[4]

II. The Common Law

If the public has come to recognize the non-functional features or dress of an article as indicating a particular source of manufacture, the common law has long recognized the right of that manufacturer to prevent others from copying the form of the article in such a manner as to cause public confusion as to source. This common-law right to prevent unfair competition has been restricted, however, where the article has been patented. It is this restriction that forms the basis for the influence of the patent laws on trademark registrability. Therefore some of the common-law cases will be reviewed to determine the extent of the restriction.

The "landmark" cases in this area of the common law are *"Singer Mfg. Co. v. June Mfg. Co.*[5] and *Kellogg Co. v. National Biscuit Co.*[6]

In the *Singer* case plaintiff was the owner of several patents on various functional portions of a sewing machine. Upon the expiration of these patents, defendant began manufacturing sewing machines which were exact copies of plaintiff's. Defendant's right to copy the inventive concepts of the expired patents was not disputed, but plaintiff alleged that he had a common-law right to exclude others from copying the non-inventive dress and trim of his machine. The Supreme Court held that upon expiration of a patent the public acquired the right to make the patented article in the exact form which the patentee had made it during the patent term, even though the public may have come to associate the non-functional dress of the article with patentee as a source. The Court found this public right to be part of the consideration for the patent grant.

In the *Kellogg* case, plaintiff sought to enjoin defendant from the manufacture and sale of shredded wheat in pillow-shaped form. Plaintiff alleged that defendant was competing unfairly because plaintiff had acquired an exclusive right, by virtue of secondary meaning, in the pillow-shape of the biscuit. Plaintiff had previously held utility patents for machines which were designed to produce only the pillow-shaped biscuits, and a design patent on the biscuit shape per se. The utility patents had expired and the design patent

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[4]Another important effect of patent concepts on trademark law relates to generic names for patented goods. This problem is discussed in Greenberg, "The Patent Clauses of the Lanham Act," *The Trademark Reporter,* Vol. 38, p. 3 (1948).

[5]163 U.S. 169 (1895).

[6]305 U.S. 111 (1938).

had been held invalid prior to the suit for unfair competition. The Supreme Court, citing *Singer,* denied relief on the ground that the pillow-shaped form had been dedicated to the public upon expiration of the patents.

Thus the *Singer* and *Kellogg* cases held that upon patent expiration the public acquires a right to copy the article in the form which it was made under the patent, and no common-law trademark rights may interfere with this public right.

The *Kellogg* case was distinguished in *Lucien Lelong Inc. v. George W. Button Corp.*[7] (hereafter referred to as *Lelong I*) where the patented article was a perfume bottle. The District Court pointed out that the *Kellogg* case had involved an attempt to show exclusive right to the patented article itself after patent expiration, whereas the plaintiff here was not attempting to enforce an exclusive right in the bottle itself, but only in the bottle as a trademark or representation of source for the perfume which it contained. The court found that confusion existed as a result of defendant's use of the same bottle design and enjoined defendant from using the bottle for perfume, even though the design patent on the bottle had expired.

A few years later the Second Circuit Court of Appeals refused to find an exclusive right in the same perfume bottle design when asserted by the same plaintiff. In this case,[8] *Lelong II,* the court refused to distinguish the bottles from the biscuits of *Kellogg* and considered that case controlling. The court noted that "during the life of a patent a purchaser will naturally associate the product with the producer, since the patent prevents others from producing." This, the court stated, does not justify unlimited extension of the monopoly.

Some dicta in *Lelong II* which is worthy of note is found in the statement that a different decision might have been reached *1*) if plaintiff had contended that some feature of its design, rather than the entire patented design, had acquired secondary meaning, or *2*) if the design patents had been held invalid before their expiration. The court believed the latter situation to be distinguishable because the patent monopoly would never have really existed.

The Seventh Circuit Court of Appeals apparently concurs in this latter belief. In two recent cases[9] it found unfair competition in

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[7]50 F. Supp. 708, 58 U.S.P.Q. 527 (S.D.N.Y. 1943).

[8]Lucien Lelong, Inc. v. Lander Co., Inc., 164 F. 2d 395, 75 U.S.P.Q. 302 (2 Cir. 1947).

[9]Day-Brite Lighting, Inc. v. Compco Corp., 311 F. 2d 26, 136 U.S.P.Q. 17 (1962),

copying the subject matter of invalid design patents without discussion of any possible conflict with the policy of the patent laws.

III. The Trademark Act of 1946

None of the above cases were concerned with registrability, but rather with common-law protection. Prior to the Trademark Act of 1946, articles of manufacture were not registrable as trademarks. The Act of 1946 introduced two concepts which were new to the registration statutes. The first was that of registration based on secondary meaning, and the other was express recognition of packages and configuration of goods as registrable matter, if capable of distinguishing the applicant's goods.

The Act provides for two separate registers. Registration on the Principal Register is prima facie evidence of registrant's ownership of the mark, and of his exclusive right to use the mark in commerce.[10] The Principal Register is expressly available even to trademarks which are merely descriptive, provided they have become distinctive of applicant's goods in commerce. This recognition of secondary meaning marks is contained in Section 2 (f) of the Act.[11]

On the other hand, registration on the Supplemental Register is of no prima facie evidentiary value. This register is a continuation of that previously provided for in the Act of 1920,[12] and is primarily for domestic registration as a basis for foreign registration of the mark under the International Convention for the Protection of Industrial Property.[13] Registration on this register is expressly open to packages and configurations of goods provided they are *capable* of distinguishing the applicant's goods.[14]

IV. Interpretation of the Act

The cases concerning registration of patented articles have followed a different course in relation to packages than with regard to configurations of goods. For this reason the two types of cases will be considered separately.

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cert. granted 83 Sup. Ct. 1868; Stiffel Co. v. Sears Roebuck & Co., 313 F. 2d 115, 136 U.S.P.Q. 292 (1963), cert. granted 83 Sup. Ct. 1868.

[10]15 U.S.C. § 1057 (b) (1958).

[11]15 U.S.C. §1052 (f) (1958).

[12]41 Stat. 533 (1920).

[13]James Heddon's Sons v. Millsite Steel & Wire Works, Inc., 128 F. 2d 6, 53 U.S.P.Q. 579 (6th Cir. 1942).

[14]15 U.S.C. § 1091 (1958).

A. *Packages*

The issue of registrability of a patented package or container design was first presented in *Ex parte Minnesota Mining & Manufacturing Co.*[15] (The *Scotch Brand Holder* case) in which application was made for registration of the well-known dispenser for "Scotch" brand pressure-sensitive tape as indicative of the source of the tape. The application requested registration on the Principal Register based on secondary meaning under Section 2 (f). The dispenser was already protected by a subsisting design patent. The Examiner in Chief first held that a package or container could not be registered on the Principal Register, even on the theory of secondary meaning, because it is not a "trademark" within the meaning of the Act.[16] The second ground of refusal was that the unexpired design patent precluded registration, just as an expired design patent had precluded protection as a common-law trademark in *Lelong II.* Thus the rule of *Kellogg* and *Lelong II* was made applicable to registration on the Principal Register, and was interpreted to bar registration even during the term of the patent.

A few years later, the Patent Office permitted registration of a patented bottle design on the Supplemental Register in *Ex parte Caron Corp.*[17] The patent, however, had expired more than ten years before the registration was issued. The Commissioner pointed out the differences in the functions of design patents and trademarks, noting that a design patent is a reward for the ultimate contribution to the public of something new, original, and ornamental, while a trademark is an indication of source. The Commissioner commented that trademarks offer protection to purchasers by preventing confusion, and at the same time protect the good will of the product and producer. These functions were found to be so different from those of a design patent that protection accorded a trademark could not realistically be considered an extension of the patent protection. Even though this case involved the Supplemental Register, its rationale is in direct conflict with that of the *Scotch Brand Holder* case, and that case was limited by the Commissioner to its "primary holding" that a container is not registrable on the Principal Register.

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[15]92 U.S.P.Q. 74 (Pat. Off. Ex. in Chief 1952).

[16]See also Derenberg, "The Lanham Trade-Mark Act of 1946, Practical Effects & Experiences After One Year's Administration," *The Trademark Reporter,* Vol. 38 (1948), pp. 831, 841, to the effect that the Patent Office did not contemplate permitting registration under Section 2 (f) of bottles, configurations of goods, etc., which were made registrable only on the Supplemental Register.

[17]100 U.S.P.Q. 356 (Com. Pats. 1954).

As to secondary meaning, it was stated in the *Caron* case that registration on the Supplemental Register required only that the bottle be *capable of distinguishing* applicant's perfume, and therefore secondary meaning was found to be unnecessary. The Commissioner commented, however, that secondary meaning probably could not be acquired during the term of the patent; but after the bottle design was added to the public domain, it could be recaptured through exclusive use and secondary meaning just as if it had never been patented.

In the *Pepsi-Cola*[18] case the Trademark Trial and Appeal Board endorsed the *Caron* holding that secondary meaning is not necessary to registration on the Supplemental Register. In addition the Board made it clear that the Patent Office would register a bottle as a mark on the Supplemental Register even though the bottle was protected by an *unexpired* design patent. The Board emphasized that:

> "(A) trademark registration on the Supplemental Register indicates only that the bottle is capable of distinguishing applicant's *soft drink* which is sold in the bottle.
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> * * *
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> Since there is nothing inconsistent about the simultaneous existence of a design patent on a bottle and a Supplemental Registration of the bottle for its contents, and since such registration during the term of the design patent clearly was contemplated by the framers of the Trademark Act of 1946, the Examiner erroneously refused registration on the ground that it was precluded by the existence of the design patent."[19]

The *Caron* and *Pepsi-Cola* cases left no room for doubt as to the Patent Office position that a patent, subsisting or expired, has no effect on registrability on the Supplemental Register. At the time of the *Caron* decision, the affect of a patent on Principal Registration of the patented article seemed moot, in view of the holding in the *Scotch Brand* case to the effect that articles as such were not registrable on that register whether patented or not.

The *Pinch Bottle* case[20] gave this question new life, however, by overruling the *Scotch Brand* case[21] and holding that a distinctive bottle is registrable on the Principal Register if secondary meaning is shown. Although no patent was involved in the *Pinch Bottle* case, the opening of the Principal Register to containers made it inevitable that a case would arise in which the container had been patented.

Such a case was presented in *In re Mogen David Wine Corp.*[22] The

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[18]In re The Pepsi-Cola Company, 120 U.S.P.Q. 468 (T.T.A.B. 1959).

[19]*Id.* at 469.

[20]Ex parte Haig & Haig Ltd., 118 U.S.P.Q. 229 (Com. Pats. 1958).

[21]The Commissioner stated that "certain broad language in the cited cases appears to have been unnecessary to the conclusions reached therein." *Id.* at n. 2.

[22]134 U.S.P.Q. 576 (T.T.A.B. 1962).

application was for a particular wine bottle as a trademark for wine. Applicant was the owner of a subsisting design patent for the same bottle design. It was contended that the bottle had acquired secondary meaning and was now distinctive of applicant's goods and, therefore, was registrable under the rule of the *Pinch Bottle* case. As to the existing design patent, applicant relied on the *Pepsi-Cola* case, in which registration on the Supplemental Register had been permitted in spite of a subsisting design patent. The Board distinguished these cases, however, and refused registration.

The *Pinch Bottle* case was easily distinguished by the Board in view of the subsisting design patent. The *Pepsi-Cola* case was also found to be inapposite because that case was concerned with registration on the Supplemental Register. The Principal Register, the Board felt, involved a different question because of the prima facie evidence of ownership and exclusive right to use afforded by registration on that register. Since registration on the Supplemental Register raises no such presumption, but merely indicates that the bottle is capable of distinguishing the goods, the Board did not consider such registration to extend the monopoly granted under the patent. In regard to registration on the Principal Register, however, the Board stated:

> "Since applicant's design patent is due to expire in 1964, it is apparent that the issuance of a registration on the Principal Register for the same subject matter would be inconsistent with the right of others under the terms of the patent grant to make fair use of said bottle or bottles including wine bottles after the expiration of the patent, and that it would serve, in effect, to extend the protection accorded the patented design contrary to the purpose and intent of the patent law."[23]

As the second ground for refusal to register, the Board held that "use of the subject matter of a design patent during the life of the patent cannot properly be considered as trademark use,"[24] citing the dicta to that effect in *Ex parte Caron Corp.* This ground is "on all fours" with the secondary holding in the *Scotch Brand Holder* case, which the Board did not cite.

It is important to note that there were two grounds for refusal in the *Mogen David* case:

> *1*) Registration on the Principal Register would be an extension of the patent monopoly and therefore contrary to the purpose of the patent laws.
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> *2*) Secondary meaning cannot be acquired during the life of a design patent.

The second ground would apparently not be applicable in a situa-

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[23] *Id.* at 578.
[24] *Ibid.*

tion where the secondary meaning was based on exclusive use after expiration of the patent.[25] Another situation in which the second ground would not apply is in an application to register a patented container as inherently distinctive rather than based on secondary meaning.

That a bottle may be registrable without showing secondary meaning, if inherently distinctive, is indicated by the dicta of the Court of Customs and Patent Appeals in the *Tabasco Bottle* case.[26] There applicant did not purport to base registrability on secondary meaning under Section 2 (f) but rather on inherent distinctiveness of the bottle. The court, in finding the bottle to be non-distinctive, seemed to consider this to be a question of fact to be determined in each case.

The *Mogen David* case is now pending before the Court of Customs and Patent Appeals and the decision on that appeal may clear up some of the doubt concerning patented containers.

B. *Configurations of Goods*

The tribunals have shown a hesitancy to permit registration of even unpatented goods on either the Supplemental or Principal Register.

One reason for this is that a configuration of goods generally can indicate only the source of the goods themselves, while a container is not considered to represent the source of the container itself, but rather the source of the goods which it contains. Because of this the tribunals have had more difficulty fitting configurations into the classic concept of a trademark—something *affixed to* goods to indicate source. This problem is averted if application is made to register only a part of the whole article. For this reason the tribunals have adopted a rule that "configuration of goods," as used in the Trademark Act, means only a part of the entire goods for which the configuration indicates the source.[27]

A second factor contributing to the hesitancy to register configurations is functionality. It is well established that a feature which is primarily functional cannot serve as a trademark.[28] A configura-

[25]The Board stated: "The question whether or not the decanter bottle has acquired a secondary meaning and therefore serves as a trademark to identify and distinguish applicant's wines is one which can be considered, if at all, only after the expiration of the design patent." *Ibid.*

[26]In re McIlhenny Co., 47 C.C.P.A. (Patents) 987, 278 F. 2d 953, 126 U.S.P.Q. 138 (1960).

[27]Alan Wood Steel Co. v. Watson, Comr. Pats., 150 F. Supp. 861, 113 U.S.P.Q. 311 (D.D.C. 1957); Ex parte Mars Signal-Light Co., 85 U.S.P.Q. 173 (Com. Pats. 1950).

[28]Alan Wood Steel Co. *id.*; In re Deister Concentrator Co., Inc., 48 C.C.P.A. (Patents) 952, 289 F. 2d 496, 129 U.S.P.Q. 314 (1961) and cases cited therein.

tion of goods, is often functional, and it is often the distinctive features which perform the function.

These factors have resulted in a more conservative approach to registration of configurations. This conservative attitude may be the reason for the harsh rules with regard to the effect of a patent on registrability of a configuration.

The strict view that a configuration of goods could not be registered, even on the Supplemental Register, and even if not patented, so long as the article "is of a nature which would clearly be subject to protection under the Patent Law if otherwise eligible," was presented in *Ex parte Mars Signal-Light Co.*[29] and in *Alan Wood Steel Co. v. Watson.*[30] Both of these cases, however, involved attempts to register the entire goods as a configuration, and the articles were also found to be functional. These two factors may have influenced the strict view taken in these cases.

The first reported case to test registrability of a patented configuration of goods was *Ex parte Metals & Controls Corp.*,[31] and that case was also complicated by an attempt to register the entire goods. Registration on the Supplemental Register was sought for the configurations of several electric switch designs. Utility patents for these same switches were still in effect, and the drawings in the trademark applications were substantially identical with the patent drawings. The Commissioner distinguished the *Caron* case as relating to registration of a bottle as indicative of the source of its contents, rather than a switch as indicative of the source of the self-same switch. In refusing registration, the Commissioner held that the subsisting patents barred registration because the public's freedom to make the patented switches after expiration would include the right to make them in the design disclosed in the patent drawings. This was stated to be a fundamental matter of law and fact.

The reasoning of the *Metals & Controls* case was adopted, although not cited, by the District Court for the District of Columbia in the *U. S. Plywood*[32] case. There, striated or grooved plywood was refused registration on either register as a mark for plywood. The court found the striae to be functional in that they prevented cracking. As to the Principal Register, the striae were found not to be "trademarks" since they were inseparable from the goods themselves.

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[29]*Op. cit., supra,* note 27.

[30]*Op. cit., supra,* note 28.

[31]110 U.S.P.Q. 62 (Com. Pats. 1956).

[32]United States Plywood Corp. v. Watson, Comr. Pats., 171 F. Supp. 193, 120 U.S.P.Q. 261 (D.D.C. 1958).

Registration was also refused, however, as barred by a subsisting utility patent relating to the striae. The court considered the holding that patented goods could not be registered as a trademark to be so obvious that no discussion was warranted.

Both the *Metals and Control* case and the *U. S. Plywood* case preceeded the *Pepsi-Cola* case, which permitted Supplemental Registration of a patented container before patent expiration. It is interesting to note that the Trademark Trial and Appeal Board, in *Pepsi-Cola,* did not feel compelled to even distinguish the *Plywood* case, in spite of the fact that the latter was decided by a Federal District Court. This exemplifies the prevalent feeling that configurations of goods present a completely different problem than do containers in regard to the effect of a patent on registrability of either.

The Court of Customs and Patent Appeals recently considered the effect of patents relative to registration of configurations. *In re Diester Concentrator Co., Inc.*[33] concerned an application for registration on the Principal Register under Section 2 (f), of an outline shape for an ore concentrating table. The table was rhombic in outline, and had been the subject matter of two utility patents, only one of which had expired. Applicant was not seeking registrataion for a rhombic shape to be marked on the tables, but was seeking to register the shape of the tables per se as indicative of table source. Registration was refused because the outline was found to be functional. In so refusing, the court used strong language to the effect that the *Kellogg* case must be read into the Trademark Act of 1946. Reading the decision carefully, however, it is evident that by this the court meant only that the public has a right to copy functional shapes, absent any patent or trademark protection, and such shapes cannot be protected by trademark even though they may, in fact, be indicative of source. As to the patents, the court emphasized that they were not a bar to registration except insofar as they were evidence that the shape was functional.[34]

Although the discussion of the effect of the patents in *Deister* could be passed off as mere dicta, since registration was refused because of functionality, it appears to be a strong indication of the feeling

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[33]48 C.C.P.A. (Patents) 952, 289 F. 2d 496, 129 U.S.P.Q. 314 (1961).

[34]A more recent case, In re Pollak Steel Co., 50 C.C.P.A. (Patents ___, 314 F. 2d 566, 136 U.S.P.Q. 651 (1963) also emphasizes that functional features are not registrable even though they indicate source. That case involved no patent. Registration was refused on the Supplemental Register because the feature in question being functional, and thereby copyable, was not capable of distinguishing the goods, if someone else should choose to copy.

of the court because of the emphatic manner in which it was stated.

C. *Summary of the Case Law*

It is evident that the Patent Office considers containers which are capable of distinguishing the goods contained, to be registrable on the Supplemental Register in spite of either a subsisting or an expired patent covering the container.[35] Likewise it is clear that the Patent Office does not consider a container which is the subject matter of a subsisting patent, to be registrable on the Principal Register based either on secondary meaning or on inherent distinction.[36] It is questionable whether the Patent Office considers an expired patent to bar registration on the Principal Register, but the first ground of refusal in the *Mogen David* case indicates that it does.

As to configuration of goods, the law is not nearly so clear. The strict view is that goods which are capable of patent protection by their nature (without regard to the question of invention) are not registrable on either register.[37] This view has been expressed, to date, only in cases which involved functional, configurations of goods, and possibly may be restricted to such situations. Other cases have held that configuration of goods are not registrable on either register if they are the subject matter of subsisting patents.[38] Dicta in one of these cases indicates that the Patent Office would apply this rule even if the patent had expired long ago. Again, these cases have involved functional goods, and it is not clear how much influence functionality had on the decisions.

The Court of Customs and Patent Appeals has indicated that it considers patents, either subsisting or expired, to have no effect on registrability, except as evidence of functionality.[39] Although this case involved a configuration of goods rather than a container, it is likely that the same rule would be applied to containers, in view of the generally more liberal view taken towards them. The *Mogen David* case, now on appeal, will give the court an opportunity to consider this.

Of course it is questionable whether a configuration of goods is registrable on the Principal Register even if not patented or of a patentable nature,[40] but dicta in *Deister* indicates that a shape which is

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[35]*Op. cit., supra,* notes 17 and 18.
[36]*Op. cit., supra,* note 22.
[37]*Op. cit., supra,* note 27.
[38]*Op. cit., supra,* notes 31 and 32.
[39]*Op. cit., supra,* note 33.
[40]Judge Rich has expressed such doubts. In re McIlhenny Co., 47 C.C.P.A. (Patents) 987, 287 F. 2d 953, 126 U.S.P.Q. 138 (1960) (concurring opinion).

arbitrary and non-functional would be registrable even on the Principal Register.[41]

V. Recommendations

It appears to be self-evident that a patent monopoly should not be extended by the trademark laws. This general statement, however, should not be considered dispositive of all cases relating to registration of patented articles. Instead the differing functions of trademark protection and patent protection should be recognized, and both types of protection granted in the proper cases.

In determining what is a "proper case," two caveats must be kept in mind:

> 1) Functional features should never be given trademark protection.
> 2) The *Singer* and *Kellogg* cases must be read into the Trademark Act of 1946.

Absent patent protection, the public has a right to copy functional features so long as the goods are clearly labeled to avoid confusion as to source. If this were not so, the trademark laws might serve as a substitute for the patent laws, and give protection unlimited in term to functional features which were not sufficiently inventive to obtain the limited-term protection of the patent laws.

Care should be taken, however, not to overextend the prohibition of registration of functional features. The cases involving containers have recognized that a container is functional in that it acts as a receptacle. Yet it is not this functional feature which distinguishes a particular bottle such as the "Pinch Bottle." Therefore, it is recognized that registration is not sought for the functional feature which is common to all bottles, but for an arbitrary and non-functional design of a functional container. Similarly a configuration of goods should not be refused registration merely because the goods are functional, but only if the configuration which distinguishes the goods is functional.

Although the *Singer* and *Kellogg* cases were concerned with the common law of unfair competition, the Trademark Act of 1946 is based on that common law and is primarily directed to registration of rights which already existed under it. Absent any contra indication, it appears that Congress intended these cases to be read into the Act.

These cases held that the policy of the patent laws requires the form of the patented article to be donated to the public domain upon patent expiration. Since retention of a trademark right in the form

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[41] *Op. cit., supra,* note 33, 129 U.S.P.Q. at 321.

would be inconsistent with the public's right to freely copy it, all trademark rights in the form are lost at patent expiration.

Neither *Singer* nor *Kellogg* should be considered, however, to prohibit registration of patented article forms in all circumstances. Unpatented article forms and descriptive words which are part of the public domain may become trademarks if they acquire secondary meaning. Similarly patented articles, although a part of the public domain by operation of law upon patent expiration, should be recognized as trademarks if they acquire secondary meaning based on use after such expiration.

When a single producer operates extensively under the patent and he continues to be the sole producer of the form after expiration, it sometimes may be difficult, as a matter of fact, to determine whether the use after expiration was sufficient to establish secondary meaning without the use during the patent term. However, such a finding should not be prevented as a matter of law.

To refuse trademark portection based on secondary meaning acquired during the patent term is logical even in the absence of the *Singer* and *Kellogg* rules. During the patent term the public may well come to associate the patented form with the patentee as a source. But in such a case the secondary meaning is the product of the patent monopoly. To grant an exclusive trademark right because of this secondary meaning, while perhaps not literally an extension of the patent monopoly, would be the grant of a second monopoly based only on the patent monopoly. Although admittedly concerned with a completely different problem, a long line of patent misuse cases make it clear that the patent monopoly is not to be used to gain another monopoly.

Again, recognition of a trademark right based on secondary meaning acquired after patent expiration is not inconsistent with this reasoning.

Keeping the above caveats in mind, the objection that trademark protection is an extension of the patent protection appears unreasonable. The patent protection is a grant of the exclusive right to make, use, and sell for a limited term, in return for disclosure of the invention and a right in the public to copy the invention after the patent term. The purpose of the patent laws is to promote the progress of the arts and sciences. Trademark protection, on the other hand, is a form of protection given to a merchant to prevent others from trading on his good will, and a protection to the public to prevent them from being confused as to the source of the goods they purchase. The protection extends only to prevent others from using the

mark in commerce, in connection with a sale, in such a manner that confusion is likely.[42] This protection is not only considerably narrower than the patent protection, it is for a different purpose. In fact, it is a different protection and cannot be considered an extension of the patent protection so long as it is not the product of the patent monopoly.

This reasoning leads to the conclusion that containers and nonfunctional configurations, if capable of distinguishing the goods, should be registrable on the Supplemental Register irrespective of any patent, either expired or subsisting. Such registration serves primarily as a basis for foreign registration and raises no presumption of exclusive right to use. Thus it is not inconsistent with the public right to copy the article form upon patent expiration.

Registration of patented containers and configurations on the Principal Register should also be permitted, where secondary meaning can be shown based on use after the patent expiration. The *"Pinch Bottle"* case recognized that unpatented containers were registrable and, therefore, patented containers should be also, provided the secondary meaning is acquired after patent expiration. There appears to be no good reason that the same rule should not apply to arbitrary configurations. The cases which have dealt with patented configurations have involved functional configurations and should be restricted to such fact situations.[43]

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[42]15. U.S.C. § 1114(1) (1958).

[43]The argument that a configuration of goods cannot be a "trademark" since it is not applied to the goods appears overly technical when the configuration is nonfunctional. Is not the configuration applied to the goods?

Protection Against Imports Which Undermine The Value Of A United States Patent

LAWRENCE G. KASTRINER*

I. Introduction

The growing importance of international trade and the growth of other highly industrialized countries has resulted in a steady increase over the past two decades in the importation of manufactured goods of all types.[1] As the total amount of importation increases, it is reasonable to expect a proportional increase in the importation of products patented in the United States and of products made by the use of patented processes. This discussion will consider the legal protection which a domestic patentee has against such importation and its adequacy.

There are at present two independent sources of legal protection against imports. One is provided by the Patent Laws;[2] it requires bringing an action for patent infringement. The other is provided by Section 1337 of the Tariff Act[3] which necessitates instituting an action to exclude the product from importation.

II. Protection Under the Patent Laws

A. *The Statute*

The Patent Act provides a remedy by civil action against anyone who infringes a patent.[4] It defines an infringer as one who "without authority makes, uses or sells any patented invention, within the United States" or one who "actively induces infringement of a patent."[5] If the patent owner prevails in such a suit, he may obtain damages,[6] an injunction[7] or both, together with costs, and in excep-

*This paper was submitted in partial fulfillment of the requirements for the Seminar and Lecture Series given by the Research Institute in conjunction with The George Washington University Law School for the year 1963.

[1]United States Department of Commerce, Bureau of the Census, Statistical Abstract of the United States 875-876 (1962).

[2]35 U.S.C. § 1-293 (1952).

[3]46 Stat. 703 § 337, 19 U.S.C. § 1337 (1960).

[4]35 U.S.C. § 281 (1952).

[5]35 U.S.C. § 271 (1952).

[6]35 U.S.C. § 271 (1952).

[7]35 U.S.C. § 283 (1952).

tional cases, attorney fees.[8] Invalidity of the patent and non-infringement are the principal defenses provided for.[9]

B. *Judicial Interpretation*

It is a fundamental principal of patent law that the claims of the patent constitute the monopoly granted.[10] Consequently, it has been held that a product claim can only be infringed by a product, while a process claim can only be infringed by practice of the process.[11]

In a leading case, *Dowagiac Manufacturing Co. v. Minnesota Moline Plow Co.*,[12] plaintiff, owner of a patent for certain grain-drills, having succeeded in an infringement suit, sought an accounting of profits and an assessment of damages for sale of the infringing article. Included in plaintiff's claim for damages was the *sale* by defendant in Canada, of 261 drills. No part of the sales transaction had occurred in the United States, nor had defendant manufactured the drills. The Supreme Court held that as to the drills sold in Canada there could be no recovery, stating, "The right conferred by a patent under our law is confined to the United States and its Territories. . . and infringement of this right cannot be predicated of acts wholly done in a foreign country." Thus, it seems evident that the acts constituting infringement (making, using or selling) must take place within the United States, since foreign acts have no legal effect upon the rights of an American patentee. This is necessarily so, since a patent is a grant by a sovereign power, and the rights, privileges and obligation arising therefrom must begin and end with the boundaries of the sovereignty that granted it.[13] Foreign patents grant no monopolies in the United States, just as United States patents grant no monopolies in any foreign country.[14]

There is, however, a statutory exception from the law stated above. Section 272 of the patent laws provides that the temporary or accidental presence in this country of foreign vessels, aircraft, or vehicles does not constitute infringement if the invention aboard such craft is used exclusively for the needs of such transportation facility, and provided the foreign country involved affords similar privileges to the United States.

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[8] 35 U.S.C. § 285 (1952).
[9] 35 U.S.C. § 282 (1952).
[10] Aro Mfg. Co. v. Convertible Top Replacement Co., 365 U.S. 336 (1961).
[11] In re Amtorg Trading Co., 75 F. 2d 826 (C.C.P.A. 1935).
[12] 235 U.S. 641, 650 (1914).
[13] Aluminum Co. of Am. v. Sperry Prod., 285 F. 2d 911 (6th Cir. 1960).
[14] *Ibid.*

It is readily apparent, that as a consequence of the application of the principals discussed above, the importation of articles which were manufactured in a foreign country may infringe a product patent but cannot infringe a process patent.

In *Boesch v. Graff*[15] the defendant imported certain patented lamp burners which he had purchased in Germany from one authorized by the German patentee to make and sell them. In an infringement action brought by the owner of the United States patent, it was held that regardless of the rights defendant may have acquired from the German patentee, he was not thereby authorized to sell the articles in the United States in defiance of the rights of a domestic patentee. The court stated:

> "The sale of articles in the United States under a United States patent cannot be controlled by foreign law."

A similar situation involving the question of *use* rather than *sale* of an imported article was presented in *Daimler Manufacturing Company v. Conklin.*[16] In that case the defendant purchased an automobile abroad having patented improvements from a person authorized to sell it there. Plaintiff sought to enjoin his use of it in this country on the ground that the defendant had no license of any kind from the United States patentee. The court made note of the fact that the United States grants patentees three distinct and independent rights within its own territory, *viz.,* the right to make, the right to use, and the right to sell the invention. Relying upon *Boesch v. Graff* it found no reason to distinguish between use and sale of an infringing import, and granted plaintiff the relief he sought.

Hence, it may be said that either use or sale in the United States of an article patented in this country, will constitute an infringement of a domestic patentee's rights, though such article may have been purchased in a foreign country from one authorized to sell it there, and even though use or sale of it in such foreign country may be wholly lawful. In other words, the owner of a product patent has the exclusive right within the jurisdiction of the United States to control the use or sale of that product regardless of where it may have been manufactured.[17] However, effectiveness of bringing infringement suits against users and sellers, rather than the manufacturer is another matter.

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[15]133 U.S. 697 (1889).
[16]170 Fed. 70 (2d Cir. 1909).
[17]Beckton, Dickenson & Co. v. Eisele & Co., 86 F. 2d 276 (6th Cir. 1936).

The owner of a process patent, however, receives no protection at all under the patent laws, since a process patent is not infringed by the importation of an article made by the patented process in a foreign country.[18] To constitute an infringement, the patented process would have to be practiced in this country.

III. Protection Under the Tariff Act of 1930

A. *The Statute*

The patentee has an alternative remedy provided by § 1337 of the Tariff Act of 1930[19] whereby he may be able to exclude entirely the importation of an article from the United States. That is, of course, a highly desirable type of protection, or at least it would be, were it more readily available.

Section 1337[20] provides in substance that unfair methods of competition and unfair acts in the importation of articles into the United States, the effect or tendency of which is to destroy or substantially injure an industry which is efficiently and economically operated, are unlawful. When such unfair acts are established to the satisfaction of the President, he directs the Secretary of the Treasury to exclude the articles concerned from entry into the United States.[21]

B. *Procedure*

The complex requirements of the statute make it evident that the procedure for exclusion is a tedious one. When a domestic manufacturer discovers, he need not, of course, be the owner of a patent, that someone is importing goods which damage his business, he initiates action by filing a complaint with the Tariff Commission alleging that such importation will have a tendency to injure a domestic industry which is efficiently and economically operated. If the manufacturer has a patent on the article being imported he will naturally mention its infringement. It is interesting to note, that all reported cases which have arisen under this section have involved patents or trademarks.[22] After receiving the complaint the Commission makes an investigation on its own of the facts, and if these warrant futher action, it conducts a public hearing in conformity with its

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[18]In re Amtorg Trading Corp., *Op. cit., supra,* note 11.

[19]*Op. cit., supra,* note 3.

[20]19 U.S.C. § 1337 (a) (1960).

[21]19 U.S.C. § 1337 (e) (1960).

[22]Taylor, "Protection Under the Tariff Act," *Western Reserve Law Review* (1962), pp. 377, 383.

rules[23] at which time both the importer and the domestic manufacturer are permittd to introduce evidence, subject to cross-examination by the opposing party.[24] The importer's appearance is, however, entirely voluntary, there being no provision to compel his participation in the hearings.[25] Upon the conclusion of the hearing, the Commission makes its findings of fact. These findings are then submitted to the President, along with recommendations by the Commission. It is then left to the President to decide whether the facts establish to his "satisfaction" that the importation constitutes an unfair method of competition or an unfair act of importation within the meaning of the act. If the President finds for the complainant, he will direct that the articles in question be excluded from entry.

The right of appeal in this procedure is rather limited. The statute[26] permits no appeal from the Tariff Commission's findings of fact, and permits appeal to the Court of Customs and Patent Appeals only with respect to questions of law, and even then only by the importer. Accordingly, a finding unfavorable to the complainant ends the matter. Even if the Commission's recommendation is favorable to the complainant, the facts may not have been "established to the satisfaction of the President"; from his decision there is no appeal.[27]

C. *Judicial Interpretation*

What constitutes "unfair methods of competition" or "unfair acts in importation," insofar as a patent owner is concerned?

The first case to consider this matter was *Frischer and Co. v. Bakelite Corp.*[28] which held that articles made in conformity with a process claimed in a United States patent constituted an unfair act. This finding was not, however, necessary to the decision, since the court also found "palming off" which would have met the traditional, common law definition of unfair competition, as well as trademark infringement. The *Frischer* case also held that the Tariff Commission had no authority to pass on the validity of the patent involved and had to treat it as prima facie valid unless the evidence established that the patent had either expired or had been invalidated by a court of competent jurisdiction.

Four years after the *Frischer* case, in 1934, two more cases arose.

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[23] 19 C.F.R. § 201.10 (1951).
[24] 19 C.F.R. § 201.14 (b) (1951).
[25] *Op. cit., supra,* note 22, at 384.
[26] 19 U.S.C. § 1337 (c) (1960).
[27] 19 U.S.C. § 1337 (e) (1960).
[28] 39 F. 2d 247 (C.C.P.A. 1930).

In the first of these, *In re Orion Co.*[29] the court upheld the Commission's finding that the imported articles were made in conformity with the specifications and claims of the complainant's patents, and that these facts formed a proper basis for a holding of unfair competition, and that such findings did not and could not amount to a finding of infringement as defined by the patent laws, since such a determination did not lie within the Commission's jurisdiction.

The second of these cases, *In re Northern Pigment Co.*[30] was decided the same day as the *Orion* case, and was substantially similar on its fact to the latter case. The material point of distinction between the cases is that in the *Northern Pigment* case a process patent was involved, while in the *Orion* case there were product patents. Hence, in the *Northern Pigment* case the importation and subsequent sale in this country of the articles made by the patented process did not constitute an infringement, as it did in the *Orion* case. Nonetheless, the court reached the same result in both cases. In fact, the court stated directly that importation of a product made by the process of an American patent falls within the meaning of "unfair competition" as used in the Tariff Act, even though it may not constitute an infringement under the patent laws. Less than a year later, however, in *In re Amtorg Trading Corp.*[31] the court upon "mature consideration" reversed its position, overruled its decision in the *Northern Pigment* case insofar as it related to process patents, and held that Congress had not intended to enlarge substantive patent rights by enactment of the Tariff Act. Thus, the process patentee was again left without a remedy against imports which could materially diminish the value of the patent.

In 1940 Congress repudiated the *Amtorg* case by adding section 1337a to the Traiff Act[32] which places the owner of a process patent in the same position as the owner of a product patent. It states:

> "The importation for use, sale, or exchange of a product made, produced, processed, or mined under or by means of a process covered by the claims of any unexpired valid United States letters patent shall have the same status for the purposes of section 1337 of this title as the importation of any product or article covered by the claims of any unexpired valid United States letters patent.

Only two cases involving section 1337a have been reported. Both of these seem to voice a more liberal construction of the Tariff Act

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[29] 71 F. 2d. 458 (C.C.P.A. 1934).
[30] 71 F. 2d 447 (C.C.P.A. 1934).
[31] *Op. cit., supra,* note 11.
[32] 54 Stat. 724 (1940), 19 U.S.C. § 1337 a (1960).

than was evident heretofore. *In re Von Clemm*,[83] the first of these, held that the term "unfair methods of competition" should be broadly construed and not be limited to acts coming within its definition when applied to purely domestic competition. It held further, that in order to satisfy the statutory requirement of substantial injury to an industry, it was sufficient to show that only one company was in the industry, whose size was immaterial, and that no substantial damage to the complainant had to be shown, it being sufficient if a tendency to damage had been shown. The second of these, *S. J. Charia & Co. v. United States*[84] held that the extention of a presidential order excluding certain imports beyond the term of the infringed patent was proper, since unfair competition within the meaning of the Tariff Act does not depend upon the existence of a patent.

Despite these decisions, uncharted areas in the Tariff Act still remain. Phrases, such as "efficiently and economically operated" industry have had no judicial interpretation, and therefore, remain possible traps for future litigants.

IV. Conclusion

A. *Criticism*

The conclusion seems obvious that despite two independent sources of legal protection the patent owner's real protection against imports which may materially lower the value of his patent is grossly inadequate and impractical. In some cases it is unfair to the importer.

While it is true that the patent laws permit the owner of a product patent to sue users and sellers of imported articles which infringe his patent, they seem to offer a relatively ineffective remedy. Enforcement of the patentee's rights is likely to require a multitude of infringement suits where the cost of each suit may well be greater than the damage caused by any single user or seller. Additionally, merely locating every infringer is likely to present formidable problems in the case of items purchased by the general public. The owner of a process patent receives no protection at all from the patent laws. Under these circumstances the patent owner finds himself at a considerable disadvantage when trying to protect his rights against imports, as compared to his remedy against a wholly domestic infringement. In the latter situation, a single successful suit against the infringing manufacturer can put an end to the infringement

[83] 229 F. 2d 441 (C.C.P.A. 1955).
[84] 135 F. Supp. (Cust. Ct. 1954), aff'd., 248 F. 2d 124 (C.C.P.A. 1956).

at its source of origin. An equally effective remedy should be provided against imports.

The protection offered by the Tariff Act seems even more impractical than that offered by the patent laws, even though the former is available alike to owner's of product and process patents. The procedure is overly cumbersome, the burden of proof too nebulous and difficult, and the possibility for judicial review unnecessarily limited, in fact, non-existent for the complaint-patentee.

To prevail against a domestic infringer, a patent owner need only prove an infringement and defend the validity of his patent if challenged. Under the Tariff Act, however, he must show substantial injury to an economically operated domestic industry. The latter requirement is not only vague, but seems to be unrelated to the patentee's personal rights which he is attempting to protect. Additionally, the defenses available to the importer under the Tariff Act are insufficient, since neither the Tariff Commission, nor the Court of Customs and Patent Appeals have jurisdiction to determine the validity of a patent. Hence, the importer is denied a principal defense, that of invalidity. A separate suit for declaratory judgment is necessary to raise this defense, and even if it be successful, it may not avoid a finding of unfair competition and still result in exclusion of the import.

B. *Recommendations*

Legislative revision of both the patent laws and the Tariff Act would seem to offer the only way of remedying the problems presently confronting a United States patentee by imports which infringe or materially undermine the value of his patent.

First of all, the patent laws should be amended to include an importer of a product made by a process patented in the United States, in the definition of an infringer. This would place the owner of a process patent on equal footing with owners of product patents where imports are concerned. Such a change in the law would in no way give extraterritorial effect to our patent laws.

Secondly, the right to exclude infringing products from importation should be simplified procedurally. At the same time the procedure should enable an importer to raise all appropriate defenses including invalidity of the patent, and should afford both parties adequate rights of appeal. All of these purposes could, it seems be accomplished by removing those cases of unfair competition which are based on patent infringement from the jurisdiction of the Tariff

Commission, and by granting jurisdiction in cases seeking exclusion of imports to the federal district courts. Such cases could then be tried the same as ordinary infringement suits. Based upon a finding of infringement, with all the conventional defenses thereto, the court could recommend to the President that the imported articles be excluded from this country. In other words, exclusion would be added to the remedies available under the patent laws. Such a recommendation would then be based not on the grounds that substantial injury to an economically operated domestic industry has been found, but simply on the grounds that infringement upon rights granted by the United States to an individual has been found. Such a right would be consistent with the spirit and purpose of the patent laws which is to encourage domestic industry and ingenuity by granting an effective monopoly right; a right with remedy equally as effective against infringement by imports as against a wholly domestic infringement.

Legislation such as proposed is needed if patent rights granted by the United States are to be adequately protected within the territorial limits of this country and not be robbed of their effectiveness as at present.

SELECTED TRANSLATIONS

New Brazilian Antitrust Law—A Departure

IN CONNECTION WITH THE RESEARCH INSTITUTE'S inquiries into Latin American industrial property and related rights, we are presenting a translation of the text of the new Brazilian antitrust law with a Memorandum (Commentary). It seems to be timely for three reasons: first, the new law appears to be a departure in many respects; second, it may be a pioneer forerunner and influence other Latin American countries; third, there was some discussion of certain aspects of it by Dr. Carlos Henrique Fróes at the fifth International Public Meeting of The Patent, Trademark, and Copyright Research Institute of The George Washington University.[1]

While the translation printed here is unofficial, it is regarded by some as the "most authoritative English version." Others, including Dr. Fróes, have raised questions concerning certain points.[2] Unofficial translations may be somewhat different. Commentary may also not be concurred in by other authorities. This points up some of the difficulties in translation, but the benefits on the whole make it worth while. Caution is suggested until there is an official text.

According to our information, the previous antitrust laws of 1938 and 1951 were not vigorously enforced. In fact, the new law is the first statute devoted exclusively to antitrust matters. Pursuant to Chapters II and III of this law, a new administrative agency with broad jurisdiction and authority, CADE, has been established and major changes and additions have been made in the types of offenses recognized, the methods of procedure, and in the penalties and fines imposed. For example,

[1]Held in Lisner Auditorium on the campus of The George Washington University on May 23, 1963, this meeting devoted to Latin American changes and prospects was one of a series of public lectures and discussions on "Current International Industrial Property Developments and the Relation Thereto of Antitrust and Trade Practice Laws and Policies." The object of the series is to provide an opportunity to exchange views with officials and other foreign experts who are in a decision-making or recommending capacity with respect to new international developments and who, being located abroad, would not ordinarily be available to people in this country.

with respect to procedure, Article 74 requires a registration of certain agreements, Article 78 allows CADE rather wide discretion for the production of books and papers, Article 43 makes it possible to issue a cease and desist order, Articles 45, 46, and 47 introduce the concept, and Articles 48 through 71 provide a comprehensive judicial procedure, for the assumption of government control of companies. Articles 43, 46, 74, and 78 assess and levy rather heavy fines.

Dr. Fróes, one of the guest lecturers in the fifth International Public Meeting of The PTC Research Institute, discussed some difficult questions raised with respect to Article 4 (a provision specifically directed to patents) as follows:

> "MR. PHILLIPS (Moderator): . . . 'If one obtains a patent in the country of origin, such as in the United States here, and we file, let's say, 15 or 20 patent applications in international convention countries, including Brazil, if we permit the patent to lapse in Iran, for example, would that cause a lapsing of the Brazilian patent or must the lapsing be only in the United States?'
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> "DR. FROES: . . . As you could see from the quotation I made of Article IV, it is a very vague provision . . . . because it refers to a country with which Brazil has an agreement and it may happen, for instance, that an American patentee has patents elsewhere and also in Brazil. Due to some reason or other, he allowed the patent to lapse in Iran, for instance, many years ago, whereas his patent is alive in Brazil, where he's very interested in working it, having a plant exactly for that purpose.
>
> "So, the question is: Will he lose the patent because in the past inadvertently he allowed the patent in Iran to lapse? That is the big problem. Now, we have to see that in detail. I have to answer the question by parts. The first one concerns the meaning of the word 'caducado.' . . .
>
> "The fact is that the word 'expired' contained in the translation does not correspond exactly to the Portuguese word 'caducado.' This word in Brazil is the equivalent to 'forfeited.' So you see it does not have such a broad meaning as the word 'expired' because 'forfeited' pursuant to my knowledge, is the expiration of a patent, for instance, due to some fault on the patentee's part . . . . the payment of taxes, and in Brazil the lack of working, too. Therefore, in case my interpretation prevails, the provision will be applied to just an insignificant number of cases. By the way, I am pretty sure that the intention of the legislator was to use the word 'expirado' ('expired') but instead—I don't know why—he used the word 'caducado' ('forfeited'). Now, according to the Brazilian system, what matters is what is written, not what was intended to be written. Under these circumstances, reverting to the example given in the question raised, if the patent in Iran just lapsed due to the expiration of its normal life, this would not entail the cancellation of the Brazilian patent.
>
> "Let me now revert to the second part of the question. . . . Though the law was intended to cover all the countries, the expression used was not very clear, and why the correct interpretation is the one that considers only the country of origin. I think it is a quite reasonable in-

terpretation and, as a matter of fact, it is the only reasonable one, especially if you compare this provision with the similar one that has been inserted in the foreign capital law according to which no royalties can be remitted unless it is proven that the corresponding registration and patent are in force in the country of origin. In that case it is clearly stated: 'the country of origin.' But in the further provision, a rather vague expression was used which in my opinion should be interpreted in the sense of 'country of origin' because otherwise, it does not make much sense.

"If you will allow me to go a little further, I would even add that the validity of this provision is debatable. I don't know whether the courts will enforce it because it clashes with the Paris Convention to which Brazil is a member. As a matter of fact, this convention provides that patents are considered independent, one from the other, in the various country-members, so what happens to the patent in Iran must not affect the life of the patent in Brazil."[3]

Negotiations are under way to obtain additional, and where possible, official translations of other laws and their interpretations for publication in subsequent issues as part of our Latin American research program. As these translations become available, they will be considered for inclusion in this *Journal.*

L. James Harris

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[2]"DR. FROES: . . . You have read the translation made by the American Chamber of Commerce.

"MR. BAER (From the floor): Yes.

"DR. FROES: And I venture to say that this translation is not quite accurate as far as industrial property matters are concerned. Perhaps the person who made the translation is not an attorney at law and is not fully familiar with the provisions of the Industrial Property Code in Brazil."

"Current Developments in Industrial Property Rights in Latin America and the Relation Thereto of Antitrust and Trade Practice Law and Policies," *PTC J. Res. & Ed.,* Vol. 7, No. 3 (Fall 1963), p. 301.

[3]*Ibid.,* p. 301-302.

THE BRAZILIAN ANTI-TRUST LAW*

(Final text including Vetoes reinstated by Congress)

CHAPTER I
GENERAL PROVISIONS

Art. 1—The elimination of abuses of economic power referred to in Art. 148 of the Federal Constitution will be regulated by the provisions of this act.

Art. 2—The following will be considered abuses of economic power:

I—To manipulate national markets, or to eliminate competition, wholly or in part, by means of:

a) compacts or agreements among companies, or among those persons connected with or interested in their activities;

b) accumulation of companies or of their shares, stock, certicates, or rights;

c) merger, integration, association, incorporation, or any other form of concentration of companies;

d) concentration of shares, stock, certificates or rights under the control of one or more natural persons or legal entities;

e) accumulation of control, management, or administration of more than one company;

f) total or partial cessation of business activity, whether instigated by the company itself or by third parties;

g) obstructing the formation, operation, or development of other companies.

II—For natural or actual monopolies to increase profits arbitrarily by raising prices without need for expansion or other just cause.

III—To seek to create monopolistic conditions, or to speculate excessively for the purpose of promoting a temporary increase in prices, by means of:

a) the destruction or idleness of productive capacity or of consumer goods, whether instigated by a company itself or by third parties;

b) monopolization of finished goods, services, or raw materials;

* The translation of the statute and the Memorandum, dated November 26, 1962, was prepared by the American Chamber of Commerce for Brazil in Sao Paulo and is reprinted here with their permission.

c) withholding goods from the market in order to create a shortage;

d) use of artificial means to cause fluctuations in prices to the detriment of competing firms or sellers of raw materials.

IV—To form economic groupings of companies which restrict the free actions of buyers and sellers, by means of:

a) discrimination as to prices or included services amongst different buyers and/or sellers;

b) conditioning the sale of any product to the sale of any other product or service, or conditioning the purchase of any product to the use of a particular service.

V—To practice unfair competition, by means of:

a) demanding exclusive promotional advertising;

b) making prior agreements as to prices or other benefits in dealings with public authorities or administrative agencies.

Art. 3—When a company with few competitors does business in a certain area of sales or services in which its competitors cannot function, said company will be obliged to submit proof of production costs when there are very clear indications that excessive prices are being charged.

Art. 4—Patents issued by DNPI will be automatically revoked once it is proven that another country with which Brazil has an agreement covering the subject has granted this patent, and that such patent has (subsequently) expired in (such country).

Art. 5—Monopolistic conditions are defined as those in which a company or group of companies so controls the production, distribution, and sale of a product or service that it exercises a preponderant influence on prices.

Sole paragraph: It will be deemed an abuse of economic power for a company operating in monopolistic conditions to suspend or greatly reduce production in order to affect prices, or industries dependent on such goods, unless proof of just cause for such action is presented to CADE.

Art. 6—A company is defined for the purpose of this law as any private or commercial enterprise whose purpose is to earn profits, whether organized as a legal entity or not.

Sole paragraph: Private individuals and the directors and managers of legal entities who do business contrary to the provisions of this act will be civilly and criminally responsible for such abuses of economic power.

Art. 7—Companies which do business contrary to the precepts defined in Article 2 will be subject to the penalties provided in Articles 43 and 47 for such abuses of economic power.

CHAPTER II
ORGANIZATION AND COMPOSITION OF CADE

Art. 8—The Administrative Council for Economic Defense (CADE) is hereby established. This Council is responsible directly to the Prime Minister, and is entrusted with the verification and elimination of abuses of economic power in accordance with this act. CADE shall have nationwide jurisdiction and its head office shall be in the Federal District.

Sole paragraph: (VETOED)

Art. 9—CADE will be composed of a president and four other members to be nominated by the Prime Minister and appointed by the President of the Republic, subject to the approval of the Senate.

§1—The president of CADE will carry out his duties as a delegate of the Cabinet and may be dismissed at the will of the Cabinet.

§2—The other members of CADE will be appointed for four-year terms, with one member to be renewed annually, and reappointment to be allowed. The first appointments will be for four, three, two and one years, respectively, to facilitate the rotation pattern.

§3—During their terms of office the members of CADE will have the privileges and limitations of members of the Judiciary, providing these do not conflict with the present act, including the prohibition against political activity. This provision shall also apply to Regional Inspectors.

§4—The President and other members of CADE will receive a monthly salary of one hundred thousand cruzeiros (Cr$ 100,000.00).

§5—In case of death, resignation or dismissal of a member, the new appointee will serve for the remainder of the term so vacated.

§6—Appointments for the first terms of office will commence from the date CADE is first set up. Thereafter terms will be measured from the termination of previous terms.

§7—Members of CADE may be dismissed only after an administrative tribunal has found such member guilty of administrative irregularity, in accordance with the provisions set forth in the By-laws of Public Civil Servants of the Republic.

Art. 10—The following persons may not become members of CADE:

a) directors, managers, administrators, agents and those holding "ad-negotia" or "ad-judicia" proxies of any company;
b) directors, managers, administrators, agents and those holding "ad-negotia" or "ad-judicia" proxies of any public utility concessionaire or of any other company which enjoys special privileges granted by the State;
c) public servants of any category who do not have the guarantee of stability.

Art. 11—CADE will formulate regulations for its internal operation in accordance with the provisions of this act.

Art. 12—Any member of CADE who is absent from three successive regular meetings, for any reason except a special leave of absence, will automatically forfeit the remainder of his term of office.

§1—(VETOED)

§2—In the absence of the president the member who has been with CADE the longest or, if all have been with CADE for the same time, the eldest shall preside.

Art. 13—Four members must be present to constitute a quorum for CADE, and resolutions will then be effected by a simple majority vote.

Sole Paragraph: In case of a tie the president's vote will be decisive.

Art. 14—On taking office members of CADE will present proof of compliance with the income tax law and a statement of property and income for themselves and their wives, such statements to be submitted annually prior to April 30.

§1—These documents will be filed with the Government Accounts Tribunal.

§2—Regional Inspectors and assistants to members of CADE must submit the statements required by this Article. . .

Art. 15—The general counsel of CADE will attend all meetings, but will not have a vote.

Sole Paragraph: The president of CADE may invite any person to present his views as to matters on the agenda.

CHAPTER III
THE GENERAL COUNCIL

Art. 16—A General Council will be attached to CADE, its members to be selected from amongst the legal counselors and functionaries of the federal government, autonomous and government

institutions, states, and the public service, providing such individuals are not essential to the group from which they are selected.

§1—The persons chosen will serve two year terms, reappointment being allowed.

§2—(VETOED)

§3—The General Council will be headed by a general counsel chosen by the president of CADE in accordance with this Article.

CHAPTER IV
RESPONSIBILITIES OF CADE

Art. 17—CADE shall have the following responsibilities:

a) to make preliminary investigations to verify whether there is a good reason to institute an administrative hearing when an abuse of economic power has been alleged;

b) to ascertain the existence of any acts constituting an abuse of economic power punishable by this act when such has been alleged;

c) to take the necessary steps to eliminate any abuses of economic power being practiced, and to set time limits for the cessation of such practices;

d) to decide whether or not abuses of economic power have been made, in accordance with this act;

e) to notify all interested parties of its decisions and to see that such decisions are being carried out;

f) to inform the General Council of the administrative or judicial action required;

g) to request the assistance of state and municipal executive departments in enforcing this act;

h) to request from any government power the services, personnel, investigations or information required;

i) to approve the appointment of any technicians or experts whose services are deemed necessary for any examination, survey or study, approving in each case the fees and expenses required. These expenses will in turn be assessed against any company found guilty of the violation of this act;

j) to request government control of the company in accordance with the provisions of this act;

k) to inform the judiciary of the names of the officials appointed to control the company;

l) to request the General Council to act in accordance with the pro-

visions of Law No. 3,502 of December 21, 1958, with regard to seizure and loss of property or assets (obtained) unlawfully by any members, assistants or employees of CADE;

m) to establish fines, in accordance with this act;

n) to draw up a list of employees to be submitted to the National Congress by the Prime Minister;

o) to submit a yearly report to the Prime Minister containing information for CADE's allocation of the Federal Budget;

p) to propose the expropriation of assets of companies as provided by this act;

q) to prepare detailed reports on legal entities as required;

r) to inform the public as to the practices which constitute abuses of economic power.

Art. 18—CADE will supervise the administration of quasi-public enterprises and those which constitute national concessions, whatever the form of organization.

§1—This supervision will include economic management and accounting procedures, by means of indirect and subsequent investigations.

§2—CADE will make a yearly examination of the balance sheets and accounts of the companies referred to in this Article, and based on these and on the results of its examination, will propose to the Prime Minister the necessary steps to be taken.

Art. 19—Government employees and managers of companies appointed by the government who commit acts of abuse of economic power will be dismissed from their positions and will also be subject to penalties for their actions, upon accusation by the injured party or ministry to the judicial or administrative authorities.

Art. 20—In addition to the recourse provided in the previous Article, the injured party may seek damages from the responsible government department and its administrators in accordance with the regular procedures of law.

Art. 21—CADE will conduct research and studies which will enable it:

a) to determine what are the effects on the national economy of profit margins, and their effect on the distribution and reinvestment of profits;

b) to define "unfair competition."

Sole Paragraph: Upon completion of the research and studies referred to in this Article CADE will submit its findings to the Prime

Minister, who will in turn take the necessary administrative action or request Congressional action, as required.

Art. 22—Within ninety (90) days after receiving a recommendation from CADE the Prime Minister will submit a message and proposed bill setting forth a standard for balance sheets and accounting methods.

Art. 23—The following shall be the duties of the president of CADE:

a) to preside over meetings, to insure that CADE's decisions are complied with and that its rules are observed;
b) to allocate cases among the members of CADE, by lot, at regular meetings;
c) to exercise the deciding vote, in case of a tie, in addition to his regular vote as a member of CADE;
d) to request from any federal department, autonomous and government controlled entities, as well as from state and municipal departments, all information and measures necessary for complying with this act;
e) to represent CADE in legal matters;
f) to guide, control and supervise the various services of CADE;
g) to call meetings, seeing to it that the respective minutes are drawn up;
h) to draw up a list of employees and submit this to the full board for approval;
i) to sign all correspondence.

Art. 24—The following shall be the duties of the members of CADE:

a) to inform themselves of cases of abuse of economic power and prepare reports thereon;
b) to vote on all questions submitted for decisions;
c) to register decisions on cases under their supervision;
d) to carry out any other duties assigned to them.

CHAPTER V
RESPONSIBILITIES OF THE GENERAL COUNCIL

Art. 25—The following shall be the duties of the General Council:

a) to see that this law is fulfilled, complying with the decisions of CADE and seeing that they are observed;
b) to give opinions on the results of preliminary investigations as to whether to initiate administrative hearings or not;
c) to supplement cases submitted to CADE;
d) to follow up preliminary investigations and administrative hear-

ings and to explain the reasons therefore at the regular meetings.

e) to request from CADE whatever information is deemed necessary to guide the preliminary investigation of the administrative hearing and to follow up thereon;

f) to prepare written opinions on cases submitted to CADE.

CHAPTER VI
PROCEDURAL RULES FOR ADMINISTRATIVE HEARINGS

Art. 26—Abuse of economic power will be verified through administrative hearings initiated by CADE.

Art. 27—Preliminary enquiries, irrespective of notification to the interested parties, will ascertain whether the allegations warrant a full administrative hearing as requested.

Art. 28—Preliminary enquiries will be conducted:

a) by CADE, "ex-officio";

b) by CADE at the request of:

b1) a State Governor;

b2) a State Legislature;

b3) a Mayor;

b4) a Municipal Council;

b5) Federal, State or Municipal public administrative departments, autonomous or government controlled entities;

b6) individual or juridical persons.

§1—The President of CADE will select, by lot, a member who will be in charge of the preliminary investigations of a particular case.

§2—Allegations reported by Legislative Committees of Enquiry will require no preliminary investigation and a full administrative hearing shall be started immediately.

Art. 29—The allegations referred to in Article 28 must be in writing, well founded, signed and witnessed.

Art. 30—Based on the report given by the responsible member of CADE and the opinion of the General Council, CADE must decide whether to initiate a full administrative hearing or to table the allegations. This decision must be made within thirty (30) days of the completion of the preliminary inquiry, without exception.

Art. 31—Once the full administrative hearing has been initiated the president of CADE will select, by lot, a member to be responsible for the case.

Sole paragraph: The responsible member of CADE will direct the ad-

ministrative process and see to it that all time limits established by this act are scrupulously complied with.

Art. 32—The responsible member of CADE shall fix the day, hour and place to start the enquiry and will notify the defendant accordingly.

§1—The enquiry will be started within 10 to 45 days after the administrative process has been initiated.

§2—Defendants will be notified by registered mail or through the office of a Notary for Registration of Deeds and Documents.

§3—In case the defendants cannot be notified as above, special notification will be made through the Federal Official Gazette and through a newspaper of wide circulation in the State where the defendants reside or are established, specifying therein that it replaces a personal notification.

Art. 33—The notification will consist of:

a) the complete allegations and a copy of the decision requesting an administrative hearing;

b) indication of day, hour and place where the enquiry will be started and defense may be submitted.

Art. 34—Defendants who do not submit a defense within the legal time limit will be considered in default, and all other time limits will count against them, irrespective of further notification. Defendants in default may intervene at any stage of the process.

Art. 35—The administrative hearing must be conducted and completed as soon as possible, with complete elaboration of the facts by the president of CADE, its members, the General Council and its employees and officers, who will be held responsible for non-compliance.

Art. 36—The provisions of Book II, Chapter III, Title I of the Code of Criminal Procedure, with the amendments made herein, shall be applicable in the conduct of the administrative hearing.

Art. 37—All witnesses summoned by CADE will be heard during the hearing, a maximum of 8 witnesses being allowed for the defense.

§1—A witness who does not appear within five (5) days of the time he is called will be subject to the provisions of Art. 218 of the Code of Criminal Procedure.

§2—To give false testimony, to deny or withhold the truth as a witness, expert, translator or interpreter, will be considered a crime and

will be subject to penalty in accordance with Article 342, of the Criminal Code.

§3—(VETOED)

Art. 38—Proof requested by the responsible member of CADE or by the defendant, the examination of witnesses, and other such matters, shall be submitted within thirty (30) days.

Art. 39—The responsible member of CADE may require additional investigations and may grant an additional twenty (20) days for the gathering of evidence.

Art. 40—The accused company may be represented at the administrative hearing by its directors, managers, or attorneys. In all cases the company will have free access to CADE's files.

Art. 41—Service of notice will always be by means of registered mail in accordance with the provisions of paragraph 3, Article 32. The parties will be notified of the final decision by publication in the Official Federal Gazette.

Art. 42—Counsel for CADE and the defendant shall each have the right to speak for fifteen minutes in plenary sessions and in accordance with the regulations of CADE.

Art. 43—If CADE, after considering the opinion of the General Council, decides that a certain act or acts constituted an abuse of economic power, it will indicate to the responsible parties a time limit, as the circumstances require within which such practice must be stopped, and will assess a fine equal to five (5) to ten thousand (10,000) times the highest minimum wage in the country on the date of the decision.

§1—The time limit referred to in this Article shall run from the date of publication of the decision in the Official Federal Gazette.

§2—CADE's decision shall be published in the Official Federal Gazette within five (5) days after it is made.

Art. 44—CADE's decision that there has been an abuse of economic power shall contain the following:

a) specification of the acts adjudged abuses of economic power and an indication of the steps required of the responsible parties to eliminate such practices;

b) setting time limits for the initiation and completion of the required reforms;

c) the stipulated fine.

Art. 45—Defendants shall state within ten (10) days their willingness or refusal to take the steps indicated by CADE in order to

eliminate the abuse of economic power within the time demanded.

§1—In case of refusal, CADE will immediately request government control of the company.

§2—In case the accused agrees to the reforms required, CADE will verify whether or not the abuses have terminated. This investigation will commence only after the expiration of the time limit referred to by Article 43.

Art. 46—When the termination of the abuses of economic power has been verified by CADE, the responsible parties will sign a pledge not to renew such activities. Breach of this pledge will subject the responsible parties to a fine double that provided by Article 43.

Sole paragraph: In the event that this pledge is broken there will be an immediate interposition of government control in addition to the stipulated fine.

Art. 47—If the parties notified do not comply with the decisions of CADE within the established time limit, CADE will request legal execution of the decisions and government control of either one, several or all of the companies involved.

Sole paragraph: The executive procedure used in relation to fiscal debts shall be used in the execution of the fine.

CHAPTER VII

JUDICIAL PROCEDURE

Art. 48—Government intervention will be requested by CADE within ten (10) days from the Federal District Court of the (State) where the defendant company has its head office, or if several companies are involved, in the (State) where any one of them has its head office, at CADE's option.

Sole paragraph: The petition shall contain precise information as to the practices or actions deemed abuses of economic power. When government control is requested the petition shall be accompanied by the records of the original administrative hearing or authenticated copies thereof.

Art. 49—If the petition fails to comply with the requirements of the previous Article, the judge will order that such omissions and irregularities be corrected within 10 (ten) days and shall request that CADE, within the same time limit, supply all information deemed necessary.

Sole paragraph: If the judge finds that the defendant was improperly notified or that his rights were in any way infringed in the administrative proceedings he will reject the petition, providing that such irregularities cannot be rectified.

Art. 50—The judge shall announce his decision fifteen (15) days after receipt of the initial petition.

Art. 51—If the judge decides that government control is justified he will request that CADE appoint an administrator to carry out his decision.

§1—The defendant company shall have forty-eight (48) hours to protest the selection of the administrator appointed, on grounds of lack of competence or ability. The company will have three (3) days to prove its allegations and the judge will have an equal time in which to make his decision.

§2—If the allegation is found to be justified the judge will give CADE five (5) days to appoint another administrator.

Art. 52—An appeal against government control may be made to the Federal Court of Appeals within five (5) days.

Art. 53—Then [sic] the government administrator has been legally installed the judge shall officially inform the defendants of this fact by court order or decree.

Art. 54—The defendants may demand a re-hearing within ten (10) days of the decree.

Art. 55—If a re-hearing is demanded, all documents will be made available to the state's attorney for ten (10) days so that he may give an opinion on the case.

Art. 56—After the usual time limit for opposing the re-hearing petition has elapsed, a ten (10) day extension may be granted at the request of the interested parties. The judge will fix the day, hour, and place for handing down his final judgment and instructions, in accordance with the provisions of Articles 263 and 672 of the Code of Civil Procedure.

§1—The judge will also have the benefit of this ten (10) day extension in the exercise of his "ex-officio" right to require the production of any further evidence he deems necessary.

§2—If the evidence has to be procured outside the district the judge may allow up to thirty (30) days for compliance.

§3—The judge is also subject to this thirty (30) day limitation in procuring evidence on his own initiative.

Art. 57—If the decision on re-hearing is favorable to the defendant company an automatic review of the decision is required.

This review will not suspend the decision of the re-hearing and will be made by order of the judge himself.

Art. 58—If the decision on re-hearing is not favorable to the defendant company appeal to a higher court may be made in accordance with Articles 844 and 845 of the Code of Civil Procedure.

Art. 59—Procedures and decisions referred to in this act shall have preference over any other procedures or decisions, except "habeas corpus" or court injunctions.

Art. 60—Government intervention may be suspended before the established time limits, after consultation with CADE's General Counsel, once it is proven that the abusive practices have been terminated.

Art. 61—If it becomes clear that the defendant company cannot function in accordance with this act, the judge may order judicial liquidation at the request of CADE.

Sole paragraph: Liquidation shall be made in accordance with the provisions of Book IV, Title XXXVIII of the Code of Civil Procedure.

Art. 62—It shall be the duty of the government administrator to see to it that the necessary steps are taken to eliminate the abuses which required government intervention.

Art. 63—All books, papers, documents and information concerning the company and its assets shall be available to the government administrator as he deems necessary, even when such materials are in the hands of third parties.

Sole paragraph: When the government administrator takes office he may ask the management of the company to take an inventory and draw up a balance sheet, as he deems necessary.

Art. 64—The members of the Board of Directors of the company will continue holding their positions, but they shall be subordinate to the government administrator concerning matters relative to the latter's action or powers.

Art. 65—Should the majority of those responsible for the administration of the company refuse to cooperate with the government administrator, the judge will order the government administrator to assume the entire administration of the company.

Art. 66—The judge may dismiss all responsible persons who obviously try to prevent the government administrator from carrying out his duties. Replacement will be effected as set forth in the by-laws of the company.

Art. 67—If, in spite of the measures provided by the previous Article, one or more responsible persons should persist in obstructing the carrying out of the government administrator's duties, the judge will act in accordance with the provisions of Article 66.

Art. 68—The judge will determine the salary of the government administrator.

Art. 69—A new government administrator will be appointed should the original appointee resign, die, be declared incompetent, request bankruptcy, make an agreement with creditors, or fail to carry out any of his duties.

Art. 70—In addition to the duties of Article 62 it shall also be the duty of the government administrator:

a) to receive and investigate complaints presented by third parties;
b) to bring to the attention of CADE and the judge any irregularities or frauds committed by persons in charge of the company which come to his attention;
c) to submit to the judge and CADE a monthly report covering his activities;
d) to stop any action by the Board of Directors of the company which may prevent the company from returning to legal operation, as well as to eliminate any abuse of economic power as defined in this act.

Art. 71—All expenses incident to government control shall be borne by the company.

CONTROL

Art. 72—Commencing with the effective date of this act the National Department of Industry and Commerce, the Board of Trade, and similar state organizations, are prohibited from filing any documents referring to the establishment, transformation, merger or association of companies, or changes in their articles of incorporation, if such documents fail to include the following information:

a) an accurate and detailed statement of purpose;
b) the capital contribution of each member, as well as conditions and terms of payment;
c) the full name and description of each stockholder;
d) the address of the head office and all branches of the company;
e) the full name and description of each director;
f) the duration of the company;

g) the number, type and value of the shares.

Sole paragraph: In case of liquidation the documents must include information as to the amount divided among the members, the names of those taking over the assets and liabilities of the company, and the reasons for liquidation.

Art. 73—Upon request, the National Department of Industry and Commerce, the Boards of Trade or competent state departments will submit to CADE a summary of all acts, contracts, corporate by-laws or alterations, filed or registered with them, together with all the information referred to in the previous Article.

Art. 74—Unless approved and registered with CADE, any facts, contracts, agreements, or conventions of any kind, made between companies or persons, or a group of persons connected with such companies or interested in their business, shall be void if made for any one of the following purposes:

a) to put production on a par with consumption;
b) to control a market;
c) to standardize production;
d) to stabilize prices;
e) to divide markets between companies, whether of production or distribution;
f) to restrict distribution in such a way as to harm equivalent or substitute goods.

§1—Any agreements or practices of the above nature in effect at the date of publication of this act must be submitted to CADE for approval within one hundred and twenty (120) days.

§2—Those companies which fail to submit the agreements or practices defined in the previous paragraph for CADE's approval shall be subject to fines of from five (5) to one hundred (100) times the highest minimum wage and must still comply with this requirement under penalty of government control.

§3—CADE shall have sixty (60) days to render its decision in each case. If CADE does not make a decision within this period all acts will be considered legal until such time as CADE renders its decision.

Art. 75—Federal authorities and directors of federal autonomous or government controlled entities are obligated to render whatever assistance or cooperation CADE may request, under penalty of appropriate disciplinary measures.

Art. 76—Federal Public Power authorities and directors of federal autonomous or government controlled entities must report to

CADE any and all abuses of economic power which may come to their attention through the carrying out of their duties.

Art. 77—Public servants or those employed by autonomous or government controlled entities who should hinder, delay, or obstruct CADE's operation, or that of its employees, shall be subject to penalty of dismissal or suspension from public duties. CADE will initiate both legal and administrative procedures against those responsible for such actions.

Art. 78—Whenever required by CADE and within seventy-two (72) hours after receipt of written notification, companies shall make available their accounting records, including books, documents, papers and files, to the experts and employees in charge of the investigation.

§1—The refusal to show such documents will make the companies liable to pay a fine, to be fixed by CADE between 5 (five) and 500 (five hundred) times the highest minimum wage.

§2—In case of refusal CADE will request the legal penalties provided by this act and demand production of the documents in accordance with Articles 218 and following of the Code of Civil Procedure.

Art. 79—Any employee of CADE who discloses to third parties any facts coming to his attention during the performance of his official duty will also be subject to dismissal and the penalties set worth in Article 325 of the Criminal Code.

Art. 80—Whatever information requested by CADE must be submitted by the companies in writing and duly authenticated.

Sole paragraph: Directors, administrators or managers of companies who refuse to submit the information referred to in this Article, or who submit inaccurate information with fraudulent intent or in bad faith, will be subject to one (1) to three (3) months in jail.

Art. 81—The provisions of this law for the elimination of abuses of economic power are not exclusive. Other infringements against the public economy and transgressions by public servants shall be punishable as before.

Sole paragraph: The investigations of Congressional Committees and studies of the economy carried out by the National Economic Council are not affected by this act even when they are made for similar purposes.

Art. 82—CADE's expenditures for personnel and material will be included in the allocation shown on the statement prepared by the Prime Minister and attached to the federal budget.

Art. 83—The executive department is authorized to open a special credit of up to Cr$ 300,000,000.00 (three hundred million cruzeiros) to cover the expenses arising from this act.

Art. 84—The executive department will issue the regulations necessary for compliance with this act within sixty (60) days.

Art. 85—This act will become effective ninety (90) days after its publication, all provisions to the contrary being hereby revoked.

MEMORANDUM

It is the purpose of this Memorandum to call to the attention of our clients those provisions of the recent Antitrust Act which appear to us to be the most significant. While no one can predict at this point just what will be the emphasis and vigor of the new law, it does seem advisable to point out sections which will likely be troublesome, in order that any necessary corrective measures may be taken prior to the effective date of the new law.

GENERAL STRUCTURE

The Antitrust Act begins by defining illegal economic activity in Article 2, and then proceeds to set up an administrative agency (CADE), whose function it is to see that the congressional mandate is carried out. CADE is given very broad investigative powers by Article 17, and a General Council is established by Article 25 to give CADE legal assistance and advice. State and local authorities will not be allowed to conduct investigations of their own, but must submit to CADE any allegations which they may have (Art. 28). CADE has the power to determine whether or not an abuse of economic power exists (Article 17 d) and to assess fines for such illegal activities (Article 17 m). A company which refuses to eliminate any practices found illegal by CADE will be subject to government control (Article 45), but only if the courts find that government interposition is required (Chapter VII). Judicial procedure is also required for the enforcement of any fines assessed by CADE (Article 47).

PROHIBITED ACTIVITIES

The heart of the new law is contained in the detailed prohibitions of Article 2. Section I lists seven types of activity which are illegal only when performed for the purpose of controlling markets or eliminating competition. Thus it would not be an abuse of economic power for

an individual to serve as the director of more than one company, unless he did so pursuant to a plan to control competition in a given market. Similarly, an agreement among shoe manufacturers to use standard measurements for shoe sizes should be perfectly legal. On the other hand, an agreement to stop production of certain unprofitable sizes or styles might be considered an abuse of economic power because it would tend to reduce the area of competition among companies, without justification. This would seem to be the intent of Article 74 c), which makes void any agreement to standardize production. The other five types of agreements rendered illegal by Article 74 shed further light on the meaning of Article 2, I, a), by specifically invalidating certain practices which also have the effect of reducing competition. Thus agreements among companies to allocate certain geographical areas for exclusive selling by each one, or to limit production, or to allocate the production of certain goods among themselves, would not only be void under Article 74, but would also constitute a punishable offense under Article 2.

It is not clear whether the practice of resale-price maintenance is prohibited by the new law. While the act seems to be aimed at horizontal agreements between competitors in the same general line of business, it cannot be said with certainty that agreements between a manufacturer and various retailers would not be illegal, since one of the effects of such agreements is to reduce competition between the retailers of the product whose price is controlled, and any agreements which reduce competition are outlawed by Article 2, I, a). Similarly general language in the American antitrust laws was construed as prohibiting such resale-price maintenance. Since the fine assessable by Article 43 may be well over Cr$ 100,000,000.00, and since this fine is assessable even if the company agrees to stop the practice declared illegal, it would certainly seem advisable to limit resale-price maintenance to "suggested" prices until a definitive interpretation is available.

Another ambiguity of the new law lies in the words "compacts or agreements" of Article 2, I, a), "ajuste ou acôrdo" in the Portuguese text. While both words mean "contract" in everyday conversation, it may prove significant that the word "contrato" itself was not used, and that it is possible to understand the words to mean some sort of agreement short of a legal contract. Conceivably this may refer to mere custom of parallel action, as in an industry dominated by one large company whose competitors always raise, or lower their prices in accord with the price leader. More likely, however, is the possibility that "agreement" may include situations in which companies in a certain

line of commerce circulate a trade journal in which the editor concludes that certain prices are justified for certain products, and all subscribing companies habitually charge just such prices. Thus the ambiguity in the wording may have been intentional, in order to cover such possible methods of avoiding the real purpose of the law. It should be sufficient to warn that subtle methods of disguising agreements aimed at fixing prices or otherwise limiting competition cannot be relied on.

The practice of tie-in sales or tying contracts does not seem to be prohibited when practiced by only one company. Thus for a manufacturer of an electronic data processing machine, who also manufacturers the cards used by this machine, to insist that the buyer always purchase the necessary cards from him would be perfectly legal under Article 2, IV, b) because only one company is involved. If the same machine manufacturer agreed with another manufacturer of cards to sell his machines only to those who agreed to buy the cards of the other manufacturer, however, this might constitute a sufficient "grouping" to violate Article 2, IV, b). This same analysis also applies to price discrimination, since paragraph a) must be read in conjunction with the introductory language of Article 2, IV. Thus it would not be considered an abuse of economic power for a single company to give a price discount or additional service to a favored customer, whereas it would be illegal for several companies to agree to do this, since the combined power of these several companies would be likely to destroy all competitors of the favored customer. While this seems to be the clear purport of Article 2, IV, which emphasizes the need for a grouping or aggregation of companies, Article 74 is more vague. It is possible to read Article 74 as condemning both tying and discount sales as sales contracts which restrict distribution to the detriment of competitive goods. Although it seems more likely that the clause condemning restrictions in distribution was aimed at the large company which tries to induce wholesalers or other distributors not to handle the goods of a competitor, under the threat of losing its business, nevertheless tying and price discrimination do tend to restrict distribution, or may be devices to control a market. In our example the electronic data processing machine manufacturer could be using his power in the machine market to attempt control [sic] the market for the cards. Despite these uncertainties it does seem reasonably clear that isolated discounts or tying sales would be permissable even under Article 74, and indeed such devices are often the signs of healthy competition. Systematic favoritism, however, especially in favour of a powerful customer, and

without economic justification such as reduced costs from selling in bulk to large customers, should be avoided.

Since many companies in Brazil may be the only producers of certain specialized products, the provisions of Articles 2, II, 3 and 5 deserve special mention. Article 2, II makes it illegal for such companies to raise prices "arbitrarily," without just cause. One such just cause seems to be the internal financing of investments in the plant which are required for increasing production. Increased labor or material costs would probably constitute just causes for increasing prices, since such increases would not be "arbitrary," but based on rational grounds. There is no provision for submitting contemplated price increases to CADE for prior approval, so again a company with an "actual monopoly" must take the risk of a fine if its price increase is later found to be "arbitrary." There is also a provision in Article 5 which would prohibit reducing production in order to affect prices when a company finds itself operating in monopolistic conditions. The definition of Article 5 would seem to include companies with few competitors (Article 3), at least in so far as those products which have no competition are concerned. But the mere fact that a company is currently the only producer of a certain product would not in itself subject it to Article 3 if it could be shown that other companies are capable of entering the market, even if they have not as yet done so. It should also be noted that an importer with an exclusive agency may find himself operating in monopolistic conditions if there are no competitive products on the market, either domestic or imported. For such an importer to withhold goods from the market would probably be considered a reduction of production under Article 5, or be prohibited under Article 2, III, c).

As in the case of resale-price maintenance it is not yet clear whether exclusive-dealing contracts will be permitted under the new law. While a contract between a manufacturer and a large retailer to the effect that the manufacturer will not sell his product to any other retailer within a certain geographical area does have the effect of reducing competition among retailers, it may also have the effect of increasing the competition among manufacturers of the same product, if such a contract is the only way a manufacturer can enter a certain geographical market. Article 2, V, a) which prohibits demands for exclusive promotional advertising, suggests that exclusive-dealing contracts may also be illegal. Since exclusive advertising contracts are less injurious to competition than exclusive-dealing contracts, in that the former still leave the retailer's customer with a choice among the brands carried,

it seems likely that exclusive-dealing contracts will also be prohibited under Art. 2, I, a). The law does not go so far as to say that a manufacturer must sell or deal with anyone who wants to buy its product, however, and this may leave an opening for those companies which consider it necessary to limit the outlets for their products. Such companies should still be able to determine, unilaterally, with what persons or companies they will deal, justifying such action in terms of credit ratings, past experience, need for prestige marketing, or the like. There is still some danger that such exclusive-dealing will be prohibited by Article 74 f) and § 1, which outlaw restrictive distribution practices "of the above nature." This language is very broad indeed because Article 74 speaks not only of "compacts or agreements" already discussed in Article 2, but also of "acts or conventions" ("atos ou convençoes"), which seems to mean that mere customary practices of exclusive-dealing will be contrary to law. Whether or not exclusive-dealing could be justified on the ground of a unilateral decision would thus depend on the particular facts in each case and no general conclusion can be given.

Article 2, V declares that "unfair competition" is illegal. In addition to the practice of demanding exclusive advertising previously mentioned, this provision also condemns price rigging in dealings with government bodies. Article 21 goes on to say that CADE will conduct studies to determine what other business practices should be condemned as "unfair competition." These later findings will undoubtedly be of the greatest importance, not only in themselves, but also as an interpretative guide to those sections of the present law which are yet ambiguous.

CONCLUSIONS

It is strongly recommended that the managers and directors of all companies familiarize themselves with the new antitrust law in order to avoid future difficulties. These general observations can in no way substitute for the specific questions that will occur to the executive who reads the law with the practices of his own company clearly in mind. After such review has been made it should be possible to determine whether changes in present contracts or practices are required, whether such contracts or practices should be submitted to CADE for review in accordance with Article 74, § 1, or whether no action is required.

Finally we would like to observe that while the new law appears to be a strict one it does not seem to be any stricter than those that most

international companies have learned to live with in many other countries. American business has prospered despite the fact that the Sherman Antitrust has been in existence in the United States since 1890. This act is very similar to Article 2, I, a) of the Brazilian law. The United States has also had its Clayton and Federal Trade Commission Acts in force since 1914, Canada has its Combines Investigation Act and England has its Monopolies and Restrictive Practices Acts. Like these foreign predecessors of the new law, the Brazilian Antitrust Act seems to be designed simply to protect free competition for the benefit of the economy as a whole. So considered, it is possible to look upon antitrust, in the words of the American Ambassador, Lincoln Gordon, as an ". . . important institutional improvement for modernizing *societies bent on constructive development.*" (Speech of July 14, 1962.)

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Fogel, L. J., *Biotechnology: Concepts and Applications,* Prentice-Hall, Englewood Cliffs, 1963, 826 pages.

An interdisciplinary book that combines mathematics, biology, psychology, and engineering in the study of human performance in "man-machine systems."

Gruber, H. E., Terrell, Glenn, and Wertheimer, Michael, eds., *Contemporary Approaches to Creative Thinking,* Atherton Press (Prentice-Hall), New York, 1962, 223 pages.

Paper by six eminent participants in a 1958 symposium at the University of Colorado. Sequel to *Contemporary Approaches to Cognition,* Harvard University Press, 1957.

Hailsham, Rt. Hon. Viscount, *Science and Politics,* Faber and Faber, London, 1963.

Pritchard, J. L., *Sir George Cayley: Inventor of the Airplane,* Horizon Press, New York, 1962.

Cayley (1773-1857) was the "Father of aerial navigation," according to the British. He designed, built, and tested flightworthy airframes and demonstrated man-carrying gliders. His disappointment with the British patent system is recorded on pp. 146-148.

Profiles of Manpower in Science and Technology, National Science Foundation, 1963, 36 pages.

A brief statistical survey of scientists, engineers, technicians, and teachers of science and mathematics in secondary schools—his-

torical, geographical, and according to economic sector, age, and field of specialization.

Seidel, Arthur H., Dubroff, Stanley, and Gonda, Edward C., *Trademark Law and Practice,* Clark Boardman Co., Ltd., New York, Matthew Bender & Co., Inc., New York, 1963, Vol. 1 (741 pages) and Vol. 2 (Appendix, Forms, Index).

A terse, looseleaf treatise on trademarks comprising two volumes, the second an appendix including "in addition to each of the federal trademark statutes, and and Trademark Rules of Practice, . . . the text of the current trademark statute of each of the states, Puerto Rico, and the Virgin Island." With respect to the cases reported, the authors state that "the enormous bulk of the material has forced the authors to the position of presenting those cases of recent vintage, and the classic cases which, in the authors' opinion, serve as the most meaningful guideposts to the practitioner seeking to find his way.

"The book covers the law of trademarks insofar as it deals with registration. While, due to tangential impingement of cases dealing with infringement litigation, a number of such holdings are analyzed, the prime emphasis and thrust is always in the direction of registration." The authors have dispensed with footnotes, developing the cases in the text instead. Although some chapters are stronger than others, much care and effort have apparently gone into this labor. It should provide another very practical tool for the busy practitioner's armoire. The looseleaf feature is intended to provide for future supplements.

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Bochner, Solomon, "Revolutions in Physics and Crisis in Mathematics," *Science,* August 2, 1963, pp. 408-411.

Comments on the breaking of new paths in physics and mathematics, making reference to T. Kuhn's *Structure of Scientific Revolutions.*

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". . . while the answer to the question of whether the convention date or the U. S. filing date should apply under 35 U.S.C. § 102 (e) and 103 is not free from doubt, on balance the courts that

have considered this have arrived at the conclusion that it is the convention date which should control."

Clark, Tom C., "Antitrust Principles and the Common Market," *American Bar Association Journal,* Vol. 49, No. 9 (September 1963) pp. 837-839.

"The Common Market . . . has adopted American-style antitrust principles, [and] provides a working model of the operation of the rule of law on an international basis . . . these principles will operate as a bulwark against both fascistic cartelization and communism."

Derenberg, Walter J., "The Sixteenth Year of Administration of the Lanham Trademark Act of 1946," *Patent, Trademark and Copyright Weekly Reports,* Vol. 138, No. 7 (August 12, 1963) Part II.

This is a report made to the patent, trademark and copyright law section of the American Bar Association at its annual convention in Chicago in 1963. The report is divided into three parts: Part I, Interpretation of the Lanham Act in Ex Parte Proceedings; Part II, Interpretation of the Lanham Act in Inter Partes Proceedings; and Part III, Trademark Infringement and Unfair Competition. Part I is further divided into I—The Principal Register and II—The Supplemental Register. Part II into I—Likelihood of Confusion and II—"Damage" or "Injury" Based on Other Grounds. Part III is divided into I—Use of Infringing Mark or Name, II—Taxation Aspects of Trademark Litigation, III — Unfair Competition by Copying of Non-Functional Features; The Problem of Product Simulation, and IV—Jurisdictional Problems.

The report was printed in the August 12, 1963 issue of the *Patent, Trademark and Copyright Weekly Reports* as Part II, Vol. 138, No. 7, and reprinted as Vol. 53, August 1963, No. 8 of *The Trademark Reporter.*

De Simone, Daniel V., Gambrell, James B., and Gareau, Charles F., "Characteristics of Interference Practice," *Journal of the Patent Office Society,* Vol. 45, No. 7 (July 1963) pp. 503-591.

The entire issue is devoted to the presentation of data accumulated in a survey of the interference universe. The paper consists almost entirely of tables presented in an appendix where they are arranged in the following categories:

"1. General data
   A. Revised classification of interference terminations
   B. General data as to all interferences

C. General data as to the ten-percent sample
D. Miscellaneous
2. Data on the parties, their applications and patents
3. Data concerning the issue-forming period
A. Preliminary statement data
B. Motion data
4. Data relating to the testimony period
5. Data relating to the final hearing period
6. Data relating to the post-decision period"

The authors caution: "It is well to emphasize that the material presented is intended to describe the present interference universe, not to draw value judgments."

Fiero, George W., "Report on Program of Common Names for Pesticides," *The Trademark Reporter,* Vol. 53, No. 5 (May 1963) pp. 553-559.

"This report describes the activity of the American Standards Association Committee and procedure for obtaining acceptance of a Common Name for a pesticide." A specimen statement prepared by the sponsor of the Common Name is included in an appendix.

Gendelman, Irving, "The Court of Customs and Patent Appeals and 35 U.S.C. 103," *Journal of the Patent Office Society,* Vol. 45, No. 9 (September 1963) pp. 645-652.

"I would draw the following conclusions. The C.C.P.A. cannot review a Patent Office determination under 35 U.S.C. 103 as a question of law. It can do so only by way of unsupported substantial evidence. When the Patent Office record is so devoid of the prior art that no reasonable basis can be made by the Patent Office as to the question of obviousness, that is what the prior art teaches as a matter of fact, then this would constitute a Patent Office determination unsupported by substantial evidence."

Hudon, Edward G., "The Copyright Period: Weighing Personal Against Public Interest," *American Bar Association Journal,* Vol. 49 (August 1963) pp. 759-763.

"Against the background of the current proposal that the copyright protection period be extended, Mr. Hudon delves into the history of copyright and the protection it has afforded under both common and statutory law. Congress must weigh the authors' and publishers' recognized needs for protection against the public's interest in access to literary works, he says."

Hyman, Ray, "Creativity," *International Science and Technology,* August 1963, pp. 51-58.

A cautious statement on testing and training for creativity in industry and on the meaning of success for organization and management policy.

Jacobson, Marvin, "Comments on Proposed Fee Bill, S.2225," *Journal of the Patent Office Society,* Vol. 45, No. 8 (August 1963) pp. 644-650.

"While it must be admitted that changes in practice directed toward making examining procedures and practices more efficient to reduce operational costs are closely allied to changes in fees which are directed towards recovering a greater percentage of the expenses, it is suggested that the former carry with them too many far-reaching effects to be included in the fee bill. It is suggested that increased efficiency, where practicable, should be implemented under the present rules of practice, as has been done, for example, by the 'compact prosecution' order of the Commissioner (781 OG 1). It is further suggested that by being included as part of an omnibus bill, the effect of the economically forced changes in practice will not receive thorough consideration of the legal ramifications since the principal emphasis will be directed towards recovery of costs."

Kastriner, Lawrence G., "The Applicability of United States Patent Laws to Foreign-Trade Zones," *The George Washington Law Review,* Vol. 31, No. 5 (June 1963) pp. 997-1013.

"Congress has not excluded the foreign-trade zones from the effect of the patent laws either expressly or by implication. The provisions of the Patent Act, as well as the legislative power to which the patent laws owe their existence, are coextensive with the sovereignty of the United States. Liberal judicial interpretation of the territorial scope of the patent laws, as exemplified by the cases dealing with United States ships, imports, and foreign and domestic transactions, has extended the jurisdiction of the patent laws to a position coextensive with that of the federal courts themselves. The *Bottone* case is clearly consistent with that view."

Kendall, F. W., "Brand Problems in Hong Kong," *The Trademark Reporter,* Vol. 53, No. 5 (May 1963) pp. 545-552.

"A series of infringement problems now plague foreign businessmen dealing in Hong Kong. These problems involve not only trademarks of American companies and individuals, but also their patents, registered designs and copyrights . . . greater emphasis will be placed in this article on trademark problems."

Kiron, Allan, "Russian Inventions and Information Retrieval," *Journal of the Patent Office Society,* Vol. 45, No. 9 (September 1963) pp. 632-644.

"This article is concerned with recent events in the Soviet Union directed to 'drastic changes' in patent policy, important new responsibilities of the Soviet Patent Office for initiating and implementing new laws and regulations, and an effective system for data processing and information retrieval to insure validity of patents and to preclude duplication of research."

LeBlanc, Robert E., "Antitrust Ramifications of Trademark Licensing and Franchising," *The Trademark Reporter,* Vol. 53, No. 5 (May 1963) pp. 519-544.

". . . it would seem appropriate to investigate the nature of the franchise method of doing business; the older decisional law stated to circumscribe its legality; the expressed position of the Department of Justice; and recent Court decisions which more clearly delineate the permissible modus operandi of this form of doing business." The final sentence of the concluding section of the paper reads: "While it is obvious that trademark license agreements do not constitute carte blanche exceptions to the antitrust laws, it is equally obvious that the antitrust laws do not constitute a blanket prohibition of the requirements and restrictions which may be necessary to effective and successful trademark licensing."

Long, Edward V., "Administrative Proceedings: Their Time and Cost Can Be Cut Down," *American Bar Association Journal,* Vol. 49, No. 9 (September 1963) pp. 833-836.

"Senator Long declares reforms are needed now and he outlines the three-pronged legislative attack supported by the American Bar Association." The author states that: "The first bill upon which hearings were held this year by the subcommittee was S. 1466. This bill, which has long been sought by the American Bar Association, is designed to get rid of the special admissions requirements for legal practice that are perpetuated by some federal agencies, such as the Treasury Department, the Patent Office and others."

Marsh, Norman S., "Unfair Competition and English Law: An Introductory Note with Particular Reference to Passing-Off," *The Trademark Reporter,* Vol. 53, No. 2 (February 1963) pp. 139-152.

"It is difficult to give a comprehensive view of the extent to which English law restrains unfair competition as it is generally understood on the Continent of

Europe. The main difficulty, at all events from the standpoint of the foreign lawyer, is the diversity of approaches adopted and the apparent lack of any general criteria for judging whether the competition is unfair; an additional technical difficulty is, or at least has been, the differing attitudes of equity and the common law. There are also some gaps in the law restraining competition which business practice might consider unfair and the economist might judge undesirable."

Matsuo, Kazuko, "The New Japanese Trademark Law," *The Trademark Reporter*, Vol. 53, No. 2 (February 1963) pp. 117-138.

"The new Japanese Trademark Law (Law No. 127 of April 13, 1959) came into effect on April 1, 1960 together with other new industrial property laws, namely, Patent Law, Utility Model Law and Design Law. The following [paper] is a summary of the salient features of the new Trademark Law." The author introduces the Main Points of the Revision with a very brief History of Revision. The paper includes sections on Separation of Trademark from Business, Actual Use of Trademark, Extension or Strengthening of the Protection of Trademark Rights, Revisions of Procedures, and Miscellaneous Matters.

Moody, Marvin, "Problems of Patentees Arising from Infringement by the United States Government," *Journal of the Patent Office Society*, Vol. 45, No. 8, (August 1963) pp. 595-600.

"Rather than amend section 1498 as proposed by S. 382, it would seem that more could be accomplished for the patent owner's benefit by giving him a quicker decision in the administrative agency and by providing funds which are readily available to pay legitimate claims of this nature. . . . Another approach would be to establish an administrative, quasi-judicial board to hear such claims for all agencies."

Oisher, Jack, and Steinhauser, Carl P., "The Role of the Prior Inventor Under Section 102(g)," *Journal of the Patent Office Society*, Vol. 45, No. 9 (September 1963) pp. 595-619.

"An analytical comparison of Subsections (a) and (g) of 35 U.S.C. § 102 had led to a proposal that the two sections be applicable in different fact situations. 35 U.S.C. § 102 (a) should apply only if there is a publication of the invention which precedes the filing of a patent application and conception of the invention by the applicant or patentee. 35 U.S.C. § 102 (g) should apply when the publication of the invention postdates the conception, or filing date, of the pat-

entee, provided that the first inventor conceived the invention earlier and was diligent. The prior inventor does not have to file a patent application and claim his invention to defeat a subsequent patentee, but may elect to publish his invention by use, or disclosure in a printed publication. Thus Section 102(g) may be considered to be a "sleeper" provision which defeats the patentee on a fact situation wherein the Patent Office granted a patent because no machinery existed for inquiring into priority as between rival inventors, one of whom had not claimed the invention in a patent application."

Orenbuch, Louis L., "Abandoned Applications as Prior Art," *Journal of the Patent Office Society,* Vol. 45, No. 8 (August 1963) pp. 613-634.

"The Patent Office, in its reaction to the decision in *The Corn Planter Patent,* changed its practices regarding abandoned applications more than was necessary. The Supreme Court opinion in the *Milburn* case intimates that the Patent Office could return to its former practice of searching among abandoned applications, and as a necessary adjunct, laying abandoned applications open to the public. Because the present practice of the Patent Office regarding abandoned applications has been followed for more than 80 years, there is little likelihood that it will return to its former practice unless a statute, such as the proposed H.R. 3561, authorizes the Patent Office to print and distribute copies of abandoned applications in the same manner as it prints and distributes patents."

Pattishall, Beverly W., "The U.S.A. Courts and the Prevention of Unfair Competition," *The Trademark Reporter,* Vol. 53, No. 6 (June 1963) pp. 599-624.

". . . if you are involved in an unfair competition case in the United States you must examine both the statutory and the common law aspects of your case and remember to pay some serious attention to the Section 43a provisions of the Lanham Act to see if they are of some value, or detriment, if the shoe is on the other foot. You must examine the jurisdictional considerations resulting from *Erie* v. *Tompkins* quite carefully. You must consider: does the unfair competition affect or occur in interstate commerce, and you must evaluate that question from a jurisdictional standpoint. You should consider whether or not you need to claim pendent jurisdiction under Section 1338(b) of the U.S. Code.

"If you are involved in something in the nature of a 'passing off' case, remember my unfortu-

nate *7UP* v. *Blue Note* case and the requirements changing almost all of the law you will find should you rely upon the earlier cases—changing the law as far as jurisdictional amount is concerned from the value of the mark or name involved to the value of the damage that can be shown.

"You must always consider the dilution statutes even though, as we see them, they have not been too strongly enforced."

Queenan, John W., "Law and Accounting: Co-operation for Better Public Service," *American Bar Association Journal,* Vol. 49, No. 8 (August 1963) pp. 755-758.

Law and accounting have a natural affinity whose potential for better service to clients can be realized only through understanding and cooperation, Mr. Queenan declares. He sees these professions as having the greatest opportunities for growth and useful service in the expanding United States economy."

Schneider, Philip, "A Consideration of U. S. Patent Office Practice in Citing Foreign References," *Journal of the Patent Office Society,* Vol. 45, No. 8 (August 1963) pp. 635-643.

"To sum up, equitable application of Patent Office rules requires the provision of an English-language translation when foreign references are cited in rejection of claims. If such references are being employed properly by the examiner, provision of such a translation places little or no additional burden upon the operations of the Patent Office. English-language translations of cited foreign references should be furnished to applicants as an implementation of the 'new examining procedures' instituted recently by the Patent Office."

Schon, D. A., "Six Ways to Strangle Innovation," *Think,* July-August 1963, pp. 29-32.

Offers advice to companies for making "more effective use of the resources of innovation already at hand."

"Trademarks in the Marketplace," *The Trademark Reporter,* Vol. 53, No. 7 (July 1963) pp. 687-783.

This is the edited minutes of the first trademark forum of the United States Trademark Association. A full day's program of panel discussion was presented on March 20, 1963. The entire issue is devoted to the program. The theme of the forum was "Trademarks in the Marketplace—Today's Problems in Their Creation, Development and Use." In the morning session a representative of management, market research, an advertising agency, and

a designer and lawyers considered "Selection and Adoption of Trademarks." The afternoon session was devoted to "Proper Use and Protection." The panelists for the afternoon session were representatives from management, an advertising agency, the press, public relations and lawyers.

"So the final conclusion must be that this subject is too dynamic to be constricted into a fixed set of rules. A trademark is a merchandising symbol. Its significance can be influenced by the amount of money spent in promoting it, by the manner in which it is used, by the way in which competitors reset [sic] to it, and by a host of other variables.

"The marketing team and the trademark lawyer must work together to create the best possible trademark, to help it grow into a vital force in the marketplace, and to keep it from dying."

Ulmer, Eugen, "The Law of Unfair Competition and the Common Market," *The Trademark Reporter,* Vol. 53, No. 6 (June 1963) pp. 625-650.

This address is divided into six parts: The first part defines the subject and refers to "the work of coordination in related fields"; the second part surveys the legal premises of the common market countries with respect to the law of unfair competition. "The question of which interests are protected by the law of unfair competition" is discussed in the third part; and in the fourth section, the author considers certain "groups of unfair trade practices." The fifth section is devoted to "protection of distinctive signs, protection of indications of origin and advertising by making reference to competitive goods." In the concluding section, the author considers "the need to coordinate the law and the means of doing so."

Whittredge, Robert B., "Recent Developments in Federal Trademark Statutes and Rules," *The Trademark Reporter,* Vol. 53, No. 9 (September 1963) pp. 871-886.

"This paper is the substance of a talk given at a meeting of the New Jersey Patent Law Association . . . on April 18, 1963." The author reviews the "most important" of the " 'Housekeeping Amendments' to the Lanham Act." These amendments became effective October 9, 1962. Mr. Whittredge also briefly discusses the October 1961 amendment to the National Stamping Act and the trademark provisions in the Drug Amendments of 1962.

Wise, John K., "Patent Problems in Government Sponsored Re-

search," *Journal of the Patent Office Society,* Vol. 45, No. 9 (September 1963) pp. 620-631.

"The problem is simply this: who should own the patents eventuating from government sponsored research? It is not a new problem, but it is one whose importance to all of us has recently increased sharply, increased for two major reasons: the rapid rise in government expenditures for R&D, and the recent enactment of legislation requiring that in certain fields of endeavor the government should take title to all such patents."

REPORTS AND HEARINGS

Barber, R. J., *Economic and Legal Problems of Government Patent Policies,* Report prepared for Subcommittee on Monopoly of Senate Select Committee on Small Business, June 15, 1963, 21 pages.

Favor's Government's "taking title to patents where its resources represent the primary contributions and . . . establishing a new independent agency [an Inventions Development Authority] to exploit the technical information and inventions generated by federally financed scientific programs."

Economic Aspects of Government Patent Policies, Hearings Before a Subcommittee of the Select Committee on Small Business, U.S. Senate, 88th Congress, First Session, March 7, 8, 13, and 14, 1963.

Testimony by representatives of Federal and private organizations (including American Patent Law Association) on "impact of government patent policies on economic growth, scientific and technological progress, competition, monopoly, and opportunities for small business."

Ladd, David L., "ICIREPAT 1963 —Progress, Pitfalls, and Prospects," Press Release, Patent Office, U. S. Dept. of Commerce, September 18, 1963.

An address by the Commissioner of Patents delivered before the third annual meeting of the Committee of the International Cooperation in Information Retrieval among Examining Patent Offices held at the Austrian Patent Office in September 1963. The Commissioner briefly refers to the problems arising from the rapid accumulation of scientific documents and the increasing complexity of inventions. He emphasizes the importance of comparing machine-searching with patent adjudication "as we know it now." Commissioner Ladd also discusses three burdens which each research project employing specialized techniques and devices must bear. His evaluation of the prospect is reflected in the

sentence: "I view the tasks ahead, as formidable as they are, manageable."

O'Brien, G. D., "NASA Patent Policy and Procedure," in Proceedings of the Second NASA-Industry Program Plans Conference, Washington, February 11-12, 1963 (NASA SP-29), pp. 203-206.

Discusses "reporting of new technology" and "property rights in inventions" in connection with Secs. 203 (a) and 305 (b) of the Space Act.

Patents, Trademarks, and Copyrights, Report of the Committee on the Judiciary, U.S. Senate, made by its Subcommittee on Patents, Trademarks, and Copyrights, Pursuant to S. Res. 267, 88th Congress, Second Session, as extended.

Science, Government, and Information, Report of President's Science Advisory Committee, White House, January 10, 1963, 52 pages.

This prestigious report deals with "the responsibilities of the technical community and the government in the transfer of information."

Thirteenth Annual Report, Select Committee on Small Business, U.S. Senate, April 2, 1963, 104 pages.

In a chapter on "Antitrust Activities," there is a section on "Government Patent Policy" (pp. 45-49) which touches on familiar issues of public and private rights.

U.S. Patent Office Research and Development Program, Staff Report of the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, U.S. Senate, 88th Congress, First Session, Pursuant to S. Res. 65.

NOTES

Tentative Conference Theme: Emerging Problems in Property Rights to R&D and Related Information

It is tentatively planned to cover various emerging or intensifying problems in R&D property rights in the eighth Annual Public Conference of the Research Institute in June, 1964. Among the topics under consideration are legal and economic problems incident to abstracting and duplication of copyrighted matter, the organization of information in new forms by means of data processing equipment, the employee exploitation in new positions of information derived in former employment, domestic use of imported products that have been patented in the United States, and the accelerated diffusion and application of technology developed with the aid of federal contract funds.

Extending the Scope of Our Foreign Operations

The Patent, Trademark, Copyright Research Institute is extending the scope of its foreign operations in several areas. First, the Research Institute is gathering opinions in Europe on industrial property and the relation thereto of antitrust, trade practice laws and policies. In carrying out this phase, the Research Institute is conducting interviews in depth with prestigious persons abroad. The information obtained will appear in a Symposium in *The Patent, Trademark, and Copyright Journal of Research and Education.*

Second, while developing its research project on Latin America, the Research Institute is canvassing Latin America for materials on industrial property and antitrust laws. A considerable amount of material in foreign languages (Spanish, Portuguese, and French) has been received. After having reviewed the materials and expended some efforts at translation, the Research Institute has enlisted the aid of leading practitioners in the countries themselves, where practical or feasible, with the hope of getting more authentic translations than can be prepared in the United States of this primary information.

As a third phase of its operation,

the Research Institute is considering plans for the extension of the Public International Lecture and Discussion Series. It appears that the impact of the first phase of the series was good. The correspondence from abroad and the United States has encouraged consideration of the possibility of a second phase. This would be an extension of this dimension of our educational program.

Patent Office Society Award Recipient Chosen

The Third Annual Patent Office Society Student Award will be presented to Don W. Martens, formerly a student in The George Washington University Law School. The award is made annually for the best paper written by a student in the Seminar and Lecture Series conducted by The Patent, Trademark, and Copyright Research Institute. Mr. Martens will receive a citation and an honorarium of $100 contributed by the Society.

His paper, "Trademark Registration of Patented Articles—Extension of Monopoly?" is published in this issue of *The Patent, Trademark, and Copyright Journal of Research and Education.*

Mr. Martens received his Juris Doctor from The George Washington University in June, 1963. He worked in the U.S. Patent Office as a patent examiner, and was Patent Editor of *The George Washington Law Review.*

Previous winners of the Patent Office Society Student Award have been Mr. Jerry Cohen and Mr. R. Steven Pinkstaff, who wrote on "The Constitution and Enforcement of Government Owned Patent Rights," and "Copyright Notice Requirements for Foreign Works Published Abroad," respectively.

Digest on Trademarks Being Prepared

The Research Institute is preparing its latest *Digest,* the first on the subject of trademarks. This *Digest* will include non-technical summaries of the results of its research on trademarks and news of its educational activities. The *Digest,* issued from time to time, is written for the use of executives, government officials, educators, and those with a professional interest in the patent, trademark, and related fields. The issue will also contain information on trademarks of general interest to the layman.

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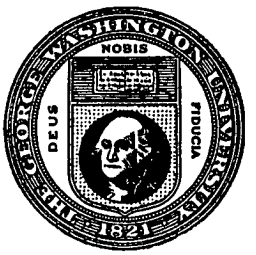
PROCEEDINGS

of the

SEVENTH ANNUAL PUBLIC CONFERENCE

of the

Patent, Trademark, and Copyright Research Institute



The George Washington University
Washington 6, D. C.

Effective September 1, 1963 the name of The Patent, Trademark, and Copyright Foundation of The George Washington University was changed to:

The Patent, Trademark, and Copyright Research Institute of The George Washington University.

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The positions taken by authors of articles in the *Journal* which are not the product of the Research Institute's research program are not necessarily those of the Research Institute.

The Patent, Trademark, and Copyright Journal of Research and Education is:

- Devoted to the publication of scientific research regarding the principles, the facts, and the practical operations of the patent, trademark, copyright, and related systems of the United States and other countries;

- Calculated efficiently to educate and inform across broad fields the general reader and those with special interests from business, industry, the sciences, and the professions with respect to the functioning of these systems; and

- Dedicated to convey to these publics the relation of the systems to industrial and social progress.

THE CONFERENCE

The Seventh Annual Public Conference, broadcast nationally, was the occasion for the presentation and discussion of the research findings of the Foundation and important current issues relating to "Fostering and Rewarding Invention in the Company, the Government, and the University," from which the Foundation itself may derive guidance on the planning of its future work. The Conference also provided an opportunity for people from different fields to meet and participate in the stimulating and productive exchanges and contacts of the Conference.

The research work of the Foundation represents the first university attempt at a comprehensive study of the patent, trademark, copyright and related systems in the United States. This study is systematically planned and coordinated, inter-disciplinary in nature and utilizes a combination of specialties such as economics, statistics, psychology, sociology, and law; and empirical, that is, based on the facts gathered by the staff on the actual operation of the systems.

In attendance at this Conference devoted to Fostering and Rewarding Invention were key representatives from the different fields of activity throughout the nation: commerce, education, science, manufacturing, labor, finance, and the professions. For this Conference the concept of invention was construed broadly to include all manifestations of purposeful creativity—such as, scientific discovery, patentable and unpatentable invention, engineering development, employee suggestions. Among the subjects discussed were rewards and incentives to employee inventors and the extent to which new ideas of outside inventors are adopted by organizations.

The proceedings of the Conference are published in this issue of *The Patent, Trademark, and Copyright Journal of Research and Education.* It contains a summary, an edited transcript of the proceedings, which includes research by the staff of the Foundation until the Conference, the presentation of current issues by qualified discussants, and questions from the floor and answers.

When discussants are invited to participate in the Conference, they are, of course, assured of freedom to say what they wish, either as individuals or members of their organizations. Their remarks pertain both to staff reports and various aspects of the patent and related systems.

Summary

Director O. S. Colclough opened the Seventh Annual Public Conference and, in his capacity as Provost of The George Washington University, welcomed the participants. He emphasized the importance of communicating the factual information the Foundation is gathering, and referred to the media published by the Foundation as serving that purpose. He introduced the Executive Director, L. James Harris, who inaugurated the Conference with an address entitled "Encouraging Creativity in a Research Foundation."

Executive Director Harris opened his remarks with the statement that "the same kinds of factors and interrelationships of individuals and environment vitally affect creative activity in the physical sciences as in the social and applied social sciences—in which we are, for the most part, engaged." He referred to the Foundation's experience with diverse specialties: "We have found that our inter-disciplinary research has led to a whole that is greater than the sum of its parts. Experts in particular fields working with strange premises, concepts, and models have been able to communicate with, persuade, and energize experts in other fields. The Foundation's experience has shown that rapport is eventually established, that new bonds of unity are formed, and that a cooperative creative enterprise can thus be achieved."

The Executive Director went on to enumerate the explicit factors found to be most pertinent to the stimulation of creative achievement: "*(1)* the nature of the project, *(2)* the characteristics of the researcher and *(3)* the quality of the surroundings. A fourth factor, the abilities of the individual are, of course, equally important." In discussing the third factor, he pointed out that, "It was our policy not to discourage our researchers from investigating targets of opportunity that opened up as their work progressed. In this way we encouraged considerable research independence within the framework of a coordinated structure. . . . Rapport was also benefited by having the investigators participate ex officio in critical review of plans, procedures, findings, and reports for studies for which they did not have primary responsibility."

Executive Director Harris called attention to an unusual research procedure: "We also recognized in a rather unique way the wisdom of change to provide a fresh approach and encourage productivity. . . . The program was reorganized around smaller study units, having a shorter production cycle, covering a relatively wider range of topics and permitting greater flexibility in arrangement for collaboration among researchers. Here instead of asking the researchers to make a difficult change, we accomplished a transfer for them by constructing a

new environment." Referring to researcher frustrations, he explained, "Some of the frustration is, of course, inevitable and is inherent in the nature of creativity. Intellectual effort often has to be conducted in a state of rebellion. Authority often becomes the place where lightning strikes. Particularly in early periods when ideas seem much more difficult and a researcher is fighting himself and the problem, he will vent his tensions, frustrations and antagonism on administration—which is related to red tape and not too popular anyway. Administration must perform the constructive function of taking it in good spirit, offering understanding and sympathy."

Executive Director Harris said that he is, "inclined to attribute the achievements of our research teams in large part to particular persons who have a peculiar tendency toward creative expression. . . . These persons seem to be uniquely charged with the essential attribute which if genuinely appreciated by the team and skillfully nurtured by those who administer the team, can be highly intensified." He concluded with this caution:

"There is an understandable disposition on the part of administrators —and I confess to it myself—to generally over encourage, to drive for creative effort. From personal experience I would say that the spur should be applied with great discretion on a case by case basis. . . . Of vital importance in any case is the proper diffusion and acceptance by the team members of the new ideas—and the danger to this collaboration of overloading one contributor with too much credit. Lead, inspire, criticize, or even promote rivalry, if necessary to spur the noncreative members to produce, but above all, maintain the unifying interest among the team—the morale balance of the members cannot be overemphasized."

THURSDAY SESSION

The Thursday early afternoon session of the Conference was devoted to GOVERNMENT-ORGANIZATION INTERACTION. The moderator was Raymond L. Bisplinghoff, Director, Office of Advanced Research and Technology, National Aeronautics and Space Administration. Invited contributors participating in this session were: M. Lee Rice, President, Atlantic Research Corporation, Alexandria, Virginia; Elmer J. Gorn, Associate General Counsel, Raytheon Company, Lexington, Massachusetts; and William B. McLean, Technical Director, United States Naval Ordnance Test Station, China Lake, California. The following members of the Foundation research staff contributed in this session: John C. Green, Mary A. Holman, Donald S. Watson, Robert B. Bangs,

and John F. Creed. This was followed by a Panel Discussion and Question Period in which the panelists were the above named speakers.

The late afternoon session, organized around the theme of INTERNATIONAL COMPARISON, was moderated by Ragnar Rollefson, Director of International Scientific Affairs, Department of State. The speakers included: Donald A. Schon, Senior Staff Associate, Arthur D. Little, Inc., Cambridge, Massachusetts, and Chairman, OECD Committee on Encouragement and Promotion of Invention; André Armengaud, Beau de Loménie, Armengaud & Houssard, Paris, France, and Senator in the French Parliament; and John R. Pierce, Executive Director Research, Communications Principles Division, Bell Telephone Laboratories, Murray Hill, New Jersey. Foundation research contributors were: P. J. Federico, George E. Frost, Barkev S. Sanders, and Gerard J. Weiser. After making their presentations, the participants in the session engaged in a Panel Discussion and Question Period.

KETTERING AWARD

The Award Dinner, held Thursday evening, honored Dr. Joseph W. Barker, noted educator, engineer, and public servant, recipient of the 1962 "Charles F. Kettering Award for Meritorious Work in Patent, Trademark, and Copyright Research and Education." Dr. Barker, in his acceptance address, pointed out that: "From the tenor of the recent Congressional hearings it seems that legislation looking toward some changes in government patent policy on inventions arising from government financed research and development may be enacted in the near future." He cautioned, "If the legislation permits the granting of royalty-bearing licenses, either exclusive or non-exclusive, under the principle that the Treasury should be recouped whenever possible for some proportion of the costs of federally supported research, then major questions arise as to the administrative machinery to be established. Patent licensing administration is a specialized technical art in which the government agencies have had little or no experience. (TVA and Agriculture did attempt many years ago royalty-bearing licenses in a very limited field but gave it up when administrative costs exceeded royalty income)."

Dr. Barker suggested that: "The recently enacted 'Commercial Satellite Act of 1962' may well offer a prototype of legislation to organize a government corporation for the commercial licensing of government-owned patents. Such an independent corporation could prove conclusively whether or not a pool of government-owned patents arising from government agency generated and supported research projects

could be licensed to private industry commercialization and produce a 'net profit' which in turn could be utilized to assist in supporting government research through the National Science Foundation. To avoid the pitfalls encountered by the United Kingdom in the National Research and Development Corporation, any legislation should prohibit carrying government financed research patents through the commercial development phase (save of course in the fields of atomic energy and defense weaponry which would be supported by the respective agencies under their organic legislation).

"Such a National Patent Corporation could take the form of a federally chartered non-profit corporation or foundation whose net income over operating costs would be returned to the U. S. Treasury to be applied as an offset to any appropriations made by the Congress for the support of the National Science Foundation or the National Institute of Health. It could be organized with a capital grant of say $5,000,000 which would be a 'final' capitalization. If it could not produce a net income before this initial capitalization was used up, it would go into bankruptcy and the experiment would have been proved a failure.

"I suggest this 'stand or fall' method because I believe that placing any such patent administrative machinery under any government agency would not produce the critical experiment to prove or disprove the concept. I know also that the present government portfolio of some 12,000 patents is comprised of many which because of the defense weaponry nature of much government research have a very limited, almost infinitesimal commercial potentiality. History proves, I believe, that any government operated agency once created is almost immortal —it goes on and on and is never critically evaluated."

FRIDAY SESSION

The Friday morning session on ORGANIZATION-INDIVIDUAL CONFRONTATION was composed of two divisions: Division A, "Organizational Context," moderated by Professor S. Chesterfield Oppenheim, the Foundation's Adviser on Research, included the following invited contributors: S. Blake Yates, Vice President, Research Corporation, New York; John W. Simpson, Vice President, Engineering and Research, Westinghouse Electric Corporation, Pittsburgh; Irven Travis, Vice President, Burroughs Corporation, Detroit; John Hanifin, Manager, Domestic Patent Operations, International Business Machines Corporation, New York; and Sylvan O. Greenlee, Director of Research and Development, Guardsman Chemical Coatings, Inc., Grand Rapids, Michigan. Foundation researchers participating

were: Charles Y. Mansfield, Jesse W. Markham, James N. Mosel, Joseph Rossman, Irving H. Siegel, and Edgar Weinberg. Both groups engaged in a Panel Discussion and Question Period following the presentations.

Division B, "Individual Motivation," was organized as an Inventors' Round-Table. John C. Green, Consultant to the Foundation, moderated. The inventors constituting the Round-Table were: James E. Beggs, Electronic Engineer, General Electric Research Laboratories, Schenectady, New York; Henry P. Kalmus, Chief Scientist, Harry Diamond Laboratories, Department of the Army; William J. Sparks, Scientific Advisor, Esso Research and Engineering Company, Linden, New Jersey; and Richard R. Walton, Boston, Massachusetts.

SYNOPSES

The Seventh Annual Public Conference covered a very wide front, including the university, the company, and government, and many points of view were represented. The variety of viewpoints are evident from the following summaries submitted by several participants when they returned their edited Conference remarks for publication. Although one can hardly substitute the summary for the actual presentation (no synopsis can do full justice to the real thing), it is our purpose to have them convey something of the scope, the variety and the excitement that were present—to mirror the life of the Conference. Happily, these summaries permit us to reflect on what some of the participants said, in their own language, and will encourage the reader to savor the discussions more extensively at his leisure.

In the first session, on GOVERNMENT-ORGANIZATION INTERACTION, M. Lee Rice, President, Atlantic Research Corporation, of Alexandria, spoke on "R&D Direction." His summary reads:

"Since Atlantic Research Corporation is primarily a contract research and development organization, which by definition of its business, assigns most rights to patentable discoveries to program sponsors, the company has had to develop incentives other than direct monetary gain for stimulating and rewarding inventiveness in its technical personnel. In its 13 years of operation, Atlantic Research has found that professional recognition, a personal interest in the company's progress, and the opportunity to advance as rapidly as one's ability will allow have probably proved more effective than direct monetary reward in stimulating a high level of creativity among individual scientists and engineers.

"More importantly, the management of Atlantic Research has at-

tempted, we think, successfully to create an atmosphere in which individual technical creativity can thrive by stressing informality, independence, free flow of ideas, and personal recognition. The management of Atlantic Research is comprised primarily of highly competent practitioners of the engineering and scientific professions. Ideas are considered the life blood of the company and flow upward freely. Emphasis is placed on rapid recognition.

"The success of the Atlantic Research system is best demonstrated by the company's rate of growth—generally in excess of 50 percent per year throughout its history. The system has also produced a substantial number of issued and allowed patents."

Robert B. Bangs, an economist specializing in tax matters and a member of the Foundation's research staff, participated in the first session. He "described the survey of tax experience of individual inventors conducted by the Foundation several years ago. This showed that independent inventors have obtained only limited benefits from Section 1235 of the Internal Revenue Code, enacted for their benefit in 1954; but they are more willing to enter into exclusive licensing arrangements because of this special tax provision."

André Armengaud of Beau de Loménie, Armengaud & Houssard, Paris, France, spoke on "Legal Guidance" during the late afternoon session on INTERNATIONAL COMPARISON. Mr. Armengaud "observed that the first point to consider was whether the legislation and judicial precedents of our Western countries offer sufficient incentives to prompt the creative spirit of the employee. With regard to Eastern countries, all creative ideas are meant to be materialized, to find their places in the realization of the Plan, and to bring just returns to the inventor.

"Three categories of countries may be distinguished in the Western world:

(a) Those countries in which national laws do not contain any specific provision in favor of the employee-inventor, but in which judicial precedents have established a sort of code, systematizing the measures toward the employee-inventor. This is so, for instance, in the United States, where the obligation to file a patent in the name of the inventor is a sort of advertising factor in favour of the latter. It is so also in Great Britain where the distinction between "service inventions" and "independent inventions" determine the grant of a fair remuneration; the final decision being left with the Patent Office, if necessary.

"It is also true in France where judicial precedents, differentiate

between service inventions, belonging to inventors, dependent inventions co-owned by employees and employers, and independent inventions belonging to inventors. Labour conventions, varying with professional sectors, also regulate the financial and juridical aspects of inventions made by salaried personnel. The same sort of legislation applies also to Switzerland where the "Code of Obligations" outlines the rights and obligations of both inventors and employers.

"*(b)* Those countries in which a special law specifically defines the rights of both the inventor and of his employer, such as Sweden, the Federal Republic of Germany, and Denmark. The fundamentals of this legislation is the acknowledgement of the right of the inventor to a fair compensation to the extent the salary he receives does not already include a remuneration in keeping with the profits made by the employer out of his employee's invention.

"In such countries, the amount of the remuneration may be decided by arbitration (in Sweden, for instance) or may result from a calculation made according to a formula whose variables take account of the functions of the inventor in the enterprise, of the respective parts the employee and the enterprise played in the researches leading to the invention, of the value of the invention determined either directly or figured out by comparison with the royalties that would derive from the invention (in Germany, for instance).

"In Germany and in Sweden an arbitration board settles the disputes which may arise.

"*(c)* Those countries in which the Patent Law itself provides the basis for determining the rights of the employee and of the enterprise in the case both of service inventions or independent inventions. Such is the case in Austria, where a remuneration is due to the employee-inventor; in Japan where, in any event, the employer receives a license on the invention and where the financial consideration to the inventor is in proportion to the value of the invention and to the inventor's functions in the enterprise. This legislation is also that of Italy and of the Netherlands where arbitration is also provided in case of disputes.

"To sum up, in view of the various shifting possibilities offered by our national respective legislations, it cannot be said that we have built up a policy really granting incentives to research work, even though in certain countries the publicity given to the inventor's name and the right to a remuneration may increase his standing.

"It is to be desired that all Western countries adopt regulations deciding the award to the inventor-employee, either through provi-

sions incorporated in laws, or through labour conventions varying with industrial sectors as it is either in France or in Germany."

Another participant in the session on INTERNATIONAL COMPARISON, John R. Pierce, Executive Director Research, Communications Principles Division, Bell Telephone Laboratories, Murray Hill, New Jersey, also summarized his presentation. It reads:

"Even in a large enterprise such as the Bell System, as time passes an increasing fraction of the inventions used will come from outside; this is a consequence of expanding technology. Similarly, because of expanding world technology, an increasing fraction of inventions will come from outside of the United States.

"A large industry must be successful in inventing and patenting, so that it can, through cross licensing, secure the right to use domestic and foreign inventions. We should esteem and rejoice in success, but we should not try to undo hopeless failure. We must face up to the fact that not all new technology, or even all current technology, will be American technology.

"In fostering and rewarding invention, freedom and flexibility are important. A large organization should not be forced to reward inventions or assign them to employees; this discourages a free exchange of information and inhibits progress."

At the Friday morning session on ORGANIZATION-INDIVIDUAL CONFRONTATION, John W. Simpson, Vice President, Engineering and Research, Westinghouse Electric Corporation, Pittsburgh, spoke on "Corporate Research Management."

"Corporate research management recognized the importance of creative technical talent in the strength and growth of the company. For this reason, inventiveness is rewarded. The extent of financial rewards is dictated by the profitability which a particular invention demonstrates.

"There are two schools of thought on how best to accomplish this equitably: one is the payment of royalties, the other is on a progressive scale as value becomes appreciated. Westinghouse, supported in this position by the overwhelming majority of its engineers and scientists, favors the latter approach because it permits awards to be made closer in point of time to the date of invention and disclosure.

"The practice of having new employees assign title to future discoveries and inventions to the company is generally accepted as fair, in view of the company's contributions in terms of training, equipment, guidance, supporting service, etc. This assignment, in the opinion of a number of polled inventors, should properly include only those patents

developed using employer's facilities and/or pertaining to employer's product.

"Patent disclosure and award systems must be reviewed from time to time to insure that they are having their intended effect. Quantity is no substitute for quality of inventions, and every effort should be exerted to stimulate solutions through innovation rather than imitation."

During the same session, Dr. Irving H. Siegel, a member of the Foundation's research staff spoke on "Individual and Joint Invention." He summarized his presentation:

"Statistics on inventors per patent reveal that individuals remain much more productive than combinations, i.e., pairs, trios, etc. Indeed, single inventors continue to dominate even in contexts considered favorable to the conduct of research activity on a large scale basis and by teams—namely, the corporation and today's technological frontiers."

Edgar Weinberg, also a member of the Foundation's research staff, condensed his presentation on "Technology and Productivity." It reads:

"In considering measures to quicken productivity growth, it is important to recognize that technological change comprises a chain of complex activities involving inventors, managers and production workers. Case studies of two inventions—the transistors and the automatic airline reservation system—are cited to illustrate the key role of highly motivated individuals in large organizations. The persistence of the sole inventor is revealed in the patent data for two new fields—numerical control and non-woven fabrics. Acceleration of invention, innovation, and diffusion is a complex process involving provision of motivation and awards for individuals of various skills, provision of appropriate organizational framework, etc. A key condition of technological change today is the need to improve the education and training of the labor force."

In the lively Inventors' Round-Table discussion, three of the four participants submitted summaries. James E. Beggs, an electronic engineer with the General Electric Research Laboratories in Schenectady stated:

"Opportunity for innovation by a worker is enhanced when he is permitted to spend at least a portion of his time working on projects of his own choice. The full help and cooperation of workers in different fields of effort fosters innovation by a cross-linking of problems and solutions. The degree of cooperation and resultant innovation is maximized by a system of compensation that recognizes the contributions of the co-workers as well as the inventor."

William J. Sparks, Scientific Advisor, Esso Research and Engineering Company, Linden, New Jersey, condensed his talk:

"In perfecting our patent system, changes in the patent law are less important than improvements in the inventive environment. The inventor is exceptionally motivated by desire for recognition. Unfortunately, objective efforts to increase the gross national product by personal experimentation and observation are falling into disrepute. The term 'Edisonian' has become a bad word among some of our scientific intellectuals. The triumvirate of science, invention, and engineering, should be recognized at top level by a National Academy of Science, a National Academy of Engineering, and now a National Academy of Applied Arts."

An independent inventor, Richard R. Walton of Boston, briefed his remarks:

"It is highly essential that we locate and utilize the creative potential of our country and eliminate the suspicion which exists between industry and the inventor.

"To this end I suggest: A common meeting point for industry and this totally unorganized and uncounted group;—A counseling service to teach potential inventors the practical aspects of working with companies, learning of their problems, and ultimate sale of their inventions;—Enhancement of the inventor's place in our society."

The Proceedings of the Conference

THURSDAY EARLY AFTERNOON SESSION
JUNE 20, 1963

FOSTERING AND REWARDING INVENTION IN THE COMPANY, THE GOVERNMENT, AND THE UNIVERSITY

The Seventh Annual Public Conference was convened at 1:30 p.m., O. S. Colclough, Provost of The George Washington University and Director of the Foundation, presiding.

WELCOME

DIRECTOR COLCLOUGH: Ladies and Gentlemen, I have the privilege of welcoming you to the Seventh Annual Public Conference of The Patent, Trademark, and Copyright Foundation of The George Washington University.

As I am sure a group such as this fully understands, not only are the results of the research and educational program of the Foundation tremendously important at this time, but equally important in our society today is that which is commonly referred to as the art of communication.

It is particularly important in our industrial economy and a basic element of that economy, the patent system, that we give consideration always to whether those things we discover and those things which we have to present will reach the proper audience.

And how should one describe our proper audience? I would have to say the audience is the American people as a whole, when you are dealing with anything as vital as the industrial property system in our economic complex.

Consequently, as we sit here at the Seventh Annual Conference, I hope we will be conscious of our dual responsibility, one with respect to our own interests to develop a clearer understanding of some of the problems we face and then, secondly, to carry the message away with us and make use of it wherever we see fit.

As many of you whom I have known well over the years in this effort have heard me say so many times—but I must say it again, almost more necessarily today than ever before—it is so vital for us to understand, to appreciate, that the status of the patent system in our industrial economy depends in the final analysis, under our form of government, upon an understanding of its place not only by those of us who deal with it in our day-to-day lives but by those who are the final

beneficiaries and controlling power, the citizenry of the United States.

It is for that reason we publish the *Journal,* that we publish the *Digest,* that we published *The Patent System All Around You* series for the upcoming generation, and are now publishing *The Trademark: The Maker's Monogram* for the same audience; that we took on the task of producing a movie, *Fuel To The Fire,* and that we have an Annual Public Conference, where we are today.

You have before you in your folders the program for the Conference and for the dinner this evening where I hope we will all see you again in a social atmosphere when we honor a distinguished American, Dr. Joseph Barker.

Now, as we begin the Conference, I would like to emphasize, please, that you lend your help in proceeding with the program in an efficient and timely fashion.

It is now my privilege, as we begin the Seventh Annual Conference, to introduce my colleague, the Executive Director of the Foundation, Dr. L. James Harris.

ENCOURAGING CREATIVITY IN A RESEARCH FOUNDATION

It seems appropriate at the outset of this Conference devoted to invention in the company, the government, and the university, to discuss the factors we have found to be most pertinent to purposeful creativity. In this discussion special attention will be given to evidence that persuasively shows that the same kinds of factors and interrelationships of individuals and environment vitally affect creative activity in the physical sciences as in the social and applied social sciences—in which we are, for the most part, engaged. I think our observations offer some striking evidence of this similarity.

First a word about our Foundation. The Patent, Trademark, and Copyright Foundation, devoted to factual research and education in the fields of industrial and intellectual property, is an integral part of The George Washington University.

The Foundation's research is primarily devoted to increasing the understanding of the nature and value of the patent, trademark, and related systems, which are concerned with "intangible creations of the mind, including inventions, useful know-how, technical and ornamental designs, and literary art and other products of man's ingenuity." This research is being done on the basis of factual information gathered by carefully selected investigators from various fields of interest. The Foundation is applying to legal, economic, and sociological problems

the principles of scientific inquiry, integrating its research with the University's educational facilities for instruction and training of students, and conveying that research to the citizenry of the country in a many-sided publications program.

With respect to my report, I must caution that it is not based on a controlled experiment, and may not be entirely applicable to other groups. I will simply relate certain operations of our organization and the behavior of certain members of our staff as I see them. My observations have neither hypothesis previously advanced, nor the ultra-sophisticated statistical correlation of preselected variables of a formal study. However, the creative activity I refer to, although not normally productive of patentable invention, does reveal the same kind of incentive-developmental organization. I have attempted to analyze the process in terms of a simple, straightforward piece of observation, and, I trust, comprehension.

Cecil Kent's aphorisms coined to explain invention seems to be very pertinent to creative research in general:

1) All that mankind can do is to rearrange what he finds in the world.
2) Scientifically speaking we do not "invent."
3) We can only reorganize known structures and thereby produce new relationships.
4) These new relations can produce new results.

Charles E. Spearman, author of *The Creative Mind,* suggests that when one engages in creative activity, he takes two or more similar or different ideas or objects that are known and observes their relationship when put together in various ways. Viewed in this manner creation is simply a reorganization of known structures to produce new relations—recombinations.

In our area of interest, we have also sought to derive the benefits of recombinations of specialties. Investigators and consultants for particular research projects are commonly drawn from different disciplines and professions. They work together on studies contributing according to their particular education and experience. This integration, this intellectual cross-fertilization, has proved critical for our creative research achievement.

We have found that our inter-disciplinary research has led to a whole that is greater than the sum of its parts. Experts in particular fields working with strange premises, concepts, and models have been able to communicate with, persuade, and energize experts in other fields. The Foundation's experience has shown that rapport is even-

tually established, that new bonds of unity are formed, and that a cooperative creative enterprise can thus be achieved.

More explicitly the factors that we have found to be most pertinent to the stimulation of creative achievement have been: (1) the nature of the project, (2) the characteristics of the researcher and (3) the quality of the surroundings. A fourth factor, the abilities of the individual are, of course, equally important. Whatever theory of research creativity we accept, the researcher's ability is mainly a matter of how much information he has absorbed in the past and can now apply usefully to something else.

First, let us consider the quality of our surroundings for creative research. By surroundings I also mean the qualities of the other members of the team—both their abilities and their personalities. Also, we have found that the surroundings are not a static situation. It is in constant flux: people react with other people and with their surroundings, resulting in an interplay of opposition, cooperation, and modification. Moreover, our surroundings include not only the traits of the individuals in our teams but also the policies of the Foundation. It has also been our custom to consult with informed people in the field intimately concerned and competent in the aspects of the subject matter under study. Included are practicing patent attorneys, educators, engineers, physical scientists, business and government executives, economists, statisticians, psychologists, and other social scientists. It is our purpose that the spectrum of our information sources will be very broad in scope.

To make clearer the approaches used on those individual studies I will subsequently present as examples, I should like first to make brief reference to our over-all program. The research and the educational activities of the Foundation are now concerned with the following areas:

I—INDIVIDUAL (e. g., from the standpoint of creativity, incentives, etc.)

II—INDUSTRIAL (e. g., from the standpoint of economic growth, research and development activity, diversification of firms, intercompany relations, executive decision-making, and antitrust)

III—GOVERNMENTAL (e. g., from the standpoint of legislation, administrative regulations and procedures, terms of contracts with private firms, judicial actions, and taxation)

IV—PUBLIC (e. g., from the standpoint of the general state of opinion or knowledge, as reflected in polls or news media)

V—INTERNATIONAL (e. g., from the standpoint of foreign licensing and other transactions)

At the outset we undertook an overall exploratory study to check the validity of the approaches in the Foundation's other fact-finding studies and to determine whether data were available to establish a gross or partial measure of value so as to reduce the amount of factual research found necessary in our original planning assumptions. These assumptions had to be based on technical judgments and it was important that they be scientifically examined and corrected if necessary in the light of the findings.

Because the Foundation was sensitive to the urgent need for information in the fields of its interests, the decision was made not to delay the pilot studies for this overall exploratory study. This also gave the supporters of the Foundation tangible evidence that the work program was measuring up to expectations of feasibility from the standpoint of expended time. Moreover, it was believed that the original planning assumptions would be under constant informal examination anyway as the investigations proceeded and therefore this overall checking process would not entail many additional procedures.

Although the overall study provided a most important check on the validity of certain planning assumptions that had been made, some of our researchers expressed deep dissatisfaction with the importance accorded the overall-study. The characteristics of these researchers proved somewhat of a challenge and in an endeavor to prolong their creative contributions, we set up, so to speak, parallel opportunities for recognition. The interests of the Foundation were presented as falling into eight broad categories. One of the purposes of this reorganization was to make the environment in each group equally attractive to the researchers. It was found that an identification of the researcher with his own group resulted in a happier researcher and a "smoother" performance, minimizing internal and external friction. In fact, in a rather quiet way, the group concept seemed to promote a friendly competition. Specific assignments were made and the activities of the investigators were able to be perhaps somewhat more closely controlled and integrated. I acted in a liaison capacity among the individual researchers or teams, the other Foundation officers, the University, the Advisory Council and our Area Committees located throughout the country.

It was our policy not to discourage our researchers from investigating targets of opportunity that opened up as their work progressed.

In this way we encouraged considerable research independence within the framework of a coordinated structure.

Being very interested and participating in the research myself, gave me, as Executive Director, a fuller appreciation of the problems of our investigators and helped to maintain the confidence and spirit of the staff by affording the members direct contact with Foundation policy makers. Rapport was also benefited by having the investigators participate ex officio in critical review of plans, procedures, findings, and reports for studies for which they did not have primary responsibility. Moreover, my close relationship with our researchers alerted me to avoid policies or procedures that would have a dampening effect on their creativity by an unintentional excess of vigilance.

We also recognized in a rather unique way the wisdom of change to provide a fresh approach and encourage productivity. Thus we decided to revise the pattern of our research activities which you will remember we originally divided into eight broad categories. We subsequently restructured the eight categories into five areas covering essentially the same scope. The program was reorganized around smaller study units, having a shorter production cycle, covering a relatively wider range of topics and permitting greater flexibility in arrangement for collaboration among researchers. Here instead of asking the researchers to make a difficult change, we accomplished a transfer for them by constructing a new environment. We simply altered the boundaries of the areas, gave them a more imaginative name and content, and redesigned the units in the areas to better accommodate the growth of our staff's experience and to more effectively program the development of a large common fund of information from the various specialties.

Another factor of environment we have found important in achieving creative activity is the application of various strategems to sufficiently energize researchers—sometimes arousing curiosity, sometimes presenting the problem from a new point of view, or communicating a new insight derived from other studies, and sometimes even utilizing discontent and prestige. But for the most part it consists of communicating the satisfaction of meeting a challenge successfully or of accomplishing a creative piece of work. Most of our researchers are also busily engaged elsewhere and the creative urge which, happily, afflicts people of superior ability is generally our most dependable ally.

For a fuller understanding of the nature of this ally and other strategems, I refer you to the Foundation's study of "The Role of Patents in the Creation and Growth of Small Industrial Units" under Dr. Irving H. Siegel. Dr. Siegel devotes most of his time to a very demanding

position in another organization. As he has had much experience with questions of productivity and an extraordinary concern with knowledge as a "stuff" as real as land and labor, he is deeply interested in the work of the Foundation. To hoard this researcher's time and to maintain his Foundation activity at a tolerable level, we introduced studies in the form of trilogies—associate researchers were engaged under Dr. Siegel on three diverse young industries at a time, on new industries which appeared to be growing. These associates, economists and statisticians, actually prepared and distributed written inquiries and carried out follow-ups.

I also sought to increase this principal investigator's contribution by enlisting his interest and participation in studies in which I acted formally as a co-investigator. We are presently collaborating on two studies, one on "The Role of Industrial Property in Latin America," and another on "Positive Competition." By retaining this very close working relationship on these studies, I have been able to so control the surroundings that the talents of this researcher are utilized on a broad front and the rewards are made attractive to him.

Let us now direct our attention to the characteristics of the researcher. The creative researcher, no matter what his characteristics are—and they are often contradictory—is sometimes a difficult person to administer because of two frustrating traits, namely, perfectionism and opposition to the status quo. I do not mean by this to infer that these are his most common or most obvious traits. There are others that are more common; and these others are of considerable assistance to the administrator, such as analytical ability and diligence. Moreover, when opposition to the status quo takes the form of independent thinking, it may well serve a constructive purpose by overcoming the obstacles to progress represented by long accepted but confining research and administrative procedures.

The Foundation's Patent Utilization Study investigated a scientifically selected sample of patents from the universe of patents issued by the patent office. By statistical methods, a quantitative examination of what happened to patents was made. The researchers accumulated some very interesting information as to the use of patented inventions. In fact, they seem to have established that much more use is made of patented inventions than has heretofore been realized and has uncritically been asserted year after year. Naturally, there have been many problems in effectively applying statistical methods to intangibles, but through careful pretesting and ingenuity the techniques of the statistical discipline were effectively applied. W. Duane Evans, Asso-

ciate Commissioner of Labor Statistics, commented, and I quote, ". . . it's a pleasure and not a very common pleasure to examine a study plan in which such careful thought to the problems of design and execution has been so obviously given."

The Foundation is not endowed. It attempts to pursue its research program as a cooperative enterprise financed very modestly by private funds. We have sought with the hard work and the ability of our researchers to accumulate a maximum of information with a minimum of outlay. Because of the lack of finances to do a series of interviews of the non-respondents to the questionnaires in the Patent Utilization Study, the researchers on that study have persevered in a mild criticism of the administration for the Foundation's unattained perfection of statistical accuracy. The researchers, I believe, will continue to take us to task, and rightly so, until their conception of the principals of true scientific method has been achieved. I offer this as an example of the type of perfectionism and opposition to the status quo we have experienced—albeit administratively tolerable.

Lest there be any misunderstanding, I am entirely in sympathy with the researchers and have encouraged certain other checks, at no little expense, of their original findings. I believe the researchers, on one level, are also very sympathetic to the problems of Foundation policy-making. However, my deeper sense of research team psychological currents conveys to me a sense of researcher frustration. Although they have generally referred to this deprivation good naturedly, it is there, and we are seeking to compensate. We hope, if we can obtain the funds, to be able to remove most of this condition in the future. Some of the frustration is, of course, inevitable and is inherent in the nature of creativity. Intellectual effort often has to be conducted in a state of rebellion.

Authority often becomes the place where lightening strikes. Particularly in early periods when ideas seem much more difficult and a researcher is fighting himself and the problem, he will vent his tensions, frustrations and antagonism on administration—which is related to red tape and not too popular anyway. Administration must perform the constructive function of taking it in good spirit, offering understanding and sympathy. When the researcher makes all kinds of complaints, it is critical that he thinks he is understood. It is most important for the administrator not to break down at the same time as the researcher. In short, a proper amount of hand-holding is necessary at this time.

A key commodity in the utilization study, in fact in all our studies,

has been the enthusiasm with which our researchers have attacked their problems and dedicated themselves to their tasks. This is no idle flattery. Without this enthusiasm this study and many others would not have gotten off the ground. It was this enthusiasm which challenged Dr. Sanders and his colleagues to take certain risks—to undertake a statistical study of patent utilization. I remember him telling me that he had contemplated writing his Ph.D. thesis on the subject of patents but had finally decided against it. Dr. Holman, our Thomas Alva Edison Fellow, has written her thesis on a patent subject and found it a source of intense and, I believe, abiding interest.

From my observations, I am inclined to attribute the achievements of our research teams in large part to particular persons who have a peculiar tendency toward creative expression. Although there always must be, of course, a common objective and combination of efforts by the members of the research teams, the distinctive contributions are derived from individuals who spark the creative output. These persons seem to be uniquely charged with the essential attribute which if genuinely appreciated by the team and skillfully nurtured by those who administer the team, can be highly intensified. By encouraging interaction among specialties and interplay among teams we have managed to steer this fragile element into new studies. Once this element has been introduced, it has a tendency to proliferate, if properly encouraged.

There is an understandable disposition on the part of administrators —and I confess to it myself—to generally over encourage, to drive for creative effort. From personal experience I would say that the spur should be applied with great discretion on a case by case basis. Some individuals spark only by maintaining the pressure of urgency, others must be treated gently, must be inspired, and in still others productivity can only be induced by competition. Of vital importance in any case is the proper diffusion and acceptance by the team members of the new ideas—and the danger to this collaboration of overloading one contributor with too much credit. Lead, inspire, criticize, or even promote rivalry, if necessary to spur the non-creative members to produce, but above all, maintain the unifying interest among the team—the morale balance of the members cannot be overemphasized. There is a good chance that newcomers or slow starters will catch the fire. Even if they don't, the attention paid them will be repaid manyfold in team morale and cooperation.

We have already considered (1) the quality of the surroundings, (2) the characteristics of the researchers and (3) the ability of the individ-

ual as critical factors for creativity. At this point, as part of the discussion of the personal quality of creativity in relation to the team, it seems appropriate to briefly expose to view the nature of the project, the fourth critical factor for creativity.

The type of work or project undertaken has undoubtedly a marked effect on creative people. Some of our researchers will not participate in certain projects that may have strong appeal for members of the Foundation. Either because their training or their interests lie elsewhere. This presents a problem in the optimum use of personnel. Moreover, some of our researchers will not participate in studies unless there is an opportunity for rapid publication of short contributions, others on the contrary prefer to write a book.

Our *Journal of Research and Education* is calculated to provide an outlet for the short, long or interrelated reports of our reseachers. We have even provided a Forum section in the *Journal* to serve as a vehicle for the presentation of papers and notes which do not necessarily rest as yet on a firm basis of empirical research.

To properly motivate our researchers we pay particular attention to their work needs as creative individuals and continually reappraise their output as some index of their satisfaction. When advisable, we will seek to guide them rather loosely—avoiding the assertion of authority—into more productive channels. Although an individual may at first appear to be essential in a given work context, we have found that the optimum allocation of individuals may not be entirely manifest until hypotheses have been tested and appropriate corrections made.

I will conclude this report by restating my original premise: social and applied social science research is a creative act that is very similar to invention in the physical sciences. An examination of our Foundation research activities reveals that normally the same kinds of factors must be considered in fostering and rewarding these related types of purposeful activity.

Thank you.

(Applause)

DIRECTOR COLCLOUGH: Thank you, Lou.

As we are all aware, the theme of this Seventh Annual Conference is the "Fostering and Rewarding of Invention in the Company, the Government, and the University." And we now begin the early afternoon session, the subject of which is GOVERNMENT-ORGANIZATION INTERACTION.

It is my privilege to introduce the moderator of this early afternoon

session, the Director of Advanced Research and Technology of the National Aeronautics and Space Administration.

This gentleman received his doctor of philosophy from Swiss Federal Institute of Technology in Zurich. Prior to joining NASA he was for 16 years a professor at Massachusetts Institute of Technology. He was, I'm proud to say, a naval officer during World War II. He served as a faculty member at the University of Cincinnati.

In NASA he is responsible for all research and development of advanced systems.

It is my privilege to introduce Dr. Raymond Bisplinghoff.

GOVERNMENT-ORGANIZATION INTERACTION

DR. RAYMOND BISPLINGHOFF: Thank you very much, Mr. Colclough.

You won't find my name in the program I don't think. Dr. Hugh Dryden, the Deputy Administrator of NASA, was originally supposed to come here today. He sends his profound regrets that he is unable to be here, and he asked me to pinch-hit for him as moderator in this afternoon's session.

As a researcher who has spent his life in laboratories mostly in somebody's basement or back room, I am honored to be here with such a distinguished gathering.

As I listened to Mr. Harris and his remarks, I was, of course, very much impressed by them, because, as I think of ingenuity and invention, I have always been impressed by the fact that I couldn't seem to correlate it with anything.

I have always been impressed by the fact that there are quite a few ways that one can skin a cat when one wants to reach an objective in research.

It has been hard for me to see what criteria can be used to decide which individuals are superior researchers. For example, Isaac Newton, who had the highest ability for incisive, inductive reasoning, became later in his life the master of the mint and was one of the best bureaucrats in the history of the British Government.

Sir William Rowan-Hamilton, whose contributions to advanced mathematics, and especially to dynamics, are well known to many of you, drank himself to death like a young poet.

It's also been a little hard for me to see as a research manager how you manage truly fundamental research. I have been most impressed or was most impressed by reading the papers that emanated from the Royal Aircraft Establishment at the end of World War I when that establishment had universal management for a five-year period. As

near as I can tell, the Royal Aircraft Establishment did its most productive work during this five-year period.

I am acquainted with a fairly large company which had weak research management during the period of the depression and in which its researchers were guided by directions that emanated from their own minds. I am convinced, that the technology was laid down during this period for the later success of this company.

At any rate, the things that Mr. Harris has talked about and the things that you are going to discuss are very close to my heart.

But I did mention before that there are a number of ways to skin a cat, and this reminds me of a story which I think is probably apocryphal. There was a small manufacturer who wanted to hire a research director from the June graduating class, and he decided that he was going to get several boys together, some of the most promising boys he could find, and he was going to give them a test, and the boy who came out best in this test would get the job.

So he got four boys from four universities, and he purchased an aneroid barometer, a beautiful new aneroid barometer, and he took them over to a church that had a fairly high steeple.

The first boy was from George Washington University where they have a strong physics department. And he said, "Now, you take this aneroid barometer and tell me how high that steeple is."

And so the George Washington boy took the barometer and he put it under his arm and he climbed up to the top of the steeple and he bared his watch and reached out and dropped the barometer, timed the time it took it to reach the ground, and he made suitable corrections for windage and calculated the height.

Then next came the boy from Catholic University where they have a strong engineering department. And he was given the barometer, and he took a big ball of string out of his pocket and climbed to the top of the tower and tied the string to the barometer and let it drop down. Then he got down and measured the length of the string very carefully.

And next the boy from the University of Maryland where they have a good meteorology department. He went over to the bottom of the tower and took a reading. Then he went up to the top and took another reading. He took the difference in the readings and made suitable correction for atmospheric conditions of the day, and he calculated the height.

And finally there was the boy from the Harvard Business School. He straightened his bow tie and buttoned his coat, took the barometer, took his handkerchief out, shined it up real good. He walked over and

knocked on the door of the sexton's house. The sexton answered the door, and he said:

"My good man, I'll give you this lovely barometer if you'll tell me how high that steeple is." (Laughter)

Our panelists this afternoon I think have a special responsibility, since this is the first session of the conference. This responsibility is one of laying a foundation for the balance of the conference.

As you can observe from the program, we are divided into three parts. The first part will consist of three papers from invited contributors. The second will consist of four papers from Foundation research contributors. And, finally, in the time that remains, we will have a panel discussion and question period in which we hope to stimulate some spirited discussion among the panelists and from the floor.

I would like now to introduce first Mr. M. Lee Rice, President of Atlantic Research Corporation, Alexandria, Virginia, whose topic will be "R&D Direction."

Mr. Rice.

PART I — INVITED CONTRIBUTORS

R&D DIRECTION

MR. M. LEE RICE: Good afternoon.

My topic is the role of research and development management in fostering and rewarding invention in the company, or, more specifically, what the management of Atlantic Research Corporation has done to stimulate a high level of performance in its technical personnel.

For those of you who are unfamiliar with Atlantic Research, we are a company engaged primarily in research, development and production in the fields of rocket propulsion, rocket vehicle systems, electronic communications, electromechanical equipment, and military pyrotechnics. Our company was formed in 1949 by Dr. Arch C. Scurlock and Dr. Arthur W. Sloan, two scientists with a small amount of capital, a great deal of ability, ambition and a lot of courage. Today our annual sales volume exceeds $33 million, and we employ over 2,800 people. Our headquarters and principal laboratories are located near Alexandria, Virginia. We also operate extensive facilities in Southern California and in New England.

Since its founding, the primary mission of Atlantic Research has been the performance of research and development under contract for industrial and government sponsors. This, by definition, licenses or assigns the rights to any patentable invention or concept resulting from

the sponsored research to the sponsor or customer, along with many, if not all, of the rights to profit from their exploitation. Atlantic Research's profit must largely be derived from the fee charged for performance of the research and development effort.

I should also note that throughout our history our largest single customer, directly or through contracts with other prime contractors, has been the Department of Defense. Under DOD contracts, of course, the patent policy is somewhat different. Patent rights are generally assigned to the contractor with royalty-free license to the government. The contractor retains an exclusive right to license or exploit the item in question for commercial applications. The DOD patent policy, as you all are well aware, is currently the subject of some controversy.

Primarily because of the nature of our business in past years—heaviest emphasis on rocket propellants, propulsion, and closely related fields—few of our defense-originated patents have lent themselves to profitable commercial exploitation. The only major potential customer for such items or materials is the government. A few byproducts of this work, most notably our line of specialized laboratory mixing and testing equipment, have been marketed commercially, but these have not played a major part in our operations.

Again, because of the nature of our work and also partly because of limited financial resources, we did not in our earlier years pursue company-sponsored development of ideas or inventions to any major extent. We found it more advantageous to apply our limited capital resources to the expansion and improvement of facilities for research and development. In recent years, especially with our expansion into the electronics field with its greater potential for commercial exploitation, we have pursued a more active program of company-sponsored development.

The nature of our business, then, obviously limits the use of direct monetary gain as a reward for inventiveness, both for the company and for the individual inventor. Yet inventiveness is absolutely essential for the survival of a company in our field. How, then, does one provide the incentive to invent and reward inventiveness in such a situation? We feel that we have accomplished this by a number of means in Atlantic Research—basically by finding indirect means of rewarding the individual and by creating an atmosphere in which individual inventiveness is recognized and encouraged.

First of all, let me comment on means we have used to reward inventiveness.

A patent in itself can serve as a very significant reward to the inventor in terms of his professional status. As the publication of a

paper is considered the prime symbol of professional accomplishment for the research-oriented technical man, so, for the technologically-oriented, the patent may serve as a similar professional merit badge. Since the policy of Atlantic Research has been to file patents only on the more significant, basic developments, not on small improvements, the number of our patents is somewhat limited, and the professional significance of being designated inventor on an application or disclosure is substantial.

One should never underrate the importance of the recognition of accomplishment as a reward in itself. A sense of accomplishment and pride in his own work is a very essential thing to the creative scientist or engineer. That his work is worthwhile is best demonstrated to him through its recognition by his co-workers and superiors. The very act of filing a patent application is a recognition of accomplishment. I can recall in my early career at Atlantic Research that numerous of my ideas were pursued and developed, though neither the company nor myself ever expected that the patents would prove financially valuable. The very fact that the ideas were regarded as worth pursuing was a valuable personal reward to me and provided substantial motivation.

We also employ other, more tangible, means of rewarding inventiveness. I should point out that these means were not designed to reward inventiveness per se but as rewards for outstanding professional performance in general. We have found, however, that exceptional performance in a technological field generally presupposes inventiveness.

Salary increases, of course, are the most obvious tangible reward. Our salary policies have always offered generous opportunities. The current excess of demand over supply of scientists and engineers, with the attendant efforts of companies to outbid each other for the services of competent technical personnel, makes a generous policy necessary for survival and somewhat limits the usefulness of salary as an incentive. We have found that the frequency of salary review is, however, a very significant factor in employee morale and currently review salaries at seven-month intervals.

One of our most effective means of stimulating and rewarding outstanding performance has been through encouraging investment in the company by employees. Options to purchase stock in the company at a favorable price are granted to employees regularly. The number of shares granted in the option is determined to some extent by the employee's performance record. By giving our people a very personal interest in the progress of the company and a chance to profit from its progress, we have been able to maintain an extremely high level of performance among our technical personnel.

The use of stock options is certainly not unique to Atlantic Research. Most companies use them as an incentive for top management personnel. A number of companies extend token options to all personnel. We feel that Atlantic Research is probably unique in the extent to which it has applied this incentive. Prior to 1958, Atlantic Research was totally owned by its officers and employees. Employees and former employees still constitute a sizable portion of our stockholders, approximately 60 percent. Many long-term employees are very substantial stockholders. Also, the company through most of its history has been small enough that a significant increase in volume and profit, and consequently in the value of the employee's investment, could often be readily traced to the contribution of a single individual.

Another effective reward for outstanding performance—and, again, one which we have probably been able to employ on a somewhat broader scale than most organizations—is professional advancement within the company. Our company has grown at a very rapid rate, and the philosophy of management has been to delegate responsibility freely. Consequently, new high-level technical and technical-management positions have constantly opened up. The majority have been filled by promotions from within the company. In general, I think that any individual in the company in past years could take on as much responsibility as he was willing and able to assume. Opportunities for advancement have been, so to speak, virtually unlimited.

Advancement has been based on overall professional performance, and, as I have stated before, outstanding performance in technological areas is usually inseparable from inventiveness. A quick survey shows that the technical people who have advanced to the most important positions in Atlantic Research are also those who hold the largest number of issued or allowed patents or, in the case of those oriented toward research, the largest number of significant publications. This group includes myself, who joined the company as a mathematician in 1950, became a division director in 1955, vice president in 1958, and president in 1962; Keith E. Rumbel who came to the company as director of the Chemical Engineering Division in 1951, became vice president in 1957 and senior vice president in charge of all of the company's programs in rocket propulsion and chemical systems in 1963; Dr. Raymond Friedman who joined the company in 1955 as director of the Kinetics and Combustion Division and is now vice president in charge of research; Dr. Michael Markels who came to Atlantic Research in 1957 as a nuclear engineer and is now director of our Nuclear Engineering Division and president of the Atlantic Research Nuclear Corporation, a subsidiary. I could cite many others. Additionally, it

should be pointed out that the founders of Atlantic Research have both consistently proved their inventiveness by the patent route.

Now, aside from tangible rewards, what has management of Atlantic Research done to encourage and foster inventiveness? Primarily, we believe, we have created an atmosphere in which originality and individual initiative are encouraged and recognized.

It is not possible at Atlantic Research to draw a distinct line between corporate management and technical, or R&D, management. From the chairman of the board down, the management of Atlantic Research is comprised largely of highly competent practitioners of the engineering and scientific professions.

The founders of Atlantic Research, I feel, took great pains to establish the kind of organization that would bring out the best in the capable technical man, one stressing the importance of individual accomplishment. This is easily accomplished in a small company. I believe, though, that we have been able to maintain this atmosphere to an amazing degree throughout our growth into a sizable corporation. We have accomplished this partly by maintaining relatively small and autonomous technical groups or project teams within the larger organizational framework.

Informality has always been the rule in our operating management. Relations between the supervisor and the technical employee are cordial and relaxed. Free exchange of ideas and interchange between disciplines is encouraged. Most of it is accomplished on a very informal basis.

Ideas are the life blood of a company such as Atlantic Research. They are regarded by all as an exciting part of our business—to be expressed, discussed, traded, and promoted. Technical ideas flow upward freely, and because top management are technical men, are generally received with interest. To encourage this flow, we place great emphasis on rapid recognition, even if it consists of only a hasty conference with top management. As I stated before, this recognition in itself often serves as a significant reward to the inventor. Of course, we attempt to exploit technically sound ideas as rapidly as we can in various ways.

We also strive to maintain an atmosphere of enthusiasm in our organization. This enthusiasm is basically a characteristic of youth, and Atlantic Research, on the whole, is a very youthful and energetic organization. In our recruiting efforts we search not only for technical competence but also for imagination, drive, and ambition in technical personnel.

How successful our system has been is probably best demonstrated

by our rate of growth. With the exception of one year, Atlantic Research has maintained a growth rate in excess of 50 percent per year—measured in terms of dollar volume of sales—throughout its history.

In terms of patent statistics, in its 14 years of operation this system has produced 46 issued patents and 30 applications allowed under secrecy orders. Another 44 applications are currently pending. These numbers may not appear impressive. However, bear in mind that we file primarily on very fundamental discoveries. Many of these patents represent major advances in the state of the art of rocket propulsion, such as the basic patents on plastisol-type solid propellants or our work in aluminum and beryllium-containing high-energy propellants. Also note most of the issued and allowed patents derive from a period when the company had fewer than 150 professional employees.

In summary, I can say that we feel that our approach to management of research and development has been quite successful in terms of stimulating a high degree of creativity among the individual scientists and engineers in our organization. In terms of reward, we have found that professional recognition, a personal interest in the company's progress, and the opportunity to advance as rapidly as one's ability will allow have probably proved more effective than direct monetary reward in stimulating top performance.

I should also note that the basis of this discussion has been primarily historical. It represents Atlantic Research as it has been up until now. Our organization is growing rapidly. Larger programs are being undertaken. The major task that we have before us is to maintain the atmosphere that has proved so successful for us in the past, and, indeed, we intend to try very hard.

Thank you.

(Applause)

DR. BISPLINGHOFF: Thank you very much, Mr. Rice.

Our next speaker is Mr. Elmer J. Gorn, Associate General Counsel, Raytheon Company, Lexington, Massachusetts.

Mr. Gorn's topic is "Legal Guidance."

Mr. Gorn.

LEGAL GUIDANCE

MR. ELMER J. GORN: Thank you.

My topic is legal guidance. I believe the legal guidance content of my talk will be minimal. I am not sure that there is too much guidance that we can get from a merely strict legal analysis.

However, in order to analyze the effects of the interaction between

the government and the private enterprise organization, which is the general subject of our session here, in order to analyze those effects on the stimuli which the law provides for fostering and rewarding invention, I would like briefly to review what the legal instrumentalities are and roughly how they work.

And I want to emphasize the fostering aspect of this subject rather than the rewarding.

Sometimes we don't know whether the reward really produces the fostering, produces the generation of creative activity or not.

And so I would like to analyze this from the standpoint of how do we foster, how do we stimulate the making of these inventions.

Essentially there are two such instrumentalities. First, the patent grant. Second, the protection afforded by the law to what we have come to call proprietary information, trade secrets, and the like.

In each case the principal stimulus to purposeful creativity arises from the possibility of being able to make a larger profit than if these instrumentalities were not available.

Therefore, these instrumentalities derive their basic effectiveness from the profit motive, and anything which tends to decrease the potential of deriving profits from the exploitation of patents or proprietary information reduces their effectiveness as stimuli to creativity.

Now, the creative act, in my opinion– and this creative act has been analyzed and described at great length by many, many writers–can always be traced to the mental activity of some individual creative mind.

And it occurs, as Dr. Harris has already told us, when a creative person is placed in an environment which first supplies him with a body of information, second poses previously unanswered questions which arouse his interest and cause him to seek for new answers, third provides him with such tools as he finds he needs to probe for the answers, and fourth provides an effective channel of communication, as Dr. Colclough has pointed out, whereby the new answers which arise from his creative mental activity are transmitted at least to some segment of society capable of preserving and utilizing the new answers.

Now, in the past all of these elements were often supplied by the creative person himself, as in the case of the "garret" inventor. Even today there are still creative individuals who, motivated by the profit motive provided by patents and proprietary information, create such an environment for themselves and, in many cases, quite profitably.

However, to an increasing extent the complexities of modern technology have raised the cost of creating and maintaining such an

environment to such an extent that it can only be supplied by an organization of appreciable size.

A creative individual who joins a profit-motivated organization usually, either overtly or implicitly, transfers the responsibility of deriving profits from his creativity to the organization and thus, in one sense, removes himself one step from the direct economic stimuli arising from the legal instrumentalities we have been considering.

Now, by "profit-motivated" organization I am speaking primarily of the type of organization which looks to obtaining its major profits from the sale of its goods rather than the type of organization which Mr. Rice described in the Atlantic Research Company, although there too, as he pointed out, the profit motive is a powerful driving force.

However, this creative individual who has transferred this responsibility of deriving profits to the organization in return demands that the organization not only supply him with an effective stimulating environment but also that he be supported in the style which the engineer and scientist has come to expect.

The fact that the creative person in a profit-oriented organization removes himself one step from the direct impact of the economic stimuli supplied by the law of patents and proprietary information does not mean that these stimuli no longer operate even indirectly upon such a person. They continue to operate primarily through their impact upon the creation, maintenance and nature of his environment.

These stimuli, of course, do operate directly upon the managers of the organization whose decisions as to the magnitude and nature of the investment in the environment are directly affected by these stimuli.

To the extent that the promise of profits to be derived from patents and proprietary information are decreased, to such an extent will they fail to supply incentives to establish and maintain the creative environment.

That is not to say that there are no other motivations which may cause such managers to supply a creative environment, but usually all of these motivations are cumulative, and to decrease any of them will tend to decrease the magnitude of the investment in the creative environment.

In addition, the patent stimulus may still act, of course, directly upon the creative person to some extent. It has been pointed out already this afternoon in some cases the obtaining of patents raises his professional status. Often his pride is flattered. And sometimes he is given a direct share in the profits derived from the exploitation of his patents.

However, I believe that in general these influences, at least in the

larger profit-motivated selling organization, are relatively minor in directly stimulating creativity.

Another factor which we should not overlook is that the nature of the motivation in support of a creative environment will control the nature of the information and the tools supplied and the nature of the questions posed to the creative person, and those, in turn, will control the nature of his creative answers.

For example, a laboratory devoted solely to developing guided missiles will develop guided missiles. But such a laboratory looking forward to profits in the commercial market place may also develop rocket motors for airplanes, communication links for TV programs, high temperature plastics for stoves and cooking utensils and so on.

Now, coming to the subject matter of this afternoon's discussion, let us try to see what the GOVERNMENT-ORGANIZATION INTERACTION does to such a sytem.

The government appears to an increasing extent to consider that while the making of a profit from government work may be a necessary evil, it certainly should be kept to a minimum. This applies not only to the monies actually paid out by the government but to all secondary benefits which may be derived by the contractor.

The intensity of this attitude, particularly in the field of patents, inventions and proprietary information, is rapidly increasing.

Many bills have been introduced into Congress calling for the government to take title to inventions made by contractors in the performance of government contracts. Some of these would take complete title in all cases, no matter how small the government's contribution and no matter how great the contractor's contribution.

Even the most moderate of these bills would compel the government to take title in various general categories.

Some of these bills, of course, are now law and control the policies of AEC, NASA, and other agencies.

These and other pressures have led all government agencies, including the DOD, to include provisions in government contracts which take for the government an increasing amount of proprietary rights in contractors' inventions.

Possibly even to a greater degree is the drive in government agencies to extract from the contractor a maximum of his technical information with unlimited rights to use such information for competitive procurement.

As a result of these drives, every government contract, particularly those in which the contractor is called upon to perform some research or development, is full of lengthy contract clauses which define the

rights which the government obtains with respect to the inventions and technical data involved in the subject matter of the contract.

These clauses implicitly recognize that what is called for is inimical to the contractors' interests and therefore such contractors may be tempted to evade them. Therefore, penalties are provided in the nature of funds to be withheld until the contractor fully complies.

The concern with the possibility that some contractor may fail fully to give the government rights called for is more apparent in pending legislation. Even some of the so-called moderate bills call for forfeiture of all rights to such property for failure to comply with the reporting requirements.

Now, it is apparent that the government's desire to be able to purchase its goods competitively outweighs any desire for creativity. Thus, we have clauses in contracts for the development of new equipments which are called "Screening of Proprietary Data." These clauses require the contractor to keep out of his development everything of a proprietary nature which may impose a cost on the government in its future procurements of the equipment after it's developed.

He can only include such proprietary material if he gets the consent of the contracting officer to do so.

In effect, the contractor is told, "It is more important for you to develop something we can buy competitively, without paying anything to the owners of creative ideas, than for you to be creative."

Now, as our moderator has told us, in some areas we have found that excessive management has produced a minimum of creativity. And it may be that this is what we are facing in the government area.

It seems to me quite clear that the only effect which the government, at least in the present atmosphere, can produce with respect to the stimulus toward creativity is to decrease the incentives which patents and proprietary information give to the contractor. This has created such concern in industry that some organizations which rely on such proprietary rights to maintain profitable businesses have actually refrained from doing business with the government.

This is particularly true of some of the smaller businesses whose principal protection against larger and financially more powerful competitors is in their patents. Others are selective in the kind of government contracts which they are willing to take.

However, in view of the fact that such a large percentage of the total market available, particularly in the more highly technological fields, is supplied by the government, most businesses feel that they must do business with the government despite these restraints.

Now, what are some of the specific effects on creativity produced by the reaction between government and business?

To the extent that a business is deprived of rights to patents and proprietary information in the non-governmental area, which is what the taking of title accomplishes, to that extent will the business decide not to invest funds which can only be recovered from the commercial exploitation of the invention involved. Thus, the environment which such a business will support will be one whose cost will be recoverable solely from government business.

Such an environment, as we have seen, is a limiting one. It will evoke from the people working in it creativity limited to satisfying the particular problems posed by the government.

Such an environment will also have imposed upon it the cloud of the club of penalty should its personnel fail to comply with the myriad details to assure the government that it will get all the rights contracted for.

We all know that creative technological personnel is in short supply. A larger and larger percentage of that supply is being absorbed in doing work under government contracts. The limitation placed on the nature of the environment in which such people are working tends to make certain that their creative talents are divorced from engaging in creation and development of new and better products for the general consuming public and to this extent restrains and limits the rate of economic growth.

Another particularly stultifying effect produced by government contract provisions is the enormous amount of nonproductive reporting activity required. Some of you may have seen the cartoon of a missile factory in which trucks are loading paper at the main shipping platform, and through a small door at one side an occasional missile emerges. This is only a slight exaggeration.

The insistence by the government that it must receive full and complete reports of every technical detail—because some day it may need to "second source" an item developed or purchased under government contract—occupies the time of large numbers of technical people.

The sad part of this is, in my opinion, that by far most of this is wasted effort. The more complex and more voluminous the reports, the less useful and the less likely they are to be used.

Certainly no one occupied in detailed reporting of this kind can be expected to be very creative, while if placed in a different environment the same people might very well be extremely creative.

One effect of the government's insistence on receiving a full measure of "what it pays for," which has not been generally recognized, is the

decrease in the effectiveness of the channel of communication through which the results of the contractor's creativity flow into society.

Where a private business is free to retain full proprietary rights to its inventions, it will attempt to teach such inventions in its patents as extensively and as broadly as it can, since this tends to increase the breadth of coverage of its patents.

Also, where it can get patent protection, it is motivated to publish its discoveries fully. This increases its reputation, and if others use the published results they may well need licenses under the patents under whose protective influence the publications were made.

Where the government is involved, virtually every disclosure to the government or to the public takes something of value from the contractor, who expects that it will go to benefit his competitors.

Under these conditions, is it any wonder that the contractor is motivated to disclose no more than is required to satisfy his contractual obligations to the government?

The overall result must be recognized as interposing an additional restraint in the full flow of information into widespread use by the economy.

Nowhere in its contracts does the government offer a reward for creativity. Rather, its rewards go to the formal and routine compliance with the minutia of the contract clauses. The most non-creative execution of a development contract is rewarded equally as well as the most creative performance, as long as the formal requirements of the contract are met.

The more creative the performance, the greater is the obligation of the contractor to disclose information and grant rights to the government, with severe penalties for failure to meet such obligations.

Another restraint on creativity arising from the activity of the government is the fact that the government can and does infringe patents owned by private organizations, and it is very difficult to get any reward. Only the most powerful, the most persistent of private organizations can expect to get recompensed for this type of activity.

As a result, and as the government purchases more and more of the gross national product, more creative people feel that creativity such as covered by patents is a rather poor area where the government is involved to put their money into.

So it seems to me that to date the effect of the government on encouraging and rewarding creativity in private organizations from a legal viewpoint has been one of limitation and restraint. Perhaps this is inherent in the nature of government operation. Some sporadic attempts to substitute an award system for the traditional forms of

economic incentive have been tried. I believe they have been signally ineffective.

A solution to the problem will be long and difficult. It will never be solved until we can persuade Congress, the administrative agencies, and industry itself to divorce themselves from the emotional type of binge that we have been in and try to determine as objectively as possible the true nature and operation of the human act of creativity.

Thank you.

(Applause)

DR. BISPLINGHOFF: Thank you very much, Mr. Gorn.

Our third invited contributor is Mr. William B. McLean, Technical Director, United States Naval Ordnance Test Station, China Lake, California, and his topic is "Invention."

Mr. McLean.

INVENTION

MR. WILLIAM B. MCLEAN: Ladies and Gentlemen, I would like to talk to you this afternoon as an inventor of sorts who is employed by the government as an administrator, and therefore I can talk about both sides of the question.

I'd like to talk about the methods used to encourage and foster the inventive process, which I think we all intuitively feel is the basis of our technical progress.

One of the facts of life which an inventor must soon learn is that no matter how much the government may express the need for more creativity and invention in general, any specific invention an inventor would like to propose is likely to be upsetting to any organization as large as the government.

I don't think it applies particularly to the government; it's probably true for any large organization.

If the invention is really new, it is likely to lie somewhere between the fields of the offices which have been set up to handle specific areas of work. The inventor can expect one of two answers, either that—neither office is interested and suggests he take his idea to the other, or both are interested and they become involved in a cognizance fight to see who will gain control of the intermediate area.

Either course of action is likely to be somewhat upsetting to the inventor unless he is properly equipped with the patience to wait for the dust to settle.

A really novel invention like the aircraft or radar or the atomic bomb can be tremendously upsetting to a large organization as it takes

a long time to incorporate any of these new designs into operational use.

The organization may have to completely change its methods of doing business. People will be displaced. New training will be required, etc.

It is no wonder, therefore, that large organizations naturally develop protective mechanisms to protect themselves from such disturbances.

Some of these protective systems which the inventor may expect to encounter are, first, the requirement for written proposals before the allocation of any support for a project.

An inventor, if he is successful, generally has a tremendous amount of self-confidence and enthusiasm for his idea. If the administrator allows himself to be exposed to this enthusiasm personally, it becomes very difficult to say no. So if we put things in writing, it gives them a sort of a dead quality and allows the administrator to find some defensible reason for turning the proposal down—that is, that it doesn't meet the requirements, or it would cost too much, or it wouldn't be ready in time.

A second technique that organizations build up is multiple review. Some administrators have the perversity to like change. They may even have a sadistic tendency and want to see their associates scramble under the impact of a new concept or a new invention.

A large organization can take care of this eventuality of the unreasonable administrator by making sure that no funds can be expended without going through several levels of review. The more levels that can be inserted, the safer the organization will be from the forces of change.

A third technique for protection is very definitive long-range plans. The more completely the organization can plan and schedule its future, the more reasonable will be the rationale for avoiding anything that will have the chance of changing the future.

I am not against plans in general, but I think the government tends to be a production-oriented operation, and the planning process which is very necessary for production tends to be carried over into research much to the discouragement of the inventor.

Now, another technique we can use to protect the organization is to develop clearly defined missions for each of the parts of the organization. These serve a very highly protective function, because the really new and disruptive things tend to come where someone sees a connection between two previously separated fields, like biophysics or biochemistry, physical chemistry, and so on. If the missions of each organizational unit can be made sufficiently sacred, no one in the or-

ganization will have time to work on a new proposal. If the idea originates within some branch of the organization it can usually be thrown out as outside the mission, or transferred to another division where it will die from lack of care.

The last protective mechanism I would like to mention—I'm sure it's not an exhaustive list—is one where we strive to eliminate duplication. A new invention is likely to appear to be something that we have already done or it performs a function similar to that some other group is working on. The amount of time that can be exhausted in checking to make sure that we are not doing something similar somewhere else in an organization as big as the government, which is spending something like a hundred billion dollars a year, can expend enough time to frustrate any enthusiastic inventor.

Perhaps I am developing the impression that large organizations cannot foster invention. I firmly believe this to be true. And I find it supported by the fact that productiveness per man of a creative nature tends to fall off as the organizational size increases.

I was very glad that Mr. Rice confirmed this by the statement that most of the inventions of the Atlantic Research Corporation occurred while they had—at least the most per man occurred while they had—an organization as small as 150 people. And he also believes that in order to keep creativity high it is necessary to work in small groups.

Fortunately, I think the government also has recognized this need for small working groups to some extent for its laboratories and some of its industrial contractors and has stopped acting like a big organization relative to invention in particular.

It has provided some funds which can be spent at the small organizational level with accounting after the fact rather than before. This gives the inventor a chance to get started and demonstrate that his idea will work.

This is really an amazingly effective loophole in the armor against change, as attested by the large number of effective inventions which have followed this route of being started before they have been approved. This route avoids the problem of the inventor becoming tired of trying to sell his idea. It lets him get started while his enthusiasm is still high. And I think you can see that this does represent a very dangerous process to a large organization and therefore the pressures to eliminate it are quite high. I hope the government and the people in it will be able to resist these pressures and be able to continue giving funds without a specified purpose.

What else can we do besides decentralization of the approval process to help invention? One thing we can do is stop trying to plan inven-

tions, because the inventor tends to be motivated very much like an artist, and you only get a very mediocre product when you try to schedule it.

At present I think our highest rewards go to the inventor who delivers on schedule. We really haven't developed an inventors' critics' society comparable to that which has been developed for art critics. I think criticism of the process of invention as a creative art would do much to stimulate and foster invention.

Russia is reported to be undertaking an interesting experiment which may develop some recognition of this sort. They are setting up what they call a "science city," where various disciplines will be allowed to work together on new ideas which are devoted to change.

At the Naval Ordnance Test Station we have some experience with this mixing of disciplines. It is my opinion that the most creative effort occurs after the different specialists surmount the language barriers which normally separate them and they begin to talk to each other. In order to surmount the language barriers they have to live closely together for a while until they begin to recognize what the other man is saying.

To summarize, I think that invention needs small organization size, a mixing of disciplines, some confusion relative to the missions of the various groups, and finally, I think it needs the development of an inventors' critics' association.

(Applause)

DR. BISPLINGHOFF: Thank you very much, Mr. McLean, for your delightful remarks.

Now we turn next to our five Foundation research contributors, and we start off first with Mr. John C. Green, whose topic is "Government Programs Affecting Industrial Technology."

Mr. Green.

PART II — FOUNDATION RESEARCH CONTRIBUTORS

GOVERNMENT PROGRAMS AFFECTING INDUSTRIAL TECHNOLOGY

MR. JOHN C. GREEN: This topic assigned, "Government Programs Affecting Industrial Technology," is certainly too embracing, because every government action, every government initiative, every government expenditure affects industrial technology.

When NASA lays out a research program which will require the equivalent of the annual output of scientists and engineers from all of

our technical schools, they are in competition with industry for talent; therefore they are, in effect, affecting industrial technology.

So in the time I have I would like to limit my observations to government programs which consciously are designed to support industrial technology. And these fall into five general categories—education, finance, research, diffusion of technology, and institutions and policies.

In the area of education, the President's Science Advisory Committee has laid down the targets for the years ahead. For example, in three disciplines, engineering, mathematics and physical sciences, they have recommended that the number of doctors' degrees awarded reach 7,500 per year by 1970. In 1960, 3,000 such degrees were awarded.

They propose also that the number of students who complete a full year of graduate training rise to 30,000 by the same year. For comparison, in 1960 that figure is 12,000.

Third, they have recommended that the existing centers of educational excellence be strengthened and that new ones also be developed.

Here the argument is that if these projected manpower goals are reached it will swamp the present educational institutions.

And, last, they feel that the new educational centers should be located to serve all geographical areas more effectively.

This is on the theory that education and economic vigor go hand in hand.

The primary sponsors of research in government, NASA, Defense, AEC, and the National Science Foundation, are responding already to these recommendations. In particular, the National Science Foundation is taking a series of pertinent steps. A few months ago they announced over 2,200 new awards in two fellowship programs to come into effect in the 1963-64 academic year.

Specifically, they will award 1,300 graduate fellowships and, in addition, will provide over 900 summer fellowships for graduate teaching assistants. Nearly 200 colleges and universities have applied for these awards.

The next general category of support is Finance. In the sector of direct financial aid, the government's Small Business Administration has long had a program for joining with private lending agencies to provide financial support for promising inventions and technical developments. Alternately, if a bank declines to take the risk, the SBA has authority to make a direct loan, providing the borrower has adequate collateral.

This mechanism didn't meet the need of many or perhaps most companies, and as a result the Congress set up the small business investment companies. These SBIC's, as they are known, are private groups

licensed and regulated by the Small Business Administration. They are capable of providing straight loans, equity financing and convertible debenture financing. They are expected by their charters to take a special interest in new companies which promise to bring technical developments to the market.

Now, less direct but significant financial aid is through the internal revenue laws themselves. The present Internal Revenue Code permits a taxpayer to deduct R&D expenditures when made or to capitalize them at his option.

The new tax bill would liberalize these provisions to include expenditures involved for depreciable equipment if it is used for R&D.

The third category I mentioned, research sponsored by government agencies, which is directed to an industrial environment, is a ticklish area. However, there are a number of special programs in this category, usually in the field of natural resources. I am thinking of the Office of Coal Research, the Office of Saline Water, the Fish and Wildlife Research Unit, all located in the Interior Department. And, of course, the numerous programs in agriculture devoted to the production and marketing of farm products.

In addition, the Department of Commerce has before the Congress a program for research which would support lagging industries. As of this date they have only received endorsement for this program in one category, and that is the textile industry.

Of course, the National Bureau of Standards, which is the world's foremost measurement laboratory, directly supports industrial technology by its work in precise measurement, since, as we all know, our mass production techniques, our complex parts, rely on increasingly precise measurement.

My next area is diffusion of technology. The fact that the government has preempted many of the challenging scientific areas means that the new facts are reported to the government agencies, and here again these primary sponsors, Defense, NASA and AEC, have found it necessary to set up communication channels to their audience and to those who can contribute to their mission.

Again, the Department of Commerce has supplemented this by broadening the information out to the economic community.

The last category is Policies and Institutions. Certainly the patent system authorized by the Constitution and the Patent Office and the Executive Branch of Government qualify here.

We have a constant debate and discussion on the patent policy of government. This is a subject that is increasingly being heard on public forums and in the halls of Congress. It is also in this category

of supporting, or perhaps not supporting industrial technology, depending on the atmosphere and on the policies ultimately chosen.

All I have had time for is a brief inventory. Perhaps a little later in the question and answer period we can enlarge on one or more of these items.

(Applause)

DR. BISPLINGHOFF: Thank you very much, Mr. Green.

Our next speaker is Dr. Mary A. Holman, one of the Foundation research contributors, and her topic is "Incentives to Make and Use Government-Owned Inventions."

Dr. Holman.

INCENTIVES TO MAKE AND USE GOVERNMENT-OWNED INVENTIONS

DR. MARY A. HOLMAN: Factual information about the nature and extent of the commercial use of government-owned patented inventions is important for formulating an effective government patent policy. The attitudes and opinions of firms and individuals directly affected by government patent policy are also important.

These attitudes can reflect incentives to commercialize inventions arising from government-financed R&D and also the incentives to invent for the government. The opinions of individuals and firms can also influence the evolution of government patent policy. If dissatisfaction with government patent policy exists, the discontentment can create pressures for a modification of the policy.

The government can change its patent policy to accord with the needs of firms using government-owned patents, potential users of the patented inventions, and also of inventors.

As a matter of fact, this has happened in recent years. The Department of Health, Education, and Welfare had to change from the title policy to the license policy to get private profit-making chemical and pharmaceutical firms to accept R&D contracts in the field of cancer chemotherapy.

Part of a study I recently undertook on the utilization of government-owned patented inventions sought to obtain information from inventors and from firms licensed to use government-owned patents on the effect of government ownership of patents on: (1) the dissemination of information about government-owned patents; (2) the commercial use of these inventions; (3) and the incentive to invent for the government.

Two more important factors affecting the commercial use of govern-

ment-owned patented inventions are the effectiveness of governmental efforts to transmit the new technology contained in the inventions to the business sector of the economy and the conditions under which business firms are permitted by the government to utilize the inventions. Widespread dissemination of information about these inventions does not automatically mean extensive commercial use. Although officials of firms might know about the availability of government-owned patented inventions, they can be reluctant to use these inventions. To some extent the terms on which the government makes its patented inventions available will alter incentives to commercialize the inventions.

The majority of inventors that were queried are satisfied with governmental efforts to disseminate information about their patented inventions. Inventors with the Department of Agriculture, the Tennessee Valley Authority, and the Atomic Energy Commission express the greatest amount of approval; those in the Department of Defense the least. This difference in opinion among inventors in the several government agencies probably reflects the R&D programs of the agencies themselves.

A phase of the R&D program of Agriculture, TVA and AEC is to work directly with industry to encourage the commercial use of government-owned patented inventions. The Department of Agriculture, TVA and AEC encourage the publication of information about new technology in trade and professional journals. These agencies also give advice to firms when they request it. Sometimes the departments sponsor demonstrations.

In contrast, officials with the Department of Defense consider the dissemination of information about the government-owned patents they administer beyond the scope of their mission. If firms obtain information about inventions administered by the Department of Defense, they usually do so on their own or from the widespread information programs of the Office of Technical Services in the Department of Commerce and the Small Business Administration.

The minority of inventors who believe that the government does not do all that it should do to transmit information about patented inventions to the private sector of the economy offer one general remedy —that inventors, and possibly their research teams, should evaluate the commercial merit of their inventions and disseminate reports of their findings to firms that appear to be potential users of the technology.

Even though inventors think that the government has been effective in disseminating information about inventions once acquired, the

majority of inventors also believe that a license policy is a more effective means of encouraging the commercial use of inventions arising from government-financed R&D.

The consensus is that when privately-owned patented inventions are outside the product line of a firm, information about these inventions is actively disseminated by the firm in an attempt to obtain royalty-bearing licenses.

As is well known, under the title policy, government-owned patented inventions are usually licensed on a royalty-free, non-exclusive, revocable basis. The majority of inventors and licensees contend that the title policy has an adverse effect on the commercial use of patented inventions. This opinion prevails even for firms licensed to use government-owned patents that have actually commercialized these patented inventions.

Most inventors and licensees believe that commercial use of inventions does not take place without patent protection when firms find it necessary to invest substantial amounts of financial capital on new plant and equipment, or when they find extensive testing, development and marketing programs are required. In addition, some firms found that banks consider the ownership of a patent or at least an exclusive license to use the invention necessary for outside financing. Other firms indicated a reluctance to commercialize government-owned patented inventions because license agreements are revocable.

As expected, inventors were most enthusiastic about giving their opinions on the effect of the title policy on the incentive to invent. Most inventors questioned thought that financial awards given by the government were not commensurate with the value of their inventions. They believe that inventors should have the right to commercialize their patented inventions or that they should at least receive a monetary award when a good invention contributes to the advancement of a government program.

To very briefly summarize, the opinions of licensees and inventors revealed that although these firms and individuals are well satisfied with the government's information program, they believe that the license rather than the title policy is a more effective means to disseminate information about inventions arising from government-financed R&D, to encourage the commercial use of these inventions, and to stimulate the incentive to invent for the government.

(Applause)

DR. BISPLINGHOFF: Thank you very much, Dr. Holman, for your contribution.

Our next speaker is Dr. Donald S. Watson, whose topic is "Government Patent Policies."

Dr. Watson.

GOVERNMENT PATENT POLICIES

DR. DONALD S. WATSON: Ladies and Gentlemen, with such an important topic assigned to me I will keep my remarks brief.

The controversies over Federal patent policies continue, and there are still strong efforts in Congress to extend the scope of the title policy, as Mr. Gorn pointed out to us this afternoon.

And at the same time industry and the patent bar maintain a strong defense of the license policy.

Yet in all this discussion and controversy a few simple and important facts are ignored. For example, for each billion dollars of its own money that industry puts into research and development at least ten times as many patented inventions result as from a billion dollars of Federally-financed research and development.

Then, also, very few—perhaps ten percent, perhaps a little bit more, perhaps a little less—very few of the patents retained by industry under the license policy have any commercial use at all. And of the patents with any commercial use at all, their commercial value is very small.

I think that Mr. Rice's remarks, although they apply only to one company, helped to bear this out.

Now, these facts that I have just mentioned are supported by research that has been carried on by the Foundation. They are supported by a long document recently published by the Senate Subcommittee on Patents, Trademarks, and Copyrights.

These results are also confirmed by Dr. Holman's research which will be published soon in the *Journal* of the Foundation.

Dr. Holman has found that the government is now by far the largest single owner of patents and has a portfolio that is growing with great rapidity. Yet, of the patents owned by the federal government, only between 10 and 15 percent have any commercial use, and even the Department of Agriculture, which has made over the years a strong effort to have commercial application of its inventions, has a rate of usage of about 10 percent.

Then also, as in the case of the patents retained by industry under the license policy, the commercial value of the patents owned by the government and used in industry is also small.

It follows from all this, therefore, that the license policy as it has operated so far offers no highly valuable patent rights to industry. The

license policy has resulted in no great giveaway by the government. The license policy results in no risk of monopolization that I can possibly see.

At the same time, the title policy offers no great enrichment of technology, at least not yet. The title policy at the same time offers few and small benefits both to industry and to government.

(Applause)

DR. BISPLINGHOFF: Our final paper by the Foundation research contributors is titled "Tax Aspects of Invention." We will have two speakers here. The first of these is Dr. Robert B. Bangs.

TAX ASPECTS OF INVENTION

DR. ROBERT B. BANGS: In the present-day world of high income taxes, inventors, just as other occupational or economic interest groups, are sometimes influenced by tax considerations.

An independent inventor is likely to have a highly uncertain and fluctuating income. Our tax system strikes incomes of this nature with special severity. The provisions of current law for moderating this impact so far as inventors are concerned are extremely limited.

Several years ago, as a Foundation research project, we made a limited mail survey of individual inventors to determine the extent to which they had been affected by, and had taken advantage of, Section 1235 of the Internal Revenue Code which was put into effect in 1954 for their benefit.

A patented invention is property, a bundle of rights that may be sold, licensed, or used directly by its owner to produce income. For an inventor to benefit from Section 1235, he must give up all substantial rights to his patent, either by an outright sale or by an exclusive license for the full remaining term. A series of cases coming before the Tax Court showed that many inventors failed to qualify under 1235 because they transferred something less than all substantial rights to their licensee.

Prior to 1954 inventors were taxed under the general rules of the Internal Revenue Code concerning capital assets and ordinary income. Thus, an amateur inventor could get capital gains treatment on the sale of a patent right whereas a professional had to pay ordinary income tax rates. Determining who was an amateur and who was a professional was a difficult factual question that tax administrators and courts ought not be obliged to make. The 1954 legislation therefore extended the same rights to all inventors regardless of their professional or amateur status.

In the survey we conducted we found that only a minority of all inventors had obtained any significant benefit from this special tax provision either because they were not fully informed about it or because they had no good opportunities to complete transactions that would qualify under this rule.

Our survey also showed that unattached or independent inventors often failed to get proper tax deductions for their research and development expenses because they lacked income against which these expenses were a proper offset. An inventor who is self-employed, or is employed in a capacity not obviously connected with his invention, cannot deduct his R&D costs unless they are directly related to the source of his income.

Many patents are the result of spare time and hobby activities rather than the result of pursuing invention as a trade or business. It may be that some carryover of unused R&D deductions should be considered under the tax laws.

Although our survey indicated that inventors had obtained only limited benefits from Section 1235, the majority of our respondents indicated that they were encouraged to enter into more exclusive licensing arrangements than in the past as a result of this tax provision.

The section, therefore, has largely fulfilled its purpose of encouraging the use of inventions.

Although the Administration in its tax recommendations this year has sought the removal of Section 1235, the Ways and Means Committee in a recent action has tentatively decided to reject this recommendation and to keep the section in force.

Moreover, it has voted to extend to inventors the 30 per cent inclusion of gains from capital assets held three years or more, thus lowering effective tax rates. According to the Committee, proceeds from the sale of inventions are true capital gains rather than unintended benefits.

My colleague John Creed will discuss the tax changes affecting inventors that are now under consideration in greater detail.

Thank you.

(Applause)

MR. JOHN F. CREED: Bob Bangs has briefly described the taxation of the inventor under current Federal law. I would like to cover in summary form certain of the Administration's 1963 tax proposals that would materially affect inventors.

The first of these, as noted by Dr. Bangs, involves the repeal of section 1235 of the Internal Revenue Code. This proposal would operate to deny capital gains to an inventor whose personal efforts created the patent that is sold.

Actually, the proposal would do more than eliminate the special preference conferred by that section, for proposed amendments to other sections of the Code would deny the benefits to which inventors are entitled under the general capital gains provisions of the Code irrespective of and without reference to section 1235. Thus, in a very real sense, the enactment of the proposed measure would work an actual discrimination against inventors in terms of general capital gains eligibility.

As Dr. Bangs noted, the Ways and Means Committee earlier this month tentatively rejected this proposal. In fact, it recommended that if the patent is held for three years or more prior to sale, capital gains tax would be imposed at a substantially less rate than the current rate.

A second proposal, and perhaps the most important in this area, involves contingent future payments. Current law permits capital gains on the sale of a capital asset in circumstances in which the seller receives continuing contingent payments. Perhaps most illustrative of this practice is the sale of patent rights in consideration of periodic payments measured by the transferee's sale of the patented product over the life of a patent.

It is now proposed that payments on the sale of a capital asset be taxed as ordinary income if deferred over a period of more than five years and if contingent on the productivity, sales, profitability, use or disposition of the transferred asset.

The proposed legislation if enacted would likely have its principal application to the sale of patents, trademarks, know-how, and like property. This would seem most unfortunate since the very nature of these assets frequently dictates that their sale be in consideration of contingent periodic payments. Congress expressly recognized this fact in enacting Section 1235.

The theory underlying this proposal is that in transferring an asset in consideration of future contingent payments, the transferee "is able to continue to enjoy the principal right of ownership—participation in the income produced by the asset." This is but a revisitation of the argument in which the Treasury persisted for nearly ten years with respect to royalty sales of patents, notwithstanding consistent defeat in the courts. It is the same argument that Congress repudiated in enacting Section 1235.

The Ways and Means Committee apparently has not passed specific judgment on this proposal, notwithstanding that it has apparently completed its tentative consideration of the capital gains package of which it is a part. This perhaps can be interpreted as a tentative rejection of the proposal. But there is some question whether the Treasury takes this view.

It should be appreciated that if this measure is enacted the continued existence of Section 1235 will be of most limited benefit to inventors.

A third and final proposal affecting inventors is the so-called income averaging proposal. Section 1302 of current law permits the inventor under certain restricted circumstances to spread over several taxable years the ordinary income concentrated in one taxable year. It is now proposed that this section and various other income averaging provisions of special application be replaced by a single income averaging formula that would be applied generally to all taxpayers with widely fluctuating income.

A taxpayer would be eligible to use the new averaging formula under these conditions:

1. His taxable income for the current year must exceed 133⅓ percent of his average annual taxable income for the prior four years. In other words, a one-third increase over the average for the prior four years.

2. Such excess amount must exceed $3,000.

If these conditions are met, the taxpayer can elect to pay a tax on the excess amount that would approximate the tax due had that amount been spread over a five-year period comprised of the current year and the prior four years.

This proposal could prove of material benefit to inventors as well as to authors, actors, athletes, and other groups whose income from year to year is susceptible to wide variation. The Ways and Means Committee has tentatively approved this provision.

Thank you very much.

(Applause)

DR. BISPLINGHOFF: Thank you very much, Mr. Creed.

Now, Ladies and Gentlemen, we have gone through the papers of our invited contributors and the Foundation research contributors. We have about 15 minutes remaining for discussion.

I would like those of you who are in the audience to be thinking about questions that you would like to put to our contributors, and in

the meantime I would like to review very briefly how we got started here.

Mr. Rice in his very interesting paper about the origin and growth of his company gave us what I felt was an extremely enlightening discussion of how invention has been rewarded by his company.

One of the things that impressed me was the fact that the intangible satisfaction of personal recognition was an important factor in creativity, although I gathered that Mr. Gorn, the second speaker, didn't place this factor quite so high up on the list. I gathered from him that the real stimulus derives from the possibility of making a profit.

I would like to ask Mr. Rice and Mr. Gorn whether there is really a difference of opinion in the remarks that they made.

Mr. Gorn, would you address yourself to that, please?

Part III — Panel Discussion and Question Period

Mr. Gorn: No, I think I put as high a factor of influence in the satisfaction of the individual and in the compatible environment in which he finds himself. I was directing my remarks to the effect of the legal stimulus which patents and the rights to proprietary information give. To the extent that the profit motive is affected, to that extent is the atmosphere of the environment in which the inventor finds himself affected.

Now, his creativity does not stop by any means. His creativity is affected. It is molded. The answers which he gives are channeled.

But to the extent that he is creative, obviously the personal satisfaction, the interest which he derives from his work is very and extremely important and I agree thoroughly with Mr. Rice.

Dr. Bisplinghoff: Dr. Holman, do you have any views on this subject as a result of your survey—where the real stimulus is for inventors?

Dr. Holman: This was a very small part of my topic, but it seemed to me that the stimulus for many of the government employees was with a monetary reward.

Dr. Bisplinghoff: But was your sample entirely among government employees?

Dr. Holman: No, it was not. It was also with employees of corporations.

Mr. Gorn: Mr. Moderator,—

Dr. Bisplinghoff: Mr. Gorn.

Mr. Gorn: I know that rewards are given, payments are made. I wonder how much analysis has been made. This is an "after the fact"

type of thing. Someone has done something and is given an award. Has a study been made which measures—or can it be measured?—to what extent does that type of award foster the creation of the invention in the first place? How does it work? Has this been studied?

DR. BISPLINGHOFF: Can any of our panelists answer this question? Dr. Holman, do you know the answer to this question?

DR. HOLMAN: I would defer to Dr. Siegel who is going to speak tomorrow if I might.

DR. BISPLINGHOFF: Is Dr. Siegel in the audience?

DIRECTOR COLCLOUGH: He is on the panel tomorrow.

DR. BISPLINGHOFF: We will have to wait until tomorrow to get the answer to this one.

DIRECTOR COLCLOUGH: He has done considerable on this one.

DR. BISPLINGHOFF: I was very much amused at Mr. McLean's remarks, as I know you were. I think many of them struck home. I did have one feeling, however, about these remarks from my own experience.

One of his recommendations is the decentralization of the approval process. I have found in our own NASA laboratories that it's virtually impossible to impose a *vernier* control of funds and missions on a real scientific laboratory, because regardless of how much you do this they'll find ways to get around it and bootleg research that they really want to do on the side.

You might just as well impose a very loose financial control, and I think you will find in most cases that the real ingenious, imaginative, original work is done by these bootlegged funds.

Although I agree wholeheartedly with some of the sentiments he expressed, I'd like to see if we can start some interaction between the panel and those of you who are in the audience.

Is someone willing to hold up his hand and put a question to one of the panelists to start this off?

Would you stand up, please, and speak as loudly as you can?

QUESTION: Yes, and I'll address my question to you. To avoid bootlegging, I'd like to hear any comments by research organizations that recognize and publicize the fact they will allow a certain percentage of a man's time to work on his own ideas.

DR. BISPLINGHOFF: I think there are probably a good many research organizations that do this. In the NASA expenditures of funds we have in our own laboratories a provision for this. I would say perhaps something in the order of 15 percent of our own laboratory activities go into this area.

Our funding of universities I think falls perhaps even more in this category. University grants in particular are given to university faculty members and their graduate students to pursue ideas which are not spelled out in any detail whatsoever by the grant. These grants are merely made for research in a given area which interests the faculty member and his graduate students, and they are therefore able to follow the directions which are provided by their own thinking in a rather free way.

There isn't, of course, enough of this. But I think we are doing some of it through the NASA outlets.

More questions from the audience? Here's one right here.

MR. ARMENGAUD: I would like to reply to the man who talked of the fiscal question. I would like to give you some information.

In France we have recently discussed how we could promote invention in assisting the inventor by trying to avoid undue taxation.

Insofar as the assignment of patents is concerned, the inventor had no income tax to pay on the money he receives. When he grants an exclusive license and receives royalties the income tax is due only on 70 per cent of the amount of money paid. Therefore he gets a deduction of 30 per cent on the amount paid by the licensee.

Insofar as the companies are concerned, when they sell a patent or if they grant an exclusive license, the sum they receive is deducted from the profits if this sum is reinvested in further research in the forthcoming five years.

This has been the result of negotiations with the government and the parliament that have been pending for years, and altogether it has proved to be an incentive in favor of the inventor.

I am wondering if your Treasury Department and your Committee of Ways and Means could not consider also this question, as altogether we are bound in all the Western world to have more or less common policies in that respect.

DR. BISPLINGHOFF: I think you have described a very interesting tax situation in France. I would like to ask Dr. Bangs if he can tell us whether our Congress has considered something of this kind.

DR. BANGS: All I can say is that apparently you treat your inventors in France somewhat better than we do in this country. I'm sure the Treasury Department is aware of this difference in treatment, but they have chosen not to recommend it to the Congress.

DR. BISPLINGHOFF: Mr. Creed, do you have anything to add to this?

MR. CREED: No, not really, other than to say that I don't understand the present proposal to eliminate 1235 and so forth. In 1954 when this

provision was put into law, Congress was motivated by a "desire to provide an opportunity for inventors to contribute to the welfare of the nation."

And the only implication of the present proposal as I see it is that this is no longer an important incentive.

But I would certainly think that at the very least that incentive would be retained in the national interest and otherwise.

DR. BISPLINGHOFF: I have a question back here on the aisle.

QUESTION: I'd like to ask Mr. Gorn a question. I agree with all the remarks he makes. I'm curious why the government is now swinging away from the license policy in favor of the title policy. Do you know why? I have been trying to find out in Washington for years now.

Why does, for instance, the Post Office now demand title to things they cannot use in countries with which they have no dealings? We have no answer except just that the Justice Department recommends it.

Does anybody here know why the Justice Department wants the Post Office Department, for example, to take all titles?

DR. BISPLINGHOFF: Mr. Gorn, do you know the answer to this?

MR. GORN: Well, I suspect there are certain influences at work. Actually if you look at the influences you find that there are really a very small number of dedicated zealots in Congressional committees, staff people primarily, and in the Justice Department. Statistically they are very small in number indeed. But because of their single-minded dedication to the proposition that industry does not deserve to retain any such commercial rights, this is I think the primary reason why this pressure continues and increases.

On the other hand, those of us who believe in private ownership of patents are somewhat chagrined about the failure to recruit a sufficient number of dedicated zealots on the other side. And this is a task I think we must pursue.

DR. BISPLINGHOFF: Question here, please.

QUESTION: It would be very interesting to hear what Dr. Watson has on the same subject.

DR. BISPLINGHOFF: Dr. Watson, would you be willing to respond to that, please?

DR. WATSON: Well, I can only say that in good part the advocacy of the title policy follows from a philosophy of government-business relationships, a philosophy which has waxed and waned and which in recent years has been waxing.

And at the same time the advocacy of the title policy stems from those parts of the Federal government in which there is a strong interest

in promoting a particular branch of technology—for example, Agriculture, Atomic Energy, and some of the technologies in which the Department of Interior has a voice.

And as Mr. Gorn mentioned, there are some strong personages. I have in mind some of the members of the Congress, members who are in favorable positions, who have good staffs, who are articulate, and who sincerely believe in the righteousness of their cause.

It is not a simple matter. It is a complex of philosophy, different technologies, and personalities.

DR. BISPLINGHOFF: I have a question here, please.

QUESTION: Dr. Watson, I understand that roughly ten per cent of government-owned patents find utilization. Do you have a similar figure for industrially-owned patents?

DR. WATSON: The figure there is also about ten per cent—that is, perhaps a little more, perhaps a little less. And two independent inquiries yield a figure within that range.

We were astonished three years ago when we found out in our investigations how small is the number of patents owned by industry and accruing to industry under the license policy that have commercial value. Because on both sides of the controversy, those both pro and con, had previously said—they still say—that these are valuable commercial rights. And the facts are that in the aggregate they are just not very valuable.

DR. BISPLINGHOFF: Dr. Sanders, could you add to this, please?

DR. BARKEV S. SANDERS: Well, I think there was a misunderstanding. The question was what is the utilization rate of privately-owned patents as against government-owned patents. Our findings are that about 60 percent or so of the privately-owned patented inventions find commercial use as against 10 or 15 percent of government-owned.

But even when we say "use," after all, a patent can result in use of only a few thousand dollars or a million dollars. Therefore, if we could take this quantitative aspect into consideration, I would say Dr. Watson's guess would be very conservative that from the standpoint of inventiveness ten government dollars are equal to one private dollar. It's, I would say, 500 government dollars are equivalent from the standpoint of commercial inventive capacity to one private dollar expenditure.

DR. BISPLINGHOFF: Thank you very much.

Now, Gentlemen, we have reached the end of our time. I would entertain one more remark by anyone who might be willing to defend the government tax policies in total or in part. As the moderator I have certain privileges and I'm not going to undertake this myself, but

I will entertain one more remark if that person is willing.

Yes?

QUESTION: Mr. Watson, is the commercial use of the government patents based on licenses you studied or on other surveys?

DR. WATSON: Let me ask Dr. Holman to answer that question.

DR. HOLMAN: The study was based on information obtained from inventors, from firms licensed to use patented inventions,—

QUESTION: Right.

DR. HOLMAN:—and also from individuals and firms, primarily small ones, requesting information from government agencies about these patents. That was tried in an attempt to determine the extent of use without a license.

QUESTION: Yes, because you should consider use without a license.

DR. HOLMAN: It was considered.

QUESTION: Good.

DR. BISPLINGHOFF: Ladies and Gentlemen, I'd like to thank the invited contributors, the Foundation research contributors, and those of you who took part in the discussion which followed, and I will now turn the rostrum back to Mr. Colclough.

DIRECTOR COLCLOUGH: I thank you, Dr. Bisplinghoff, for what I consider a magnificent job of moderating.

We are very close to our time schedule, remarkably enough. By my watch, which is usually a little fast, we are only ten minutes behind.

We will have a new panel now, and, as your program indicates, we will approach a subject which is more important in this world today for the United States than perhaps it has ever been before, i.e., comparison on the international level for industrial property.

I am going to do an unusual thing as a moderator. We do not want to get too far behind, but we're going to take a vote. How many would agree that we could take—and I mean it, by looking at our watches—a ten-minute recess?

(Show of hands.)

Okay. That's it. That means five minutes past four.

(Whereupon, a recess was taken.)

LATE AFTERNOON SESSION

INTERNATIONAL COMPARISON

DIRECTOR COLCLOUGH: We now embark upon the late afternoon session, and I would again ask everyone to try to conform to the time schedule.

It is my privilege to present the moderator for the session on INTER-

NATIONAL COMPARISON. This gentlemen is the Director of International Scientific Affairs in the Department of State. He has had a long identification with the University of Wisconsin from which he received the doctor of philosophy. Maybe I shouldn't say how far back—1930 to be exact. And he has been a member of the department of physics and its chairman for 14 years.

He has also been identified with his area of scientific interest and scholarship in numerous other ways, at M.I.T., in the Radar Laboratory, as the Chief Scientist at the Naval Research Laboratory Field Station. He helped start the Lincoln Laboratory. He was Chief Scientist for the United States Army from 1956 to 1957.

And so we are about to hear a man who has, not only a distinguished scientific background, but has made use of it on many levels and now on the international level.

Dr. Ragnar Rollefson.

DR. RAGNAR ROLLEFSON: I am actually at somewhat of a loss to know why I should be the moderator at a session like this because of my small experience with patents. Perhaps it's because I have on that account an open mind, and I can explain why I have an open mind on this particular subject.

Up until a few years ago my experience with fostering of invention was mainly what I obtained in connection with government laboratories, private nonprofit laboratories, and universities. In those cases I think my impression was the same as Dr. McLean's—that you want to do the best you can to leave the inventor alone, to keep him from being squelched if he comes up with a new idea, and to see if you can't help on the development of the idea by keeping it from being abandoned because it doesn't satisfy any requirement.

I think that in my experience the existence of requirements has been the biggest obstacle in the way of developing new inventions. So many times I have heard, "Well, there is no requirement for that. Abandon it."

And I think Dr. McLean knows some very good illustrations out in his own laboratory where the things for which there was no requirement turned out very well indeed.

Now, as I said, up until a few years ago that was the only kind of experience I had had along these lines. And then I agreed to serve on a summer study organized by one of our law professors to study the methods of fostering invention.

This was really an eye-opener to me because I had never taken time off before to think about the subject, and I found that we indeed did

not know how to foster invention. And, even more than that, we did not know whether our patent system was aiding or interfering with the fostering of invention.

I am sorry to say that at the end of the summer study we still felt the same way.

Now, I've been very much interested in the talks that I have heard so far this afternoon, but I must say that I still am not convinced that we know how to foster invention.

I hope that a comparison with what is going on in other countries may be of help along this line, and this is the subject, as you know, of our late afternoon session.

And without more ado, then, after explaining why I shouldn't make any introductory remarks, we'll start in on the afternoon program and call on Dr. Donald A. Schon of Arthur D. Little for his talk on "R&D Direction."

Dr. Schon.

PART IV — INVITED CONTRIBUTORS

R & D DIRECTION

DR. DONALD A. SCHON: Thank you for that introduction, Dr. Rollefson, which is a little bit out of date. I was with Arthur D. Little until very recently. I am now a consultant to the Department of Commerce. But since the work that is going to be presented comes out of work at Arthur D. Little, I think it's true to the spirit if not to the letter.

DR. ROLLEFSON: You know, I thought I recognized you but I wasn't sure. (Laughter)

DR. SCHON: I have been told I have a knack of looking like other people.

I'd like to talk about some issues having to do with the comparison of European and United States technology and R&D.

I am not sure exactly what the title "R&D Direction" means. I have taken freedom then to see in it anything I could that was interesting, and what you're going to get is the results.

Let's take a look at Europe to begin with. And in taking a look at Europe let's notice a few central points about European technology.

The first of these is that there has been in recent years, since World War II, a surge of new European technology and that this is in the process of making a very heavy impact on the American economy, and that this impact comes not only from the fact that there are low

labor rate countries which produce cheaper products which they can then export to the United States but that there is new technology coming out of Europe which beats American production in the same area.

In my own work at Arthur D. Little I encountered a number of examples of this kind, among them the steel production facilities of Belgium and Italy. The Belgians are shipping wire and nails in to the United States which are not only cheaper but also smoother and of better quality than that produced by domestic manufacturers.

Textile machinery in non-wovens and other areas is being brought in from Scandinavia, France, Switzerland, Great Britain, that in many cases is superior to ours.

If you want automated textile machinery today you have to go primarily either to Japan or to one or more of the European countries.

German automobiles and instruments are long familiar to us in these areas.

Fabrics, garments from Italy, Portugal, Great Britain. Machine tools from Switzerland. These are just a few of the examples.

The inroads that these are making into the United States economy are still reasonably small. In textiles and machine tools, for example, the percentage of impact is in the order of 3 to 5 percent of the domestic market. But in some ways that is a misleading figure because, although it is only 3 to 5 percent total, it tends to be concentrated in relatively small areas so that there are specific segments of the machine tool industry that are now being put out of business as a result of the Swiss development of radial drilling machines.

And there are specific segments of the textile industry such as knitted outerwear and woolen worsteds that are now being very seriously threatened by this new and in some ways superior technology coming at us from Europe.

Moreover, the figures are more threatening than they might sound because they represent the protective effect of quotas and tariffs in many industrial areas and would be much more serious if it weren't for these.

This serious impact of new technology from Europe is also accompanied by an increase in the rate of R&D spending on the part of European countries. An interesting study was done in this line by a man by the name of Kramish from the Rand Corporation. I'd like to quote to you what he said.

In 1959 if you calculated R&D expenditures as a percentage of gross national product you found that the Common Market countries, Belgium, France, German, Italy, Luxembourg and the Netherlands, had

a rate of about 0.9 percent as compared to 2.5 percent for the United States.

That 0.9 percent has since changed and is in the order in 1962 of 1.5 percent—that is, the rate of R&D spending to GNP.

But that figure hides some problems, and Kramish points them out. I'd like to read to you just briefly what comments he makes about that.

"While the R&D budgets of the United Kingdom, the United States and the U.S.S.R. in comparison with GNP are about twice that of the average for the Common Market, it must be noted that in the first three countries a larger proportion of the research and development budget is government-funded. In 1961, 45 percent of French research was privately funded, as was 48 percent of German R&D. This figure for private funding in the mid-40 percent region is probably the average for the European Community. For the United States the situation is such that about 30 percent of the nation's R&D performance is funded industry by industry. Thus, if we are to compare the industrial R&D effort in the Common Market with that of the United States, we must conclude on the basis of the rate to the GNP that the latter is not twice as great but only about 50 percent as great as the Common Market effort."

Now, if we shift from who is buying the R&D efforts in Europe to some features of it, we notice things like this:

Large companies tend to dominate in Europe even more than they do in the United States. In the United States some 300 companies do about 85 percent of all the research that is done, but in countries like the Netherlands five companies do 70 percent of all the industrial R&D that's done, and this figure is even smaller—that is, the number of companies doing most of the research is even smaller—in countries like Italy and Belgium.

Moreover, the companies that are doing this research frequently represent monopolies in an industrial area. This is particularly true, for example, in Britain and in Germany.

And the success of these monopolies in doing industrial R&D in Germany and in Britain I should think would give us pause particularly when we relate them to the equal success in our own country of Bell Telephone, Bell Laboratories, which in their way represent a kind of monopoly in the area of communication here.

Moreover, in these countries there is a very heavy role for state-supported research and development, and in countries like Belgium, Germany, Holland, France and Britain we find very heavy investments

in research centers whose function is to support research and development in the industrial sector of the country.

I'd like to spend two minutes looking at Britain in this connection.

Britain has something called the Department of Scientific and Industrial Research. They have had it for 50 years. In this respect they have had a large jump on almost all of the rest of the technically advanced world.

This 50-year-old system of theirs consists of 14 research stations which amount to large government-sponsored laboratories, such as the National Engineering Laboratory, the National Physical Laboratory, the Laboratory for Hydraulics Research, and so on, and 52 research association laboratories, which at present amount to an expenditure of something over $30 million.

How well does all of this work? Well, it isn't very clear how well it has worked, and the problems about its working have some relevance for us as well.

It's possible to point to a number of specific technical accomplishments that have come out of it in areas such as textiles and machine tools and leather, for example. But when I pressed responsible leaders of this activity in Britain, on the real contributions of the DSIR, they said, in effect, "Well, we have been able to introduce technical standards for products effectively. We have been effective in training technical people for British industry. And this has been our most important contribution. And in addition to that we have been responsible for minor changes in products and processes throughout the industries. But as far as major technical change, as far as major technical innovation is concerned, this has not primarily come from government-sponsored research in Britain."

And the fact that it hasn't has been a subject of some concern, and as a result of the concern they have attempted to engage in certain organizational inventions, inventions which from my brief stay in Washington I can say would horrify most of us here.

One of these involves the use of government funds to grant research and development contracts in industry for the specific purpose of doing applications research on research results which have been derived from government work.

A second is something called the NRDC, the National Research and Development Commission. What it amounts to is government going into business. A nonprofit corporation, government-sponsored, was founded. It was given approximately $30 million worth of capital. It was told, "You will now have access to the results of the research laboratories in the Commonwealth and to any private inventions that

you can lay your hands on. You may not produce a product but you can carry the things just to the point where industry takes it over itself. You can engage in all kinds of entrepreneurial activity. You can try to make matches. You can, in fact, do everything but produce products. And you must support yourself from the financial profits that you make out of your entrepreneurial work."

NRDC has been in existence, I believe, for about ten years. It claims to be responsible for the introduction in Britain of the first computers, of a number of important drugs, of the first ground effects machines which are still in the experimental stage, of all the work that is being done in fuel cell development over there.

And, in fact, the story of NRDC is extremely impressive. But I sense some signs of uneasiness.

For one thing they are not making a profit, and they are not able to support themselves on the basis of profits from their original capital investment. And they find themselves hamstrung by what would appear to be rather liberal conditions under which they were set up.

In effect, they are entrepreneurs without the rewards of entrepreneurial activity, and they haven't been effective in operating as a business.

What we have seen in Europe since World War II is a rather remarkable surge of new technology which, when you begin to dig into it some, looks extremely attractive to us who I think represent a mature industrial economy. We are tempted as we look at it to say, "What is there about the European economy that we can copy? What is there about this fostering of invention that seems to have taken place in Europe overall that we can borrow from and use here?"

And so it is worth taking a look at some of the conditions that made it possible.

There was, for one thing, after World War II a very ready and open market, a very ready consumer market which remained to be primed with dollars from abroad.

There was an industrial system with great gaping holes in it—that is to say, holes of productive capacity, lack of capital and equipment, waiting to be filled with new productive capacity.

And, hence, there was very little or relatively little commitment to old capital equipment. Nobody had to worry about scrapping that blast furnace before he paid it off to introduce an oxygen type.

Moreover, there was a source of new risk capital out of Marshall Plan and ECA funds, and there was an example of an advanced industrial economy across the waters, namely, us.

I have noticed there is nothing that brings a company around to a new product like the news that the competitor has it.

And, in a sense, we in the United States represented such a competitor for Europe and the living proof that it could be done.

And there were a number of conditions over there, including apparently an available class of skillful entrepreneurs and a tradition of government involvement in enterprise waiting for the use of these resources.

Let's now leave Europe and turn to the United States. And I would like very briefly to point to a couple of things.

First, if we are concerned with technical innovation here, where does it come from?

Well, for the last six months I have been involved in studying the machine tool and textile industries and looking at where over the last 30 years the major innovations of the machine tool and textile industries have come from. And I would propose the following statements:

First, there has been very little major innovation in the machine tool and textile industries. There has been a class of major developments in textiles, the new synthetic fibers and finishes. There have been two significant families of development in the machine tool industry.

The period between World War I and II, saw development of carbide tools, individualized machine drives, and the smaller innovations that were required to realize these. And the period following 1953 had to do with the development of numerical controls.

Other than these major developments in the two industries there have been *(1)* a trend toward a series of small changes in process which have resulted in increased productivity, and *(2)* a series of far less significant changes in product, a series of far less significant innovations.

If you look at where these come from, they have come primarily from the following places:

A. Foreign technology.

B. Small, independent, organizationless inventors.

In textiles, the work of Sanford Cluett, the work of the man who invented the Velcro fastener, and the work of Dick Walton, who has developed one of the major new machines for the knitted goods industry, are examples of this point.

They have come from the startup of small new companies, and they have come from the invasion of these established industries by technically sophisticated industries outside.

The main thing that has happened in textiles over the last 30 years is invasion of the textile industry by the chemical industry.

The main thing that seems to be happening to the machine tool industry today—I put this in very dogmatic fashion but I do so so that you can come back with comments on it—is the invasion of the machine tool industry by the aerospace industry which has sponsored the work leading to numerical controls which, it is a good bet, will revolutionize much of the productive capacity of this country.

So that we have foreign imports, independent inventors, new small firms, an invasion of established fields by sophisticated companies in other fields, and specifically the chemical and electronics industries and aerospace industries, these three.

Now, if we look at the problems about innovation that are characteristic of these domestic sources, we can, I think, divide them into two parts.

A. The independent inventors and the new small firms. We have a sampling of these here today. Their primary problem about innovation has this in common with the problem of the new large firms: It is not a technical problem.

The problem isn't, "Can you solve certain technical problems? Can you develop discoveries? Can you turn technical tricks?"

The problem is primarily an entrepreneurial problem. The problem is much more, "Can you use the technical resources that you have?" It isn't a matter of needing more research simply. It isn't a matter of needing even better ideas. And certainly it isn't a matter of needing more technical people. It's a question of ability to make use of the technical people and the technical resources that are there. And there even seems to be in this area a kind of Parkinson's Law that says invention tends to expand to fill the entrepreneurial energy that is available for its exploitation. At least this has seemed true to me in those companies I have worked with. Inventors and inventions will come out of the woodwork if the company is really set to make use of what they are able to do.

If we look at the specific problems, independent inventors and new small companies share a set of problems. They lack risk capital for development. It's hard to get money to do development work when you can't be sure of the results.

They lack informational resources. They tend to find it difficult to know what it is that is worth working on, and they tend to find it difficult to inform people about what it is they can do.

And they lack skill and energy and support in the entrepreneurial or sales function.

The successful inventors that I know are the ones who have been inventive about selling primarily. You're going to hear from some I think either later this afternoon or tomorrow morning. It's the sales inventions and not the technical inventions that distinguish the men from the boys in the field, because there are far more interesting technical innovations now than are being used by American industry.

Looking at the problems of large companies, the data I speak about here comes out of the study of 100 companies roughly with whom Arthur D. Little over the last ten or 12 years has done what we called "technical audits"—that is to say, rather protracted study for the company of the problems about using technical people for research in that company.

I would say out of this the single striking fact is the main problem about innovation in these companies is again not lack of research resources, not lack of good ideas or lack of trained or qualified technical people, but problems about distributing entrepreneurial risk within the company.

Now, that is a sort of a cryptic phrase. Let me try and spell it out.

Once there was a little man who formed a company 50 years ago. It was his company. He had the idea. He had the capabilities. He was able to do some of the production work. He made it in his basement. He was also able to do the selling. He also worried about the finances. He was the entrepreneur. He had the energy. And he had all these functions tied into himself. He built the company, and he was successful.

And over a period of 30 years he became bigger and more and more successful. Eventually the company became so big that the central problems in his mind became the problems of how it is that you can run a very large, complicated show and keep it moving, and his function gradually shifted then from being that of starting entrepreneur to being the administrative manager who keeps things running.

And at the time that that happened there grew up a specialization of function, and the marketing and the technical and the financial and the sales and the production activities which he used to keep in his head now got divided up among groups of people, and these groups of people got covered over with a professional identity so there came into being marketing people, technical people, financial people, and production people.

And about this time the rules of the game shifted, and it suddenly ceased to be true that there was an invention once at the beginning and the company was founded on the invention and you didn't have to do any inventing after that.

And all of a sudden it began to be true that you had to invent and innovate all the time in order to stay alive.

At first we used to say "in order to grow and in order to make more profits," but now we say "in order to survive."

The Alice in Wonderland comment that you have to run to stand still applies in large corporations in America today.

And the instrument which it developed to handle the problem of how it is you can be big and complicated and still run was very poorly adapted to the problem of how it was you could innovate continually. Because now the manager who had the power no longer had the feeling for the work, no longer had the direct contact with the work that enabled him to tell what was worth doing. And the people down below had the direct contact with the work and had delegated to them the entrepreneurial task but no longer had the power to carry it out.

As everybody knows, there always comes a point in major technical development when you make an irrational leap—that is to say, a leap into uncertainty—because you are unable to get enough evidence to make the move, yet you must make it now. Nobody down below had power to make it.

And if such a man made a move he became kind of a product champion, hero, or martyr, as Dr. McLean did for the Sidewinder missile. But this was the only recourse.

In the meantime the marketing and technical people who used to be inside the head of the man who began the company had many difficulties about working together. And these difficulties, the difficulties about the spread of risk between the boss and the subordinate and the interaction between the marketing and the technical groups, seem to me to be the central difficulties about innovation in American industry today. And the result is that in many companies people down below in technology and marketing are constantly popping up balloons to the front office which are either shot down or allowed to pass, new product balloons.

The new product activity takes on much of the aura of a guessing game—that is to say, trying to guess the basis on which this company will allow new products to pass.

One research director of a paper company said to me that he had finally after 20 years begun to guess just what new products would go in this company. Of course, he couldn't tell anybody else down below. He didn't understand it that well.

And the point about this story is, of course, the requirement that he guess.

Well, the need then in large companies is the problem about entre-

preneurial activity. It's the problem about the distribution of risk. It's for new learning and new skills as to how it is that you can innovate in such a large and complicated affair. And it's for new models of how you do this.

Now, to cut here, this is not the European situation at all. It seems to me that on this basis we can say the following kinds of things:

First, there are problems. Europe's development of its technical resources, its development of new technology, its vigor, its ability to use this technology, does pose a threat to our economy and will pose a greater threat.

But the need is not simply for more research and for more development work or for more ideas.

The European situation, which we described earlier, in which this was the need, is not appropriate to us. There are, in fact, many signs that the European situation, as it becomes more mature and as markets become more saturated and companies become more developed, is becoming like our own. And, therefore, Europe's immediate past is not a model that we can follow.

But there are major national problems that we have that concern research and development, and technical innovation, and these go beyond the scope of any one company or any one industry.

There is a need to build conditions of innovation, conditions which would make technical innovation possible. These have to do with legitimizing a way of providing risk capital for development to inventors and small companies.

Where appropriate, it has to do with providing technical information services and training for these individuals.

It has to do with work on obstacles to entrepreneurial activity in specific industries, such as work on the problem of building codes in the building trades.

And it has to do with this overwhelming problem of the distribution of risk and models for innovation in large companies.

Now, I think there is no one institution in the United States economy at present capable of dealing with that problem except government, and the climate for government involvement in such activities is by no means here what it is in Europe.

The challenge to us in the immediate future is whether we can invent our way to a government-industry solution of that problem.

Thank you.

(Applause)

DR. ROLLEFSON: Thank you, Mr. Schon.

There have been many times when I have wished I hadn't believed

what I had seen written, but I think today is one of the worst. I looked at this program and I thought to myself, "Oh, I know Donald Schon." Then I saw this one is from Arthur D. Little. "Well, it must be a different one." So I didn't even look down the table to see. (Laughter)

We're actually starting on a cooperative program together, so it was quite a surprise to me.

Now, following the pattern of the previous session, we will next hear about legal guidance from Mr. André Armengaud of Armengaud & Houssard, Paris.

LEGAL GUIDANCE

MR. ANDRE ARMENGAUD: Ladies and Gentlemen, my topic I am afraid won't be so interesting as the speech that has just been given a few minutes ago.

My topic is to give you some ideas on the international comparison regarding the rights of the employee-inventor in relationship with the employer.

The comparison between incentive impulses offered to research work in different countries of the world must be viewed from a wide angle and not limited to the strict study of legal texts, judicial precedents and existing conventions.

It is up to us, Westerners subjected to the severe strain of the political and economic competition exerted by countries of the East, to show sufficient impetus for maintaining sciences at the highest possible level that will contribute to human progress.

The question, therefore, is to know if our Western world shows the appropriate attitude in the encouragement we give to research work in enterprises and universities and in the interest that industrial circles show to inventions in general.

The answer to this question can only be made of "nuances" on account of the very structure of the Western world in which the legislation of some countries is inspired by Roman law, while in other countries more pragmatic a law was established where traditions predominate over codified texts.

Without entering into the details of the laws governing socialist countries, and notwithstanding the difference existing between the status of patent holders in these countries (state-owned enterprises in U.S.S.R., the employer or the employee in Czechoslovakia, for instance), nor between the categories of creations (discoveries, inventions, rationalization means), nor between the nature of the juridical right granted (patent of invention, certificate of authorship in U.S.S.R., ex-

clusive or economic patents in the German Democratic Republic), the principle in these countries is the same: the exploitation of the invention is at the disposal of the state, who holds practically all means of production, but the employee-inventor is entitled to a compensation, the extent of which depends on the interest shown in his invention by the enterprise in which he works.

The consideration granted is calculated according to the savings or profits made by the enterprise. The inventor may also, if deemed justified, receive public awards and honorific distinctions as well as special privileges (housing, social or technical promotions, etc.).

In U.S.S.R., no income tax is levied on financial consideration received under 1,000 rubles. This consideration may be largely increased and may reach up to a ceiling of 200,000 rubles, which is more or less $50,000, for inventions and 50,000 rubles for suggestions of rationalization.

However, these regulations substantially vary from one country to the other. For instance, the concept of "service invention" subsists in Czechoslovakia and in Poland due to the survival, so light it may be, of a non-nationalized economic sector.

On the whole, however, the principle is clear: even though the invention does not arise out of the sphere of the employee's activity in the enterprise, the state has, in large, the complete monopoly for exploiting the invention. Yet, since a continuous economic expansion for fulfilling —and, if possible, exceeding—the aims of the Plan is a matter of doctrine, the law is so made that great encouragement is offered to the inventor who places his invention in the hands of collectivisms, and in return he receives privileges often confirmed by flattering demonstrations.

In our Western world, and for reasons of social structure, laws and traditions very clearly distinguish between "service inventions"—that is, inventions deriving from services performed by the employee in the enterprise—and "free inventions," which have no close nor even distant relation with the employee's obligations toward his employer. But, in contrast, provisions stipulating that the employee inventor should receive special consideration for "service inventions" can very seldom be found, even though the invention proves to be a success.

And there I will enter, if I may, into further details.

1. Countries in which the rights of employees and employers with respect to inventions made by salaried personnel are governed by traditions backed up by judicial precedents are, in particular, the United States, Great Britain and France.

Here, among American friends, my point is not naturally to sum up nor to comment on the U.S. doctrine. I only simply recall certain fundamentals.

The patent, if there is a patent, must compulsorily be filed in the name of the inventor or inventors.

The employer has an irrevocable right to a free license on the invention made by an employee (that is, shop right) if for some reasons the patent has not been assigned to the employer according to the general practice and the rule.

If the invention has been performed with the material facilities belonging to the employer and if the part taken by the employee falls within the scope of the instructions received from the employer, the employer has exclusive right to the invention.

The distinction between "service inventions" and "free inventions" stems from these circumstances. But, whatever the circumstances may be, the legal obligation to file a patent in the name of the inventor constitutes a factor of obvious publicity in his favor if the invention proves to be valuable. And that is a point that the employer cannot disregard if he wishes to keep the services of his employee.

A point should, however, be noted. It is the trend shown by governmental agencies to provide rules for rewards to the employee inventor together with the creation of government patent boards in charge of advising on the decisions to be rendered.

Let us see now how the European laws can be compared to the United States practice.

In the United Kingdom there is no special law nor any provisions in the patent law for salaried inventors. The early concept was that "the work the servant is paid for belongs to the master—even if that work happens to be a patentable invention," or that the right to an invention was determined by the "conditions of the labor contract," and since a "servant" was then more a status than a position this concept gave rise to controversial problems.

Nowadays, ownership of an invention must necessarily take account not only of the contract of service but of surrounding circumstances, such as the use of the employer's time and material, of the obligations arising from the nature and scope of the employment, of the limits of the general duties assigned, and of the fact that "an employee may be a servant for certain purposes and an independent contractor for other purposes."

However, express provisions in service contracts are admitted if not too unreasonable, providing they do not lead to "restraint of trade."

Before 1949 no division of rights was admitted; inventions belonged

"wholly" to the employer or to the employee. Now a section of the Patent Office may determine an apportionment of the benefit of the inventions in case of disputes.

In 1956 a Central Award Committee was created to assess awards for inventions used by the Crown.

In France our legislation does not provide specific regulations regarding the respective rights of employers and employees on the inventions performed by the employees.

According to a fundamental of French law the provisions agreed upon by parties to a contract "are the ruling law between them" (Les Conventions font la loi des parties), providing these provisions do not appear of a leonine character or of a compulsory nature, as the case might be if one of the parties, because of his subordination to the other party, were forced to accept a provision detrimental to his interest and conflicting with legal or judicial precedents.

In fact, judicial precedents have laid down principles which are sufficiently well outlined to determine the respective rights of the employer and of the employee. These judicial decisions differentiate between three sorts of circumstances.

"Service inventions," resulting from engineering or research work performed by employees within their employer's business.

In this case, it is admitted that, whether under express or implicit contract, the employer has secured in advance, in consideration of the contractual salary paid to the engineers, the absolute right to inventions resulting from the work said engineers have in charge. The employer has the exclusive right to file corresponding patents in his own name and to his own and sole profit.

A large amount of decisions have been rendered by the court up until quite recent days specifying this position.[1]

"Dependent inventions," meaning the invention performed on the own and sole initiative of an employee receiving a salary for other duties than researches, but within the area of the employer's business, and for which he has received, owing to his functions, direct or indirect assistance from the firm he is working for, either for developing or even only for conceiving his invention.

In principal, the court decisions have concluded to co-ownership of the employee and of the employer on an invention. And I may cite a quite recent decision of the Appeal Court of Paris May 16, 1956.

The third category of inventions are *"independent inventions,"* meaning inventions performed by the employee, on his own and sole

[1] Appeal Court of Besancon March 25, 1958.

initiative, with his own private means and outside the area in which the employer's business is involved.

In such cases, court decisions have, of course, acknowledged the exclusive ownership of the invention to the employee.

It is in the light of these general principles that the main branches of French industry have adopted "Labor Conventions" (Conventions Collectives) concluded between associations of manufacturers and worker associations of the same industrial sector.

I will give you two examples.

"General Regulations (applying to personnel of Gas & Electricity Public Works) (Utility Services)—June 22, 1946:

"Art. 35—Discoveries made by an employee within the field of his activities, in the service of his employer, shall belong by right to the enterprise with which he is engaged and the latter shall be solely entitled to file the corresponding patents. However, the name of the inventor is allowed to appear in the patent.

"Discoveries or inventions performed by the employee with his own means, outside the service with his employer, shall belong to the employee without any reserve and he shall be free to take in his own name all corresponding patents."

Now I refer to the General Regulations applying to personnel of chemical industries, which are more favorable than the one I have just cited for the employee. Article 17 of these regulations reads as follows:

"(1) In case of an invention made by an engineer or any employee of a firm, and in relation with the activities of said firm or with the studies and searches made by the firm, the name of the employee-inventor will be mentioned in the patent application if the invention calls for patent protection.

"Mention of the inventor's name does not imply by itself the right to co-ownership.

"(2) If, within the five year period following the filing of the patent application, the patent has been commercially exploited, the employee whose name is mentioned on the patent shall be entitled to receive an allowance in keeping with the value of the invention, and this even though the employee would have retired or would have left employment with the firm concerned. This provision applies to new and patented manufacturing process which, actually put into practice, increases the productivity of the manufacture to which it is applied.

"This allowance will be a fixed amount determined by taking account of the general research conditions under which the invention

was performed, of the practical difficulties encountered for applying the invention into practice, of the part of novel and personal contribution brought by the person concerned for specifically singularizing the invention in itself, and of the commercial interest of said invention. The employee concerned will be made aware of all these elements.

"(3) When an invention conceived by a staff member has no relation with the scope of the general activities, studies and researches undertaken by the firm, the invention shall remain the exclusive property of the staff member involved."

Yet, these recognized fundamentals do not exclude the possibility of differing provisions.

For instance, a clause providing for an additional remuneration even if the invention is performed within the area of the employer's business, would be considered valid by the courts if contained in a labor contract.

Similarly, a clause referring to the employee's future inventive activity, after he has ceased employment, would be valid only if the labor contract states that the employee shall not take service with competitors of his former employer during a determined period.

And furthermore another country where nothing is defined by law, where altogether it is tradition, follows the general line of this policy. This is the case of Switzerland where the relationship between employers and employees is defined by a Federal law regulating trade and called the "Obligation Code."

The points to notice in this Code are the obligation to indicate the name of the inventor on the patent, the fact that the employee is "entitled to reasonable compensation if the invention is of considerable value" and if it brings substantial advantages to the employer.

Let's take now another type of countries which have special legislation for invention made by salaried inventors which also stipulates how they are to be remunerated, which is the case in Sweden, Denmark and the Federal Republic of Germany.

In Sweden, the employee inventor's rights have been studied as early as 1919, and a revision of the patent law outlined certain provisions according to which the right to a patent belongs, in principle, to the inventor.

In 1949 an act respecting employees' rights in inventions made by them was issued for public as well as for private sectors.

The law distinguishes also the service invention and the invention made within the sphere of the activity of the employer.

The essential principle is that the inventor is entitled to reasonable

compensation, whatever may have been agreed before the invention was made.

This compensation is calculated on the commercial value of the invention, the extent of the rights acquired by the employer, the degree to which the employer contributed to the invention.

In case of "service inventions," a compensation is granted only if the remuneration already received is out of proportion with the value of the right acquired by the employer.

If controversies arise, they may be submitted to a special standing board or they may be referred to other boards operating under general Swedish law.

In Germany a special law has been issued in 1957 and confirmed by decree of application in 1959. This law covers all sectors, civil servants, public and private sectors, officers, soldiers.

A difference is made between "service inventions"—that is, an invention made during the period of employment and arising out of the employee's activities, as I said before—and the "free inventions."

The service inventions belong to the employer, and free inventions to the employee, but in this case the employee must offer a license to his employer before disposing of them.

The compensations granted to the salaried inventor is to be determined according to various factors—the value of the invention expressed in monetary terms and the position of the inventor within the firm and also the participation of the plant in the origin of the invention.

The value of the invention is found out by the profits accrued or by investigating the royalties which may be earned by the invention. A percentage is calculated on the value of the invention and is paid to the inventor. But the system is altogether rather complicated. In fact, the remuneration takes into account a certain amount of factors, and there is sort of a sliding scale which depends on the position of the inventor, the part of the employer in the invention, the means he has given to the inventor, the position of the inventor in the company. Is he a director? Is he in charge of research? And so on.

In each of these categories a certain amount of points is given, and a chart enables to make calculation of the number of points which can be afforded to the inventor-employee as regarding his relationship with the employer.

And it's on the basis of these factors that the calculation is made. You multiply the value of the invention, determined either by the profits made by the company or by the royalties that the company could receive, by this factor established with this complicated chart.

And so far as I have been informed the system is thoroughly excellent but, in fact, so complicated that the relationships between the inventor and the employer are in fact determined largely by the tradition in the industry interested.

There are some other countries in which the rights and obligations of employers and employees in this respect are defined by provisions included in the patent law itself.

It is so, for instance, in Austria, where workmen, salaried employees and civil servants are considered to be the authors of inventions made by them in service unless otherwise stipulated by agreements or service rules. The concept of service inventions is the same as in other countries, and the employer has a right of use on them, but he has also to grant a remuneration to the employee inventor except if he was employed expressly for inventive work.

In Italy the principles governing rights in inventions "made in performance of a labor contract or service contract" have been stipulated in the Patent Law of 1939.

Service inventions belong to the employer, but the name of the inventor may be mentioned on the patent.

If no compensation is provided for inventive activity, the rights still belong to the employer, and, in addition to the right of having his name indicated, the employee has right to a reasonable compensation.

If these conditions are not fulfilled the employer has always a preemptive right for exclusive or non-exclusive right for use, acquisition or filing abroad.

The law also provides that controversies shall be submitted to arbitration, or to the Minister, if the inventor is a public servant. In the latter case the decisions taken by the Minister are not subject to appeal.

In the Netherlands, service inventions belong to employers, but when the salary paid to the inventor is not deemed a reasonable compensation for the invention performed the employer is obliged to pay an equitable sum having regard to the financial importance of the invention and the circumstances in which it was made.

If disagreement arises the Patent Office will determine the compensation.

If the inventor has no right to the ownership of an invention, he shall, however, have the right to be mentioned as inventor on the patent document.

Any stipulations departing from these principles shall be void.

To sum up, while it is true that in our Western countries the principle of a fair remuneration to the employee inventor clearly emerges from our laws and judicial precedents, nowhere can traces be found

of incentives to research work extended so far as to incite the desire to invent something to become one of the objectives of the daily task of the employee.

Nevertheless, two remarks must be made:

Firstly, in countries where the name of the inventor must compulsorily be mentioned on the patent granted, the competency of the inventor, thus duly recognized by relevant circles, may open new doors for him should the enterprise in which he is working be unable to keep him, thanks to a substantial improvement of his position in the enterprise.

Secondly, in enterprises having important research departments, the atmosphere and spirit prevailing therein, insofar as France is concerned, is a determining factor on the success of the work undertaken and of the incentive offered to the employee inventor.

But these remarks apply only to extreme cases, and the question remains to determine how a system of fair incentives can be established in which the strictness of convention terms will not open the way to controversies and thus run counter to the objective.

The question is also to envisage how inventions made by outsiders can be promoted within existing enterprises without lengthening delays already so discouraging for inventors which drive them to give up their creative initiative for the detriment of our society.

Thank you.

(Applause)

DR. ROLLEFSON: Thank you, Dr. Armengaud.

We will next turn to the last one of the contributed talks this afternoon on "Invention" by Dr. John R. Pierce of the Bell Telephone Laboratories.

Dr. Pierce.

INVENTION

DR. JOHN R. PIERCE: Mr. Chairman, when Mr. Harris called me up and asked me to speak on this program, I said that I didn't really see how I fitted in. But I finally agreed, largely because I had been so annoyed by a lot of nonsense that has been said about inventions, nonsense that I am happy to say has not been repeated at this meeting. Some of it may be true some places. For example:

"Generally long-established industry wants no revolutionary invention. The great corporation laboratories set their engineers to work on small improvements which will not upset the applecart."

"It took a long time for the A.T.&T. to get into the radio techniques"—which is from a document of a gentleman named Meisner that I received through the mail.

I don't believe these things to be true, and I wanted to defend myself. I would have defended myself by saying that transatlantic radio telephony was first demonstrated by the Western Electric Company, owned by A.T.&T., in cooperation with the U.S. Navy in 1915, that we were the first people to do commercial transoceanic radiotelephony in 1927, and the first transcontinental microwave radio relay system, and the only thing that has kept the Bell System from going into the satellite business is an act of Congress.

However, I was happy in not encountering the sort of thing I thought I would object to. I have heard a lot of talks with which I have great sympathy and agreement, and this leaves me without very much to say.

However, I will talk anyway.

Since my talk is about invention in the international world, I would like to say that, large as the Bell Telephone Laboratories and the Bell System are, an increasing fraction of the inventions we use comes from outside. This is a consequence of the growth of technology, and I think we are seeing something of the same thing in the foreign field with the growth of technology in the rest of the world.

In the Bell System—and I can speak only on the basis of my own experience—we must have access to and the use of the inventions made outside of the Bell System, because however productive we may be, a larger and larger percentage will be made outside of the Bell System.

And in the same way I think the United States will find that it will have no monopoly on technology in the future, and it must learn to have some of it done some place else in the world.

Now, you'd think that this would be a fruition of the doctrine of people who say they are internationalists and believe in the United Nations, something they would appreciate. But actually, there are agonized yells of complaint whenever some other country contributes something or threatens to contribute something, such as a supersonic airliner, and the immediate reaction is that, "Oh, we don't 'dast' let any of these people we love so much contribute anything to the welfare of the world. We must beat them out by appropriating large sums of government money."

Well, there is an international commercial world in which people in other countries will do things, however much a well-meaning, internationally-minded government may try to undo this. And you have just got to put up with it and have got to recognize it.

That's one thing I'd like to say. No amount of political money or machinations or anything else will make everything new come from the United States.

Another thing I'd like to speak to is an issue that's been raised—large laboratories, large industries. It is very important that nothing be done that prevents small individual inventors, small industries from entering some field and displacing things that have been done badly. Otherwise you get ossification. On the other hand, there are some things, some very complicated things, that seem to be done better by large industries, with integrated research and manufacturing resources. The Bell System is an example. I think it has an advantage over the European telephone systems which are somewhat fragmented.

Nonetheless, here again we must recognize the necessity for using things that come from outside. Inventions are necessary in the efficient operation of our own domestic telephone system that are made abroad. And here we come to the exploitation of the patent system both internationally and nationally.

No industry can be self-sufficient—no industry of any scope. Maybe a small company exploiting some one thing can. Since there are patents in the world, any large industry must have the use of the patents of other people. It can get these without breaking itself only by having patents of its own to trade.

Therefore, the industry must diligently foster not only invention, but patents, and must get some patents with which to trade, and the better things must be patented on the world market. Otherwise you will face utterly unbearable costs for the use of invention.

What about fostering inventiveness and success in industries? I would like to say that success is an awfully important thing to foster. And here again I want to come back to something about Europe versus America. It's deemed terrible when the corpse of some industry finally goes under through foreign competition—rather than an occasion for rejoicing that this painful relic of a past age has been put out of its agony. You feel you must prop it up.

In some way, the public weal is excited more by moribund industries than by successful industries. I think this is very, very bad. The general idea of the government is that if something is about to go under which should have gone under years ago, you say, "How can we keep it, give it semblance of life and keep it eating up money?" This bothers me.

I think success is important, and I hate to see all the rewards go to failure rather than success, and all the esteem go to failure. You feel sorry for the person who fails. I suppose you feel envious of the person who succeeds. That's human, but it may lead to bad policies.

I think that it is necessary to live with the patent system in a realistic

way. You've got to encourage discovery and invention. You've got to encourage living with the patent system and filing patents.

However, the document from which I quoted said that the person who works for a large laboratory should not be able to assign his rights to the laboratory. And this seems to me inflexible and apt to work a great deal of mischief.

We have heard about laws pertaining to invention. I think that laws that dictate just how you should go about doing things leave very little room for success because they aren't aimed at success. They're aimed at procedure.

I have about 80 patents. When I came to work for the Bell Laboratories I sold them all for a dollar. But that wasn't the whole payment. The payment was the ability to share freely the knowledge of the other people in the Bell Laboratories without their withholding it from me because they thought they were going to get a patent on it the next day. In a large research organization, I regard rewards for individual inventions as mischievous in that they tend to be divisive and to create secrecy where you need an atmosphere of openness.

I'm sure that in a well managed organization creation and invention will be rewarded. Otherwise it isn't well managed. And if it isn't rewarded and if the government doesn't prop it up, it will go under, and that will be a happy disposition of the problem.

I think that that ends my remarks.

(Applause)

DR. ROLLEFSON: Thank you very much, Dr. Pierce.

I think from our contributed papers we have got material for some good discussions after while, and I'm looking forward to an exciting period.

We'll now turn to the contributions from the Foundation, and the first talk will be on "International Patent Statistics as Indices of Invention," by Mr. P. J. Federico.

Mr. Federico.

PART V — FOUNDATION RESEARCH CONTRIBUTORS

INTERNATIONAL PATENT STATISTICS AS INDICES OF INVENTION

MR. P. J. FEDERICO: I have nothing to say about international patent statistics as indices of inventive activity except that they are not.

It does not follow that if one country issues twice as many patents or has twice as many applications filed in it as another country, there is twice as much inventive activity.

As a matter of fact, the inventive activity may be even less in the country with twice as many patents or patent applications.

I make this statement even when you refine the statistics by removing applications filed by foreigners and reducing the result to a per capita basis.

You will find in the last Conference Number of the Foundation *Journal* an exposition of this theme with a showing that by following the conventional routine of using patent statistics as indices of inventive activity, the country that leads the world in inventive activity by about ten times as much as its nearest competitor, is Liechtenstein.

I do have a few things to say about international patent statistics, and I want to present some results that flow from the study of the statistics of a recent period which I think shows a revolution in the patent world.

You will find in the paper that has been distributed a series of tables. The first table is merely a compilation of applications filed and patents issued in 37 countries and is just for information, not to show that a country with 10,000 patents has twice the inventive activity of a country with 5,000 patents.

But the next series of tables is a presentation of annual number of applications filed in 16 individual countries with the totals for these 16 countries for a recent period. And these figures show a phenomenon which could be described generally in this manner:

Very few of the countries show substantial increases in the number of applications filed by their own residents. A few countries do show a substantial increase. Most of them are practically level during this 11-year period, and in a few of them the number of applications has decreased rather than increased. This decrease doesn't necessarily show decrease in inventive activity, however.

Considering the applications of domestic and foreign origin, you will see from the first table that the totals for these 16 countries increased only 14 percent in the 11-year period, with respect to applications filed by residents. On the other hand, applications filed by foreigners in these countries increased 100 percent.

And that phenomenon is shown by the individual countries in even a more striking manner.

Mentioning just a few of the countries on this list, in France the number of applictaions filed by domestic residents actually showed a decrease during the 11-year period, a slight decrease. As I emphasized, however, this does not necessarily indicate a decrease in inventive activity. There may have been a considerable increase, signs show that,

accompanied by considerably greater selectivity in what applications are filed.

On the other hand, the applications filed by foreigners in France increased from over 7,000 at the beginning of the period to over 22,000 at the end of the period, three times as many.

In Germany the applications filed by residents show a considerable decrease. Now, this decrease may be due to the fact that during the early part of the period there was a recovery from the postwar period.

Foreigners in Germany, however, filed nearly 10,000 applications the first year of this period, and this rose steadily to nearly 24,000 at the end of the period.

Great Britain shows an increase in the number of applications filed by residents, an increase of a few thousand. On the other hand, applications filed by foreigners increased from 11,000 to 23,000, over twice as many. Applications filed in England are now over 63 percent of foreign origin.

The Netherlands shows a slight decrease in the number of applications filed by residents, but the applications filed by foreigners during this 11-year period almost doubled.

And that is also shown by other countries in the table.

Coming to the United States, the United States is one of the countries that does show a substantial increase in the number of applications filed by residents. Applications filed by foreigners increased from about 11,000 to 18,000 at the end of the period, not as substantial an increase as shown by most of the other countries, for which a number of reasons may be readily seen.

While some of this activity at the beginning of the period is a recovery from the war period, there is a tremendous increase in the internationalization of patents; individuals and companies of one country filing in other countries.

Today over half of the applications that are filed in practically all of the countries of the world are duplicates of others.

There are several aspects to this increase, one of which, with which I am more directly concerned, is the administrative problems involved, the administrative burdens. It seems that patent offices of the world may soon be in the state where most of their efforts are expended in taking care of each other's washing.

But aside from that, there is a greater international interest in patent laws and patent problems which has been noticeable in the United States in recent years. And to not the same extent, because European countries were more internationally minded in patents, but a considerable increase in those countries also, leading towards greater activity

on an international level relating to treaties on patents, cooperation between patent offices, etc.

This great increase in burden in handling patent applications will certainly require the development of greater cooperation among patent offices of the world than has existed in the past.

Now, these tables I have just mentioned have been focused from the standpoint of the countries themselves and the applications filed in that country with the division by domestic and foreign origin. Another point of view may be taken by looking at the persons who filed the applications and where they filed. A second series of tables presents that aspect. (Tables C; these include some calculated or interpolated data for years for which actual data was not available.)

First the number of applications filed at home by the residents of a particular country is given, then the number of applications filed by those same residents in other countries. Of course, all of them could not be obtained, and the other countries are limited to 15. Then applications filed abroad to those filed at home is given. The total table is also presented.

In 1951, the first year of this period, residents of the 12 countries used here filed 163,000 applications in their own countries. These same residents filed 95,000 applications in other than their own countries. Of course, some of these 95,000 may be duplicates, the unit is the patent application filed in a country. This was only about 60 percent of the number filed at home.

At the end of the period, however, while they filed 190,000 at home, they filed 197,000 outside of their own country, about 104 percent.

That phenomenon is shown by most of the countries in these tables.

Looking at France, in 1951 Frenchmen filed 16,000 applications at home and only 8,000 applications abroad, but during the 11-year period they increased steadily each year so that in 1961 they are filing about as many applications outside their own country as they are at home.

This is almost non-traditional for France, because I believe in the past, the years preceding this period, their filings abroad were rather on the small side.

Germany also shows a remarkable increase. The first year of the period they filed 45,000 at home, 21,000 abroad, not quite half as many as filed at home. In the last year of the period they filed 42,000 applications abroad, more than the number filed at home.

Great Britain likewise shows an increase in the applications filed abroad during this period, a steady increase.

Italy does also, which is somewhat unusual because before this period I do not believe that the Italians filed very many applications abroad

comparatively. But they increased from 2,500 in 1951 to 6,300 in 1961, a steady increase during the period.

The Netherlands also increased, and other countries in the table. Switzerland almost doubled.

In the case of the United States, in the first year of the period our residents filed about 50,000 applications at home and only about half that number abroad, whereas at the end of the period they filed slightly more applications abroad than they did at home, with the total number more than doubling.

These tables also show something remarkable in connection with some countries. There are certain countries which seem to have a definite policy of exporting their inventions, filing in other countries. They have always done so more than any other countries and have increased tremendously.

I will mention first the Netherlands. At the beginning of this period the residents of the Netherlands filed twice as many applications abroad as at home, and at the end of the period over four times as many applications abroad as they did at home.

Switzerland is somewhat similar. They file about three times as many applications abroad as they do at home.

Great Britain is not quite that high but it also has had an export policy on obtaining patents abroad. They now file about twice as many applications abroad as they do at home.

Those three countries are at the top of the list in this respect.

Germany has steadily been increasing in the ratio of applications filed abroad, but the ratio is not nearly as high as the other countries mentioned.

The United States has been rather on the low side in the proportion of applications filed abroad but has been increasing until in numbers they are about almost the same as those filed at home.

I see that my time is up, and I won't go into any more of this except that I'd like to repeat a remark that was made by Mr. Pierce, although slightly modified.

He stated that no large company can be self-sufficient in the matter of inventions. The statement is even more true with respect to countries. No country can be self-sufficient in regard to inventions.

Thank you.

(Applause)

DR. ROLLEFSON: Thank you, Mr. Federico.

The next contribution from the Foundation will be on "Competitive Research" by Mr. George E. Frost.

Mr. Frost.

COMPETITIVE RESEARCH

MR. GEORGE E. FROST: Thank you very much, Mr. Rollefson.

We have had a good deal said from time to time here on research and invention as a competitive process, and if we think of that process on the international scene we ought to have, at least in theory, the same sort of pressures, competitive pressures, existing as on the domestic scene.

In other words, every concern engaged anywhere in the world in research, development effort, creating new products, marketing new products should have an adequate stimulus arising from the whole world market for that type of activity.

Conversely, every concern should be subject to the risk of displacement when a competitor makes and markets its inventions.

There is one third qualification: That in theory at least—and this is sort of an Alice in Wonderland approach I confess—in theory at least each country should contribute its share to the creation of these conditions.

Now, we all know that that isn't real life. A small country particularly can sit back and have no patent system at all and go along very nicely living on the research and invention done by other countries.

So that we have to compromise in our thinking and in what really happens.

The great compromise, of course, is the international convention. International convention is based on the principle of international treaty. It is not based on a principle of equity. It is not based on a principle of reciprocity. It is not based on any principle of making the competitive factors even out so that each nation contributes its share to these competitive incentives.

Now, how has the balance worked out? Is one nation contributing more than its share? Is one nation contributing less than its share? Just what has happened?

It seemed to me that the most interesting comparison that one could make would be to start with a couple of examples, and Switzerland is perhaps the best example.

As you all know, the Swiss resisted having a patent system to begin with. They had a patent system of sorts in about 1888 which excluded chemical industries as a practical matter. The Germans put considerable pressure on the Swiss, and ultimately in about 1906 the Swiss finally came around to a patent system effective as to the chemical industry along the lines of the German patent system.

Now, what has happened since that time? How does the United

States, for example, compare with Switzerland in this give and take of rights to inventions?

We can make some approximations of a sort if we think in terms of numbers of patents obtained by the Swiss in the United States and the numbers of patents obtained by the United States residents in Switzerland and we take into account, say, the difference in population or the difference in gross national product.

And the interesting thing is that almost any rational system of comparison applicable to the Swiss gives the Swiss the benefit of a considerably better bargain than we have had in this country.

If you use population as the base it comes out to be about 20 to 1 in favor of the Swiss.

Let me just speak in terms of Canada briefly, and then I'll come back to the basis of the comparison.

In Canada we have a somewhat different situation. Canadians have never overly resisted the idea of granting patents. Their patent system is in many respects like our own.

And Canada is of considerable present interest for the fact that they are considering up in Canada, or it has been proposed, that a substantial segment of the patent system be abolished in its entirety, namely, the pharmaceutical area. So some of us have been rather interested to see what can be said as to the give and take of the United States vis-a-vis Canada on the balance sheet of rights to patents and inventions.

Well, in terms of the numbers of patents, the number of United States patents granted to the Canadians is very, very small in relation to the number of Canadian patents granted to the United States residents.

But if we take into account, for example, the population, we find that the ratio is about 2½ to 1 in favor of the United States.

If we take gross national product as our test, we get a ratio of about 2 to 1 in favor of the United States.

Now, how do we compute these figures? These figures are based on the idea that a figure of merit as to the worth of each patent is equal to that patent multiplied by, say, the population of the country. So that in the United States each patent would have a figure of merit of let's say 175 million, and each patent in Canada would have a figure of merit equal to the population of Canada.

Now, in the case of using the gross national product as the basis, the multiplier is the gross national product. Of course, these are highly arbitrary. They only give very rough ideas. And they at best are just something to think about.

And I for one would think that a 2 to 1 ratio is within the range of meaningfulness of these figures, so that a 2 to 1 ratio versus a 1 to 1 ratio wouldn't be very meaningful to me at least.

Now, the reason I come to Pat's calculations is that on page 19 of his materials, if you will turn to that No. 2 Table, Pat has made computations which are far better than the sort of thing that I had done—far better and more complete than what I have done. And I would just like to share with you a few thoughts on Pat's computations.

Here is what Pat did. He took a figure of merit based on the gross national product. I have done both the population and gross national product. He stuck to the gross national product, which for a number of reasons is really a better measure.

And he operated on the basis that a United States patent has a value in proportion to the gross national product, the British patent has a value in proportion to the British gross national product, and so on.

Then he took these figures and figured out all the—let's take the United States for the moment. He took all the foreign patents obtained by United States residents and weighed them in accordance with the respective gross national products, summed them up, and then on the chart here he shows the logarithm of his figure of merit to the base 10. And he has applied a factor of, I believe, 10^{-12} on his figure just to keep the numbers from getting too big.

But when you're all done here you end up with a number which is a figure of merit based on a logarithmic scale.

So that if we take the United States for example, we have on the bottom column or I mean the bottom line in the center column a logarithm of 5.3 as the index of what United States residents get abroad from their patents. On the next column to the right we have 5.8 as the logarithm of the index as to what the United States gives to foreigners with respect to patent rights.

You'll notice the difference there is about 0.5. The logarithm of 3 is 0.477, which means that the United States gives about three times as much as it takes.

Now, I know that is a lot of language, but that is what this all adds up to.

Let's very quickly run down the other countries and see if I can indicate what's going on here.

Take Canada. In Canada the ratio when you get through all the computations here is about 1 to 1.15, meaning that Canada gives maybe 15 percent more than it takes in terms of patent matters.

France comes out almost even. In other words, despite the fact that the numbers of patents obtained by French residents abroad are much

smaller than the total number of patents granted by the French to foreigners, when the national products are taken into account and the thing is all calculated out France comes out even in this give and take.

Germany is about 3 to 1 in favor of Germany.

Great Britain is about 2 to 1 in favor of Great Britain.

And Switzerland is 10 to 1 in favor of Switzerland, which checks very neatly I think with the United States to Switzerland ratio.

So the net effect is that we have great variations in this overall picture of the contribution to the incentives that make up for research and development through the patent system.

Thank you.

(Applause)

DR. ROLLEFSON: Thank you, Mr. Frost.

Our next talk will be on "Trends in Inventions, U. S. and Abroad," by Mr. Barkev S. Sanders.

Mr. Sanders.

TRENDS IN INVENTION: U. S. AND ABROAD

DR. BARKEV S. SANDERS: From all these statistics I'm reminded of a person who was going in a train that was speeding at the rate of 80 miles an hour, and he saw a herd of cattle. He said, "That herd has 5,000 cattle."

Somebody asked, "How did you figure that?"

He said, "I simply counted their legs and divided by four. Very simple." (Laughter)

I think, as Mr. Federico has stressed, counting patents is not equivalent to measuring invention. We have no way as of now of measuring invention.

My conclusion is that as of now we have no way really of measuring inventions.

I have a few figures, and also I have a handout which I hope you have copies of. I want to try to make some very broad inferences from these figures.

On the first table you will notice in columns 3 and 4 there is indicated the proportion of patents in many countries—the patents that were granted in terms of the years in which they were first applied for in most cases—that survived to the fifth and sixth years. And this is important in the sense that in many of these countries—in fact, in all of these countries—a patent must be kept in force by payment of renewal fees.

Some years ago, prophetically, Mr. Federico pointed to these data

saying what you might call, "There's gold in them thar hills." He said that these patents that remain in force indicate patented inventions that are commercially utilized. Otherwise they would not be kept in force.

And these figures happen to coincide broadly with a more direct approach that we made in the Foundation to find what proportion of American patented inventions are used. And the findings from these two approaches seem to support one another. So these two columns indicate really the approximate proportion of patented inventions that are commercially utilized.

Now how do you account for these differences in survival rates of patents for different countries? There are numerous reasons. One of them is the very fact that has been stressed here that patented inventions are not equivalent for different countries. Different countries have different criteria for patenting. Therefore, numbers of patents can differ without any indication that inventiveness is more or less in these countries. So that's one, probably the most important differential factor.

Another differential factor is, as has been stressed already, many countries have a large number of their patented inventions taken out by outsiders, nonresidents. That's a second differential factor.[1]

Still a third differential factor is the economic size of the unit. If the country is a large economic unit, the patent exploitation has much larger value. That's the justification, if there is any, of using GNP, gross national product, as a divider. And therefore you would expect these differences in terms of size.

Then there is what I may call the mix, the industrial mix. We find that the patents in different industries or in different types of technology are used at different rates. Of course there are perhaps numerous other differentials such as proportion of assigned patents.[2]

Now, I would like to call your attention also to column 7 of that table. You notice that despite the wide variation in the rates of proportion of patents surviving, column 7 shows that the proportion allowed to expire remains essentially uniform for the different countries. This uniformity in expiration rates is not only between the fifth

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[1] On the average utilization rates of American patents which are also patented abroad are higher in comparison to inventions which are patented in the United States only. We assume this differential is apt to be true for patents of other nationals as well.

[2] On the basis of the Patent Utilization Study, the proportion of assigned patents put to commercial use is appreciably higher than that of unassigned patents. We assume that in all probability this differential will hold also for patents of other countries considered in Table A.

and sixth year, but this is essentially true for the entire period of the life of the patent.

If you turn to Chart I, you notice that the rate of decrease is a uniform line on a logarithmic scale. In other words, the proportion of the decrease from year to year is about the same. This suggests very definitely that there are economic forces that control the decline, the allowing of these patents to expire.

Now, if you turn to Table B, you notice there we find that in the different countries, despite the fact that these renewal fees are widely different, there is no influence of differences in the payments that individuals have to make in order to keep the patents in force after the fifth or sixth year.

Again, what does this mean? This means economically the returns from these inventions that are kept in force are so large that the renewal payments are insignificant in comparison to these.

Table B illustrates this another way. In the same country when the renewal fees are increased, even to the extent of almost doubling them, it makes no difference whatsoever, again indicating what we have inferred from U. S. figures and from these other figures—that by and large these are patented inventions that are being commercially utilized, notwithstanding what economists have said about patented inventions and their commercial use.[3]

I'd like to point now to one other aspect which deals with this trend element. If you look to the Charts II, III, IV, V and VI, which are for different countries, they demonstrate another principle. With the one possible exception of Denmark, they show that there has been an upward move in the proportion of patented inventions that are maintained through the payment of renewal fees, despite the fact that renewal fees have also gone up. This to me indicates that more and more there has been a greater selectivity of inventions that are being patented. In other words, the average patented invention today has

[3] A number of corporate officials have advised this writer that as far as the patents of their corporations are concerned often they are kept in force by payment of renewal fees when they are uncertain what the prospects are for the particular invention to be used commercially. This would suggest some reservation in the inference regarding use of all patents that are kept in force. It should be considered, however, that a small proportion of the patents which are allowed to expire after the 5th or 6th year represent inventions that were used commercially. Therefore, all that is being inferred is that the proportion of patents surviving through the 5th year approximates the proportion of patents put to commercial use. Furthermore, it is unlikely that a corporation would suffer continuous large losses in paying renewal fees unless the returns from some patents were sufficiently large to justify the maintenance of patents as long as there is hope that they might be used.

much greater economic significance than patents of 20 years ago, and those of 30 years ago.

We have not only this upward shift which leads us to this important inference, we have a number of other indications that this is what has happened. Therefore, to hope that by counting patents we can determine whether inventiveness has increased or decreased is a mere delusion.

(Applause)

DR. ROLLEFSON: Thank you, Mr. Sanders.

I call now for the final contribution from the Foundation on "Inventor Incentives in the EEC," by Mr. Gerard J. Weiser.

INVENTOR INCENTIVES IN EEC

MR. GERARD J. WEISER: To determine what incentives are offered to the inventor in the EEC, we must briefly review the legislation and the court precedents that exist in the EEC either under national or supranational legislation.

I will attempt to cull out some of the principles which I found striking and also try and attempt to incorporate the results made by a survey conducted by this Foundation by Dr. Joseph Rossman in response to inquiries and letters sent to various companies in Europe dealing with this problem.[1]

I—SUPRANATIONAL ASPECTS

First, also, let me touch on a point which is of importance today. The Draft Convention for a European patent law[2] makes no provisions for the rights and obligations of employers and employees making inventions in the course of employment. Article 17 of the proposed law provides that the inventor has the right to have his name mentioned in the proceedings in the Patent Office, but Article 103 is silent

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[1] The Patent, Trademark, & Copyright Foundation, Survey on the Law of Inventors in Europe—Results of a questionnaire sent to European companies on this question—1962.

[2] The Draft of the European Patent Law Convention, hereinafter referred to as the European Patent Convention or as the Patent Convention. Official text of the Coordinating Committee for Industrial Property Rights of the Commission of the European Economic Community: Avant-Projet de Convention relatif à un droit européen des brevets élaboré par le groupe de travail Brevets. The official text was published in a bilingual edition with both French and German versions. For a summary analysis, see P. J. Federico, "The Proposed European Patent Law, A Summary Analysis," *Journal of the Patent Office Society*, Vol. 45, No. 3 (March 1963), p. 153.

on the point as to whether the published patent will have to mention his name.

You probably also know that the International Convention, the Paris Convention for Industrial Property,[3] provides that the inventor has the right to have his name mentioned in the patent.

So much for the supranational aspects.

II—NATIONAL ASPECTS

In the EEC countries, the problem is dealt with in essentially three ways.[4] One, by special law typified by Germany; two, where there are no laws, no statutory provisions, there are court precedents like in France and in Belgium (but none in Luxembourg), supplemented by the strong influence of collective agreements as in France between the labor groups and management; and thirdly, by Italy and Holland which have provisions regarding the rights of inventors in their patent laws.

In analyzing these laws, I have attempted to try to see if we could deduce a lesson and to see if any one system would tend to provide a greater incentive, particularly in the light of the Foundation's survey.

This, I have not been able to do.

GERMANY

In Germany,[5] the interesting aspect, which is absent in the other

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[3] "The International Convention for the Protection of Industrial Property, as amended 1958 Lisbon," *Journal of the Patent Office Society*, Vol. 41, No. 2 (February 1959), p. 87.

[4] *The Law of Employed Inventors in Europe*, Committee of the Judiciary, U. S. Senate, Study No. 30 of the Subcommittee on Patents, Trademarks, & Copyrights; 87th Congress, 2nd Session (1963).

[5] Basic Principles of the German Law.

In the early '40s, German legislation gave recognition to a basic incentive for the employee: the right to receive from his employer reasonable compensation. This principle was new under German law. In exchange, the employee was required to place his invention at the disposal of the employer since it had originated from his work in the company. Another, second, important principle—again an incentive and a protection for the inventor-employee—are the provisions of the law that the rights and obligations which are provided cannot be defeated by contractual arrangements to the disadvantage of the employee. He is the weaker party. But freedom of contract is retained insofar as it goes beyond the basic requirements of the law.

One of the basic reasons for enacting the law in this field is the promotion and stimulation of inventive activity.

The Law of July 25, 1957

The basic law today is the law of July 25, 1957.

1. Scope of the Law. The law covers all employees in private and government

legislation, is that it covers what we would call technical improvements. If given by the employee to the employer and disclosed according to the law, recognition is given in accordance with the complicated procedure of remuneration. In territorial application, the German statute would apply to an American company which has employees in Germany where the employees have sufficient contacts with Germany to be subject to the law.

The other interesting aspect in the German law is that it covers those inventions of an independent inventor, what we would call a free lancer, who is independent from a corporation but who is dependent on the corporation for financial support.

A third interesting aspect is that, of course, the core of the law is the compensation provisions which have been studied in this country recently again.[6] It is a complicated system—the value of the invention is computed by a system whereby the contribution of the corporation is deducted from the contribution made by the employee.[7]

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service, including parties who are personally independent but economically dependent upon an employer. (Artists, writers, composers, "free lancers" in the U. S.).

2. *Type of Inventions.* Three kinds of rights are covered: patents, Gebrauchsmuster, suggestions for technical improvements. Design patents (Geschmacksmuster) are not included. But the extension of the right of compensation of the employee to this group of inventive activity—suggestions for technical improvements—is noteworthy since many suggestions—perhaps particularly in certain technical fields—do not lend themselves readily to patent protection.

3. *Type of Inventions.* Basically, there are two types of inventions: service inventions and free inventions. In the service inventions, the employer has more rights than in the free inventions. The latter can be exploited by the employee with few restrictions.

Service inventions are those made during employment which have arisen from the duty of the employee in the company *or* those based on a considerable degree of experiences or work of the company.

The terms and the scope of this section have been interpreted by a number of court decisions and by legal commentators.

[6] Brennan, "The Developing Law of German Employee Inventions," *PTC J. Res. & Ed.*, Vol. 6 (1962), p. 41; Laude, "The Compensation for Employee Inventions in Germany," *Journal of the Patent Office Society*, Vol. 44 (November 1962), p. 772.

[7] *Compensation.* The core of this law is the provisions concerning compensation. It has been stated to be essential for the continuous development of the engineering arts and for the preservation of competition and sound economy for both the individual companies and the entire industry.

The factors to be taken into account in evaluating the value of the invention and compensation are the following.

(a) The economic usefulness of the service invention.

(b) The tasks and position of the employee in the organization.

(c) The share of the company in the development of the invention.

Prevailing German opinion holds that the essential criteria are on the one hand

And, interestingly enough, the smaller, the more modest the position of the employee within the company, the greater is his reward theoretically. I don't know whether it really works out that way.

Another aspect is one of taxation. Inventors are granted a preferential treatment, and their income attributable to patentable service inventions are taxed at 50 per cent in contrast to their other income.

The Foundation's survey seems to suggest that the law is applied and lived with although quite complex.

One of the letters made an interesting comment. It says, "An employee either has inventive genius or he has not. You cannot produce such a genius by offering him better conditions"—and left it at that.

FRANCE

(a) France has no legislation on this question but has extensive jurisprudence on it.[8] One thing that has created a lot of difficulties in

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the impact given to the development of the invention by the employer and the engineering resources that he has placed at the inventor's disposal.

The compensation provisions are supplemented by the Rules of 1959. These introduce three rules for computing the compensation.

1. The value of the invention: this factor being the same as the economic usefulness criterion;

2. The share factor of the total value of the invention constituting the part—in percentage—played by the inventor, from which there is to be deducted the part played by the enterprise; and

3. The numerical calculations of the compensation—by algebraic formula—including provisions relative to the manner and periods for payment of such compensation.

Four basic methods are provided to determine the value of the invention. The value—economic usefulness—is analyzed for seven main types of possible use. And a basic formula is suggested for assessing compensation. The formula takes into account: the value of the invention, A, the share factor. It is tailored to increase in proportion to the extent that his own initiative has gone into the task and to the extent that he has contributed in finding out the shortcomings and needs of the company.

[8] Englert, "L'Invention faite par l'employé dans l'entreprise privée," *Expose de droit Compare*, Verlag Für Recht und Gesellschaft, Basel (1960).

In France there is no legislation governing this topic. Whatever incentives exist for remuneration for the employed inventor are based on contractual arrangements between the parties.

The right to be named as the inventor in the patent: The law of April 4, 1931 provides that the French inventor has the right to be named on the patent. This may increase his reputation and standing. Indirect advantages may inure to him.

1. Review of the Jurisprudence. A brief review of the cases shows the great difficulties in determining the ownership of the service invention. The cases can be grouped into three classes.

(a) The duties of the employee are defined by contract explicitly or impliedly: the invention belongs to the company. No compensation is provided the employee.

(b) In other cases the court has found that, although there is no contract express

France, as is shown by the court decisions, is the cases where supervisory, administrative or executive personnel have made an invention. There, the courts found what they called the implied clause. By this clause, it was found that the employee was under obligation to make the company benefit from it even though the invention was entirely independent.

This implied clause has been severely criticized by French commentators.[9]

Another concept which is novel and unique in France is the one of co-ownership. In a recent case, an invention totally outside of the scope of the employee's duties has been assigned both to the corporation and to the employee.

The co-ownership concept,[10] which is unique in the Common Market, has been called a strait jacket because it does not enable either the corporation or the employee to expand and use the invention.

(b) This question is also regulated by the collective labor agree-

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or implied, the activity is within the scope of the employee's duties. Same result as in *(a)*.

The implied clause has been used to find a service invention in the case of employees in supervisory, administrative, and executive positions.

[9] The implied contract clause, whereby the employee is deemed under the obligation to make the company benefit from his inventions, has been criticized as a "catchall" to the prejudice of the employee and as failing to give due recognition to inventive activity in contrast to organizational or executive duties.

[10] *Co-ownership.* Where the invention is due to the work of the employee but his work has been helped by the employer, the courts have resorted to the co-ownership concept.

In a typical case, the Tribunal civil de la Seine in Arrêt Musso c. Aciéries du Nord (1954) found the invention made totally outside of his duties. The court said it could not have been possible without the facilities of the company. It was not a service invention nor a free invention; it was a "mixed" invention.

Employee's invention. Two more recent cases recognized the sole ownership of the employee. In the McGregor Comarin c. Caillet (1955) the Tribunal de la Seine found for the employee's invention outside of the limits defined by the contract. In the Biro case—the ball point pen case—the court found that the employment contract was terminated by the time the improved ball point pen was patented.

Under French law, therefore, any incentives must be carefully provided in the contract of employment; otherwise they are most precarious.

The concept of mixed invention has been criticized as failing to recognize the different qualities of contribution of the respective parties. It has been said to short-sell the inventor. The courts also have admitted the complexity of the co-ownership concept and the lack of freedom of the parties to exploit it without the assent of the other. Casalonga, the French legal commentator, calls the concept "forced co-ownership" and a "camisole de force" (a straight jacket).

It is evident that, where there is a lack of agreement between the parties, industrial development of the invention may be dampened.

ments.[11] These have been mentioned by the prior speaker on this topic. They probably are the greatest single factor on this subject in countries like France today. The agreement in the chemical industry is a rather liberal one. The electrometallurgical one is another rather liberal one. Others differ in that respect.

OTHER COUNTRIES

Briefly, to cull out, an interesting aspect of the Italian legislation[12] is the provision that where the invention is a related one, therefore carried out by the employee independently, but within the scope of the field of activity of the corporation, the employer has a first option to take either a license, an exclusive license, or even an assignment or buying the patent.

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[11] The Electrometallurgical & Chemical Industry has a standard contract type which provides that the inventors assign the invention to the company. The company reported using bonuses, promotions, salary increases, etc.

There exists such a contract type for various sectors of the industry. For the chemical industry, Article 17 provides for the name of the inventor to be mentioned in the patent and for the employer to pay a special remuneration to the employee in the event that within five years after the issuance of the patent, the patent is exploited commercially. Remuneration must be paid to the employee even though he has left the company. If the invention does not relate to the activities of the company, it is a free invention.

Such standard contracts can be made mandatory by the government. The employees may be bound by an additional contract. These standard contracts between employee syndicates and employers' groups play a very important role in regulating this question.

[12] Italy belongs to the group which regulates the rights of the employed inventors through patent law.

Type of Inventions

(a) The invention is the employer's where it arises from inventive activity which is the subject of the contract. Other than salary, no additional compensation is provided.

(b) If the salary does not cover that activity, the law provides for the right of reasonable compensation for the employee.

(c) Where the invention has been brought about by the employee independently but is within the field of activity of the enterprise, the employer has a first option for exclusive or non-exclusive use of the invention, acquisition of the patent and filing or acquisition of patents abroad.

Arbitration is provided where no agreement is reached by the parties.

In contrast to France, national labor agreements as a rule do not have provisions covering inventions. One company reported in response to the Foundation's questionnaire that it is a common practice to give monetary awards as compensation, but also reports that inventive activity is one of the factors in considering promotion within the company. Another company reported that it approved of publishing the work or giving reports at technical meetings.

Dutch legislation[13] provides for rumuneration of the employee who had made an invention. I found no jurisprudence but there is very interesting legislative history in Holland.

I attempted to see if any one of these legislative systems favors inventive activity in themselves. But, no facts were available, in my opinion, that would make this possible.

(Applause)

DR. ROLLEFSON: Thank you, Mr. Weiser.

That concludes the formal presentations this afternoon.

PART VI—PANEL DISCUSSION AND QUESTION PERIOD

If there is no objection, what I would like to do now is to confine the discussion questions and comments to the panel for a little while, while the rest of the audience is figuring out what comments and questions it wants to present.

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[13] Holland, along with Italy, is an interesting example of a European country which tried to regulate the main problems concerning legal rights of employee-inventors within the framework of its patent statutes.

The statute provides in substance

(a) Patent applications on inventions by employees who are required to use their special knowledge in making the inventions, which become the properties of the employer, and

(b) Where the inventor is not to be compensated for the invention by salary or by special payments, the employer should be required to pay a reasonable compensation for the assignment of the patent.

The amount to be payed by the employer should be an equitable sum which takes into consideration the importance of the invention and the circumstances under which it was invented.

Legislative history of this section in the Dutch House of Representatives is interesting in disclosing that this second clause was enacted over the objections of those members who took the position that this area should be left to be contracted by the parties concerned. The legislators who prevailed felt, however, that in the light of the experience in Germany it appeared that issues of the type regulated by this provision arose very frequently; therefore, a regulation seemed desirable.

The wording of this section leaves the arrangement for remuneration of the inventor entirely to the agreement with his employer, except when the allowance made to him under such an agreement is clearly insufficient to compensate him.

In Belgium there is no special law regulating this topic. But under the general labor legislation the invention becomes that of the company.

One comment to the Foundation's questionnaire was that small-size industry could do more to provide incentives; large industry provided enough to encourage invention.

ADDITIONAL REFERENCES

Plaisant, "Employees' Inventions in Comparative Law," *5, Ind. Prop. Quat.* 31 (1960).

Rezac, "Validity of Contracts Assigning Employees' Inventions to Employers in the United States and Europe," *Journal of the Patent Office Society,* Vol. 42 (1960), p. 177.

In order to get something started and perhaps give the panel a little time, I would like to bring up a point that came up in a discussion I was in just a few days ago.

It was pointed out that in the most competitive industry that we have in this country—I think it is the most competitive ordinarily—the agricultural industry—a very large share of the research and development has been done by government laboratories and government-supported laboratories.

In connection with Dr. Schon's talk I wondered if the pattern that the British are adopting and some of the other European countries are using, government-supported laboratories to do the research and development for industry, was something that we could expect to grow in this country and something that is desirable, or just what is the point of view on that?

DR. SCHON: Thank you for the opportunity to make a comment along what amounts to a proprietary line.

In responding to you I'd like to respond to Mr. Pierce too, because really you're on the same issue.

Mr. Pierce was saying that we need to expect foreign technological contributions in this country as a matter of course and almost out of international politeness. And I think that is true. We do. The difficulty is not that we're getting innovation from abroad but that we're not getting it at home in certain industrial areas.

It's the fact we're not getting it at home that leads one to think that maybe governments need to be involved.

But then Mr. Pierce goes on and he says: But the fact that you're not getting it at home is simply a sign that you have certain moribund industries.

And, following the analogy of the evolutionary process in biology—and, incidentally, the free enterprise system—he says let's let the sick ones die and the healthy ones take over and we'll end up with a healthier economy all around.

And I must say that although I would like to argue with that completely I cannot, because I found in my own looking around that one of the major sources of innovation in our economy is invasion by new, vigorous industries of old, established areas.

This is, in fact, the major means of change in mature areas of the economy. I think you can point this out in paper and in textiles and in machine tools and lots of other areas too, graphic arts, leather.

In fact, the last 30 years have really seen chemistry and electronics and aerospace invading many traditional areas of industry.

However, there are some problems about this process.

What do you do about the displacement created by this process? What do you do about the displaced businesses? What do you do about the displaced individuals? We haven't solved this problem at all.

The existence of a persistently high unemployment rate and of portions of the country that are really vacuums of technology and vacuums of business, like parts of New England, much of the Midwest, and much of the Southeast, proves that we really haven't solved the problem of mobility, which we would need to solve from the point of view of the welfare of the country overall if we were to accept the view that we should stick with the natural process of invasion and displacement which does in fact work so well in so many areas.

The other point about it that bothers me is this: all of these industries that are going to be displaced, that are being displaced. What are we replacing them with?

As I cast my eye over the industrial scene, there are very few areas of solid domestic contribution in which we can depend and where, as you look over foreign technology, there aren't serious threats looming on the horizon without adequate responses on the part of American industry.

Mr. Pierce happens to come from a major exception. He comes from I. T. & T. and Bell Laboratories, which is something of a phenomenon in my view. As I mentioned earlier, it is a monopoly of a sort. It represents a kind of organization for innovation which I think we have nowhere else in this country.

I think Meissner's comment in the article that Mr. Pierce mentioned is not nonsense at all. Large firms generally do have major problems about innovation, and the contribution of captive research and development in large companies is generally small changes in product and process. There are some major exceptions and I. T. & T. along with Dupont has provided examples of it. But even Dupont has bought more than it has made.

Now, what does this imply? I don't know. I don't feel comfortable in the implication that it implies simply that now the government should get into business and start doing research and taking over the job of innovation. Not at all.

But I do think it implies that if we're concerned with social welfare and want to salvage some vestiges of this healthy process of displacement that we've been talking about, we need to be doing something centrally. We need to be doing something about mobility. We need to be doing something about greasing the skids, if you like, under this process.

We need to be doing something about limiting suffering to individuals and companies as a result of the process.

We need to be doing something about the traditional sources of innovation in our society, which are individuals operating as individuals and small companies.

We need to be doing something about all these things.

DR. ROLLEFSON: Would you like to comment on that, Dr. Pierce?

DR. PIERCE: Yes, I'd like to say a couple of words.

Mr. Schon is right. I didn't mean to state a broad and complete philosophy for the promoting of all the good in the United States, and there are many problems that are very difficult, and it's hard to see what to do about them, and they merit the attention of the government and particularly the attention of the industry itself.

I do think that this problem, as you said, is very real. Sometimes industries aren't salvageable and they will be replaced by invasion from outside or they will just go under, and we may well end up not doing some things that are done in other countries, just as some States in this country don't do some things that are done in other States.

I do think one has to avoid being doctrinaire about this and, as I said, look for things that are successful, not for things that fit in with some social philosophy or some predetermined idea about how this ought to be done.

And I do think that there is perhaps an excess of concern about how to salvage things that aren't getting along rather than praise of and endeavor to imitate things that are successful.

DR. ROLLEFSON: Mr. Sanders, did you want to comment?

DR. SANDERS: I wanted to comment in this sense: These are extremely important matters, and really we have not studied them. Counting patents or tabulating some patents is no study. Not even sending questionnaires and getting replies.

I think we ought to study these things very intensively.

I personally feel more and more government is not the answer. But I do not know what is the answer. If we want to survive we have to do more of a very intensive type of study. And merely sending questionnaires or counting patents is far from my notion of what it takes to understand this phenomenon. What we need is studies which lead to understanding the relationships.

DR. PIERCE: One little thing. There was a slip of the lip here down at the other end of the table. I wouldn't want it perpetuated. The Bell Telephone Laboratories is connected with A. T. & T., not I. T. & T. (Laughter)

DR. SCHON: I stand corrected.

DR. ROLLEFSON: Further questions from the panel?

I have one other thing I would like to bring up. I would judge from what I've heard today that there really isn't a great problem in fostering invention but that the problem is in getting these inventions into use, and insuring that the inventions aren't just lost or stored some place.

I wonder if you'd care to comment on that, Dr. Pierce?

DR. PIERCE: Yes, this is something that I think is very important, and again I'm not an expert on the world's economy, so I will speak about the Bell Laboratories and Bell System.

Most of the Bell System is operating telephone companies. The Western Electric manufactures telephone equipment. There are 14,000 people at the Bell Laboratories itself. Most of them are getting things into a condition in which they can be manufactured. The research department is less than a thousand people, less than a fourteenth of the Bell Laboratories, and so I assume that it takes 14 times as many people to make something out of inventions as it does to invent them, and I would estimate that of the research done maybe some place between 1 and 10 percent can be directly traced into stuff that is manufactured; the rest is of a general nature or of an unsuccessful nature or of an irrelevant nature.

DR. ROLLEFSON: I'd like to call for questions or comments from the floor.

MR. JACOB RABINOW: Mr. Pierce, if I may, how can you categorize or determine that an industry is on the skids at some certain time?

DR. PIERCE: Well, it's awfully hard to tell in this age of government contracts. It used to be that it wasn't making something that would sell at a profit. Now it may be on the skids if it can't get government contracts, whether it's making anything or not.

But if a given company is in the red persistently, I suppose it's on the skids, or I would feel that it sort of ought to be. And if no company in an industry can make money, I would say there is something wrong with the industry. But perhaps I'm pretty simple-minded.

Presumably industries perform some social service—or they used to—by making something that people are willing to give out their money for, whether we like it or not. And if nobody wants what the industry makes, it doesn't have much of a place any more.

MR. RABINOW: I'd just like to point out that very often the government helps out in these situations where a whole community is left without a job. I'd like to take a couple of automotive examples.

American Motors was in pretty bad shape ten or 15 years ago. Look at it today. Of course, there was a community that was completely out of enough activity to keep the people employed.

I think we have the same thing over at South Bend now.

The government is more interested I think in giving employment to the people in that community than they are in saving the industry. That would be my guess.

DR. PIERCE: Well, this is all very well, but American Motors saved itself. But if you just keep industries going to keep people employed, where is the country going to be? I mean in comparison with the rest of the world sometime? The industries won't be there because they are doing anything for society except to dish out money.

DR. ROLLEFSON: Yes?

QUESTION: I would like to combine the thinking of Mr. Pierce and Mr. Schon, and it leaves me with a dilemma. That is, we agree that something should be done due to the changing nature of what is happening. Everyone seems to agree that, while the government really shouldn't do it, they seem to be the only one that can do it, as Mr. Schon says. And then there are some who think industry perhaps can do it but in very, very amorphous fashion.

So I don't see any solution when you combine the two, and one is left with some sort of impasse. And I wonder if either one would like to comfort me. I would appreciate it.

DR. ROLLEFSON: I think now you know what we're here for.

DR. SCHON: I think I'd like to hear some more from the floor. There seems to be a good deal on this one.

MR. RABINOW: I would like to make some comments. I don't want to belabor Mr. Pierce's argument, but I'd like to say that a great deal of what the government does is done because it has to assume that we may have a war at any time.

If we support the railroad industry, which is dying, we don't do it for humanitarian reasons, but because we need the railroads in case of war. We do this for optical industries, for various branches of electronics, and for many other businesses including agriculture.

The matter is not so simple as to say that because an industry doesn't pay for itself one should kill it. Actually there may be a question as to whether the A.T.&T., a very admirable company in which I own some stock, is an efficient company. How do you defend a company like yours which is completely protected by the government, which makes its profit because the law sets the rates so that you have to make a profit?

How would you do it if you didn't have this protection? Perhaps you would do just as well.

Since I think the Bell Laboratories are wonderful laboratories, I'm sure you'd manage somehow.

This business of fear of war causes nations to compete in special ways. I'm not sure it makes any difference to us whether there is a supersonic plane in England, or should we therefore be forced to develop such a plane? But the fear of war requires that we do this because we must not let our technology go down.

I'm not arguing for war. I'm simply saying that if the possibility of war is with us, we must consider this.

Now I would like to make a proposal: The patent business is getting to a point where we, as a small Company, cannot afford to get patents in Europe. I understand the Common Market is going to have a common patent pool, except that it will not apply to Americans. We shall have to pay fees and prosecution charges in each country. I think this is somewhat of a racket for the European lawyers.

What we need now is a world patent system to be set up, and I suggest that it can be done in a manner something like this. That the United Nations issue a patent whose legal rights would depend on each country's laws, but that would define the invention and the inventor.

If the mechanics could be arranged by common agreement, I think that the laws of the different countries would eventually fall into line, too.

As things stand now, if we have a good invention in the reading machine field, we have to protect it in a minimum of, say, twenty countries. This usually amounts to some $20,000. If one has fifty patent applications on reading machines, as my Company has, in the United States Patent Office, this means that we need more money to cover the world with patents than we have made in total since my business has opened. This assumes no litigation, no interferences, no difficulty of any kind. Just the bare cost of filing.

This may be fine for large companies. It certainly doesn't work well for us. We often have to turn down applications for license from Europe because we have no patents in the countries involved.

I wish something could really be done about this because the world is getting too small to be covered by multiplicity of patents as at present.

DR. ROLLEFSON: Would you like to comment on that, Mr. Armengaud?

MR. ARMENGAUD: The idea when the convention and the European

patent was prepared was to have something to start to a more international patent. And the French view insofar as this proposed convention is concerned is not to limit the coverage to the six countries of the Common Market but to have a convention which can become open to members, people who don't belong to the Common Market and have that as large as possible. That means that Article 211 of the proposed convention should be altered in order to facilitate the participation of third countries to the convention. And I think it would be a wise step which would eliminate all the argument on accessibility.

DR. ROLLEFSON: Mr. Weiser.

MR. WEISER: I think this gentleman has put his finger on a difficult problem which is very important.

He underscores the problem of the medium and the small-sized manufacturer in the United States, if I understand you right, and their difficulty in competing in the patent system in the Common Market.

This problem is under consideration at the present time.

As you know, the proposed law has two alternatives, one which would make it as readily available to the United States as any Common Market country, or the other proposal, which would make it rather difficult.[1]

Notice under the second proposal there would always be individual national patents available. But that would be very expensive, as you point out, for the medium and small-sized manufacturer to go abroad and to again seek, like under the present system, patents in each and every country. Also, the protection afforded by five different patents will be less than that under one Common Market patent.

The Foundation has looked into it, and other organizations have, as well.

And, on the other hand, from the practical point of view, it's a very important question considering the area and the scope of competition between the United States manufacturer and the European manufacturer.

DR. ROLLEFSON: Well, we have reached the end of our allotted time. I'd like before turning the meeting back to the President to thank the members of the panel for their vigorous participation.

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[1] On this question, see Robbins, "The European Patent Convention—Some Present Viewpoints of the European Patent Profession," *Journal of the Patent Office Society*, Vol. 45, No. 4 (April 1963), p. 295; Roditi, "An Argument Against Accession," *Id.* at 310; Weiser, "The Right to Apply for a Common Market Patent," *PTC J. Res. & Ed.*, Vol. 6, No. 3 (Fall 1962), p. 317 and references cited in footnote 2, page 88.

DIRECTOR COLCLOUGH: Thank you, Dr. Rollefson, very much for moderating this session.

I think everyone will agree with me that the publication of the Conference this afternoon in our conference supplement will be very interesting reading to a great many people, not only in the United States, but in countries with whom we are so closely associated in the field of industrial property.

The afternoon session stands adjourned. We will see you at dinner tonight, I hope, and tomorrow morning at nine o'clock.

(Applause)

(Whereupon, at 6:12 p.m., the Conference was adjourned, to be reconvened at 9:00 a.m., Friday, June 21, 1963.)

Kettering Award Address

GOVERNMENT RESEARCH AND PATENT POLICIES

DR. JOSEPH W. BARKER

An Address Delivered by Dr. Joseph W. Barker, noted educator, engineer, and public servant, at the Award Dinner of the Seventh Annual Public Conference of The Patent, Trademark, and Copyright Foundation on June 20, 1963. Dr. Barker received the Foundation's sixth annual "Charles F. Kettering Award for Meritorious Work in Patent, Trademark, and Copyright Research and Education."

The Federal Government is today financing research and development at the rate of approximately fifteen billion dollars per annum. This rate of expenditure has been increasing almost exponentially over the past several decades. The budget of almost every Federal Department contains funds for research and development. Five agencies, Agriculture, Atomic Energy, Defense, Health and NASA, account for the lion's share of these funds. Citizens have a deep financial interest not only in the cost, not only in the direct results thereof, but also in the indirect effects on our standard of living and any possible financial returns through commercial applications of this research.

A very large proportion of these research and development projects falls into the general category of military weaponry dedicated to improving our defense capabilities. The direct results are, and must continue to be, secret; and any direct patents arising therefrom must be held in the secret classification in the Patent Office under government ownership. Some of these developments, however, may have indirect commercial potentialities. Delicate questions of government policy arise as to how commercial licenses may be granted without breaching secrecy necessary to protect the direct weaponry applications.

All Research and Development projects can be categorized further into "basic" and "developmental." Basic research deals with investigations dedicated to greater understanding and possible extensions of the laws of nature into new frontiers of science. While aimed at a particular area of science or technology, it seldom has a definitive practical objective stated in advance. Developmental research, on the other hand, is dedicated to particular objectives which may be, and usually are, stated in advance. The dividing line between basic and developmental research is hazy and one often blends into the other.

From a patent standpoint, pure basic research may produce a great

breakthrough which may lead to an underlying patent upon which a whole category of later applications will depend. Such results are very exceptional; and in general it can be said that the results of pure basic research are published freely, and without any restrictions on their use. It is generally in the grey area between pure basic research and developmental research that basic patents may result upon which whole areas of developmental research may be based. Such basic patents, if not in the secret category, may be very valuable indeed. It is from the category of developmental research that the great majority of patentable inventions result. Their value to society will depend upon the breadth of their possible applications.

The preceding discussion is equally true of privately financed and government financed Research and Development. No matter how altruistic, privately financed research must over the long run prove its "value" in a "net profit." Save as government financed research results in improved defense capabilities or in improved health and welfare of the general public, "net profit" does not now appear as a direct objective in any governmental research and patent policy.

There is presently no uniform government policy in either research or on patents governing all bureaus, departments and agencies. The Congress in establishing or authorizing the various research agencies has written into each act widely differing provisions for research and patents resulting therefrom. These provisions range from no policy statement at all, leaving it to the agency or the Executive to set policy by regulations, to the very specific and highly restrictive policy set in the Atomic Energy Act.

When government financed research was small and was largely conducted in government laboratories ("in house" research) there was little need for clearly enacted policies. However, as government financed research grew toward present proportions, and as the Congress authorized agencies to "contract out" as well as to engage in research in government laboratories, a whole host of problems arose in the area of patent policy. The disparity between the patent policies of various agencies has caused great confusion. Potential research contractors tend to accept contracts with those government agencies having a patent policy which is most favorable to the contractor. Subcommittee hearings during recent sessions of Congress bearing on the patent policies of government agencies have brought out the complexity of these problems in testimony not only from government agency officials, but also from private research contractors. Certainly some rationalization is overdue, but the principle question is in which direction should this rationalization go.

As for "in house research" there is little question. Where a government employee in the direct line of his stated job makes a patentable invention, the ownership of the patent clearly rests with the government. Where, however, a government employee *not* engaged on a particular project conceives a patentable invention, there arises a problem of patent ownership. As an incentive to such creativity, this can be equitably resolved by the employee taking out the patent but granting the government a non-exclusive, royalty-free license to make and have made for government use. A simple solution which could be included in any rationalized government patent policy.

It is when we come to "contracted research" that the truly complex questions arise. A government agency faced with contracting out a definite research problem naturally and properly seeks out potential contractors already knowledgeable in the field, already possessing laboratory facilities, and the highly qualified technical personnel necessary and, where the contemplated research may be known to depend on one or more basic patents, the contractor who owns or has licenses under such patents. These very requirements limit greatly the number of potential contractors. Furthermore, if the proposed research lies in the "secrecy" area, the question of personnel clearances also adds complexity.

Again where a newly proposed research contract is an extension or a derivation of a previous research contract, the previous contractor is best qualified to carry on with the least backlash. Such considerations lead almost inevitably to negotiated contracts versus open bids. Such concentration of contracts with a particular contractor builds into his organization a storehouse of "know-how" which could lead to a commanding position competitively should the line of research have any commercial applications.

Government research contracts in general provide that the contractor shall grant the government a non-exclusive royalty-free license to make or to have made for government use, under any patents owned by the contractor *prior* to the contract which have any application in the line of the proposed contract. Also during the progress of the contracted research the contractor is to report to the government agency any patentable concept arising from the research. The decision as to ownership of such patentable concepts is sometimes the subject of negotiation at the time of arriving at the original contract. In other cases, the Congressional Act establishing the agency requires that the contractor sign over to the government any such patentable concept arising in the progress of the research.

Certainly the prior requirement of granting the government a license under any prior patent owned by or licensed to the contractor which may bear upon any aspect of the proposed research works against the large and catholic research laboratory organization which over many years has accumulated a large patent portfolio. It would be difficult, almost impossible, to state in advance which or how many of its prior patents may have applicability. Furthermore, many of its highly competent technical personnel may have already conducted research along some aspects of the lines of the proposed research and in his notebooks may be the genesis of a patent. Whose is it?

The very proliferation of spun-off research subsidiaries of these large laboratories may be an attempt to legally limit such patent liabilities. On the other hand, such spun-off subsidiaries make simpler the financial accounting of research costs and expenditures under government accounting procedures. Also the great increase in scientific and technician staffs required by large government research contracts can be met without creating personnel problems of seniority, tenure, etc. when the government contract expires.

It is in these areas that the vexing questions of government research contracting policy arise. There is need for Congressional enactment of a clear-cut statement of government research contracting policy.

Now let us turn to the question of government-owned patents policy. There will shortly be published by this Foundation a comprehensive report, "The Utilization of Government-Owned Patented Inventions." I am indebted to the author and to the Foundation for having been allowed to read it and I recommend it to you for your thoughtful study. It may well become the leading factual study in this field.

The government now owns about 12,000 patents. Public debates about a patent policy point up the controversies over the disposition of these patent rights. As pointed out previously, there is little controversy over the fairly uniform policy of taking government title to patents arising from government laboratories. The controversy principally centers upon patents arising from contracted research. Some agencies follow a license policy requiring the contractors to grant to the government a non-exclusive royalty-free license to make and to have made for government use, while the contractors retain title to the patents. Other agencies take title in the name of the government requiring contractors to assign all patent rights. For instance, the Department of Defense and the Department of Commerce follow the license policy while the Atomic Energy, Agriculture, Interior and NASA follow a title policy. This leads to great confusion and much controversy.

Those supporting a title policy argue that government ownership promotes the widest possible commercial use and that since public funds paid for the research, the patentable results thereof should be available to all. Some argue that this availability should continue to be on a non-exclusive royalty-free basis but others also holding to the title policy contend that the policy should envision exclusive as well as non-exclusive licenses.

Supporters of a government-wide license policy with private ownership by the contractors of patents arising from government research and development also argue this as a more effective means to stimulate wide spread use of the inventions in the commercial field. This argument does not seem to be fully supported by the facts brought out in the comprehensive study soon to be published. The rate of commercial use for inventions administered by the Department of Defense, which follows this "license" policy is about 13 percent, whereas that for the Atomic Energy Commission, which follows the "title" policy is about 15 to 16 percent.

Among the arguments for a government-wide "title" policy, probably the strongest one argues that in a federally financed "contract research" the contractor and his employees become "de facto" government employees, that his facilities have been leased by the government and become "de facto" government laboratories. Consequently under the terms of the contract any patents resulting from the contracted research should become the property of the government. The strength of this argument is weakened when the contract requires that the contractor shall license the government "non-exclusive, royalty-free to make and have made for government use" any *prior* patent owned or licenses by the contractor which underlies any aspect of the research project. Under what I believe to be a proper interpretation of the principle, it cannot be extended to claim rights to a license under patents conceived and practiced *before* the contract is negotiated.

Arguments on both sides tend to distort the importance of utilization of patents arising from government financed research and development. The comprehensive study shows that although the patent portfolio of the government has doubled in the last five years and although the government is now the largest single owner of patented inventions, such government patents are only two per cent of all unexpired U. S. patents. In addition, the great majority of these government supported inventions arose from defense-oriented research which tend to have a low potential for actual commercialization.

The utilization of these government patented inventions is the basis

of the controversy, whether the public interest is served best by a government-wide title policy or a government-wide license policy. And if by a title policy how should licenses thereunder for commercial applications be administered—non-exclusive, royalty-free, or by a mixture of exclusive and non-exclusive licenses with a royalty being collected by the government.

Since the government under either the "license" or "title" policy presently grants only non-exclusive licenses, it is sometimes proposed that the government, instead of patenting should "dedicate to public use" by publication of research results. The Department of Health, Education and Welfare, following the usual practice of the medical profession, dedicates most of its discoveries by publication. Some other agencies however take an assignment of the patent and *then* dedicate the patent to public use. This course has some important advantages. Publication alone does not prevent "ipso facto" a patent grant to another party, if the patent application is filed within one year of the date of publication, *and* if the applicant is able to prove that the invention was made *before* the publication date.

Government agencies such as Atomic Energy and Defense which engage in classified research would not publish the results of such secret research until the technology has been declassified. This gives the possibility of someone securing a patent thereon and then suing the government for infringement. Such government agencies would be highly vulnerable to such infringement suits because of their vast procurement activities. Therefore, they must protect the government by patenting immediately under the "classified inventions" provisions of the Patent Law which holds such patents secret and withholds publication thereof in the Patent Office *Gazette* until the technology is declassified.

Just prior to and during World War II certain British government supported research produced some valuable international patents; such as important elements of radar, of the gas turbine and penicillin. Seeking a method to commercialize such patents and to secure royalty income therefrom, Parliament created a Crown Corporation to take title to all patents both British and International arising from any government supported research. (It should be noted that British University Laboratories are supported by the Government and hence patents arising from their research pass to this National Research and Development Corporation). This Crown Corporation was authorized to negotiate royalty bearing licenses (both exclusive and non-exclusive); was given "drawing power" on the British Treasury with approval of

the Board of Trade; was authorized to undertake additional research by "grants" or "contracts"; was authorized to support any "development work deemed necessary to bring patents to commercial practicality"; was authorized to form subsidiary manufacturing companies to place patents on the commercial market where no licensees could be found. To date this British National Research and Development Corporation has not received enough income to cover the cost of its operations. Some 84 percent of the patents cause a net loss and between 1956 and 1960 over half of the income came from two patents. Most of the deficit arises from its invention development activities. Had the Crown Corporation Act limited it solely to disseminating information to industry of government-owned patents, to seeking out patent licensees and to royalty-collecting activities, it would not have incurred the losses arising from its development activities.

If a government agency should be authorized to grant exclusive licenses for a limited period of years, the period thereof should depend upon the complexity and the cost of the privately financed development program necessary to bring the patent concept to commercial use, after which the exclusivity would be cancelled and non-exclusive licenses granted to any applicant. The cancellation of the exclusive license should also be authorized at any time when it is clear that the licensee is not actively pursuing the necessary development work leading to commercial use. An exclusive license under a government-owned patent should never permit the licensee to put the concept "on the shelf."

Government agencies have given little attention to the question of "incentive." Practically all government research contracts "require" reporting of any patentable concepts arising during the course of the contracted research program. I should hasten to differentiate between "research contracts" and "research grants" such as are made by the National Science Foundation, where no patent requirements are included in the grants. If the government patent policy is to be a "title" policy, then it would seem equitable that some form of incentive both to the individual scientist or technician and/or to the contractor should be made available. The Atomic Energy Commission has been authorized by Congress to make certain awards, such as the "Fermi Medal Award," for outstanding scientific work in the Atomic Energy field, and also certain cash awards for patentable work done prior to the formation of the Atomic Energy Commission in recompense for the patents seized by the government. The Department of Defense and NASA have awarded certain medals for distinguished performance of duties. Under a gov-

ernment patent "title" policy and if some agency is to negotiate royalty bearing licenses, a small percentage of the royalty might be held out as the "incentive" to the scientist or to the contractor. This is an element in a successful joint program for administering the patents arising from faculty research in over a hundred institutions in the United States by the Organization which I had the honor of leading for over twelve years.

From the tenor of the recent Congressional hearings it seems that legislation looking toward some changes in government patent policy on inventions arising from government financed research and development may be enacted in the near future. Certain basic questions will have to be answered. First there is a fundamental question which has never been completely adjudicated. Does the government have a constitutional right to own patents? Although cases touching on this question have been carried to the Supreme Court, there has not been a court decision explicitly stating that the federal government has the constitutional right to own and to administer patented inventions. However, the *fact* is that the federal government *does own* and *does administer* patents.

Assuming that this will not be overturned, then the question arises, does the principle relating to a government employee who makes a patentable invention in the direct line of his stated job extend to cover government financed "contracted research"? This is the essence of the controversies between the present "license" policy followed by some government agencies and the "title" policy followed by other agencies pursuant to their organic legislation. Should the Congress so legislate, this would bar government agencies from following the "license" policy and all patentable inventions made during such contracts would become government property.

Then the question arises, does the government have the right to demand from the contractor a non-exclusive, royalty-free license to make and to have made for government use under any applicable patents owned by or licensed to contractor *prior* to the negotiation of the research contract. It would seem that here is a question of "taking property without due process of law," which should be clearly resolved.

Again, if the "title" policy is adopted by the Congress, then the question arises whether or not there is a real and legal difference between "contracted research" and "grants for support of research." In either case, the taxpayer's money is being expended and if the "title" policy is to apply to "contracted research" should it not also apply to "grants in aid" made from federal funds. There should be a clear cut statement on this point in any legislative enactment.

Another important question arises, assuming the issue is resolved on the "title policy" basis:—How shall government-owned patents be administered? Taxpayer's monies having been expended on the research and development programs from which the government patents arose, shouldn't the Treasury be recouped by reasonable royalties paid on any commercialization thereof by private industry, or should non-exclusive, royalty-free licenses be issued to any U. S. applicant. And, under this question of administration, should our government (under international patent conventions) take corresponding foreign patents and administer them as well as the U. S. patents? If we do not, it would seem possible for licensees under the corresponding foreign owned patents to enter into serious competition with U. S. licensees.

If the "title policy" administration question is decided upon the non-exclusive, royalty-free license basis, there is no serious administrative problem. No administrative machinery is required, in fact this entire aspect could be covered simply by the basic legislative enactment providing that all publisly issued government-owned patents are "dedicated to public use." I have suggested the addition of the phrase "publicly issued" so that government patents under secrecy classification would not be "dedicated" until they were "declassified."

There are arguments against the non-exclusive, royalty-free license under government patents. In brief they argue—who will take a non-exclusive license, expend what may be considerable money and effort upon bringing the potential products to commercial use, when the moment the products arrive on the market any competitor can get the same license. Of course, it may be that the first licensee owns or has an exclusive license under some underlying patent which would prevent any competition during the life of the underlying patent. Or it could be that the necessary development work would either produce a "process patent" or could be copyrighted. But, in general, the non-exclusive license even when royalty-free is not sufficient incentive to undertake any material development effort and cost. Also, the non-exclusive royalty-free license does not bring even the outside chance of any reimbursement to the Treasury for the original research costs. In general it can be said that the non-exclusive license policy increases the chances that many a patentable concept will lie fallow and not be brought to commercial utilization. While on this general subject of licenses under government- owned patents, it is axiomatic that the government would in every case reserve to itself as owner the right to make and to have made for its own use royalty-free.

If the legislation permits the granting of royalty-bearing licenses, either exclusive or non-exclusive, under the principle that the Treasury

should be recouped whenever possible for some proportion of the costs of federally supporting research, then major questions arise as to the administrative machinery to be established. Patent licensing administration is a specialized technical art in which the government agencies have had little or no experience. (TVA and Agriculture did attempt many years ago royalty-bearing licenses in a very limited field but gave it up when administrative costs exceeded royalty income).

Industrial research laboratories and the patent departments of their related parent companies have had vast experience in this field, primarily in negotiating cross-licensing agreements to avoid infringements of underlying or correlative patents. Many colleges and universities have either established their own foundations or have entered into patent administrative agreements with a non-profit foundation by which patents arising from faculty research are licensed to private industry. It is in these examples that the administrative art and personnel in this complicated field are to be found.

The recently enacted "Commercial Satellite Act of 1962" may well offer a prototype of legislation to organize a government corporation for the commercial licensing of government-owned patents. Such an independent corporation could prove conclusively whether or not a pool of government-owned patents arising from government agency generated and supported research projects could be licensed to private industry commercialization and produce a "net profit" which in turn could be utilized to assist in supporting government research through the National Science Foundation. To avoid the pitfalls encountered by the United Kingdom in the National Research and Development Corporation, any legislation should prohibit carrying government financed research patents through the commercial development phase (save of course in the fields of atomic energy and defense weaponry which would be supported by the respective agencies under their organic legislation).

Such a National Patent Corporation could take the form of a federally chartered non-profit corporation or foundation whose net income over operating costs would be returned to the U. S. Treasury to be applied as an offset to any appropriations made by the Congress for the support of the National Science Foundation or the National Institute of Health. It could be organized with a capital grant of say $5,000,000 which would be a "final" capitalization. If it could not produce a net income before this initial capitalization was used up, it would go into bankruptcy and the experiment would have been proved a failure.

I suggest this "stand or fall" method because I believe that placing

any such patent administrative machinery under any government agency would not produce the critical experiment to prove or disprove the concept. I know also that the present government portfolio of some 12,000 patents is comprised of many which because of the defense weaponry nature of much government research have a very limited, almost infinitesimal commercial potentiality. History proves, I believe, that any government operated agency once created is almost immortal —it goes on and on and is never critically evaluated.

Having headed a non-profit foundation which has for nearly thirty years successfully administered patents arising from faculty research in now over a hundred institutions, I know how risky such an operation can be—I know that out of a reasonably large portfolio of patents, it is absolutely necessary that a few be *highly* profitable in order to carry the costs of the remainder. I know that invention can repay research and leave a kitty to support more research, when the portfolio is prudentially administered without fear or favor.

I would like to believe that this Kettering Award has been given to me tonight for this record and also because of my deep and abiding interest in the work of The Patent, Trademark, and Copyright Foundation which has made such a remarkable impress on the many-fold problems arising in such complicated fields. To have been selected to join the outstanding group beginning with the "Boss" himself who have been given the Kettering Award is a sincerely appreciated honor. I thank you all.

FRIDAY MORNING SESSION

JUNE 21, 1963

ORGANIZATION-INDIVIDUAL CONFRONTATION

DIVISION A—ORGANIZATIONAL CONTEXT

(The session was opened at 9:20 a.m., Professor S. Chesterfield Oppenheim, Adviser on Research to the Foundation, presiding.)

PROFESSOR OPPENHEIM: Members, Guests and Participants of the Conference: As Research Adviser to the Foundation, it is my privilege to renew the words of welcome of Director Colclough to all of you yesterday and to extend greetings and welcome to those who have arrived for this day's session.

Unfortunately, some contingency has delayed the arrival of one of our chief actors in this symposium, Dean Spilhaus, but since he's flying from California we assume that perhaps he has been delayed, and we hope for his arrival at any moment. In the meantime, I'm going to get the ball rolling.

At the dinner last night I suppose some of you did have some consciousness about calorie control in consumption of food. But yesterday afternoon's session presented a rich array of diversity of topics and speakers, and I'm sure that all of us were not worried about mental calories, because that kind of weight in knowledge is something with which we can satiate ourselves without end.

This morning's session, as the program indicates, is devoted to the organization and individual motivation or confrontation in this general topic of fostering and rewarding invention.

In the absence of Dean Spilhaus, to whom I hope to turn over the function of moderating, I am going to start with the invited contributors.

I may say that when I was asked to introduce the moderator I knew this was a moment of self-discipline for me, because I'm instinctively as a teacher inclined to talk more than I should. And so I'm going to take advantage of this opportunity to show that my silence will really be golden, but the words that are coming are the real gold.

I'll begin with the first topic under Division A, Organizational Context, and it is my pleasure now to call on S. Blake Yates, Vice President of Research Corporation of New York.

Mr. Yates.

PART VII — INVITED CONTRIBUTORS

UNIVERSITY PATENT MANAGEMENT

MR. S. BLAKE YATES: Thank you.

Mr. Moderator—or should I say Mr. Acting Moderator—and Gentlemen: I am especially honored in having been asked to participate in this stimulating conference on "Fostering and Rewarding Invention in the Company, in the Government, and in the University."

My particular subject is "University Patent Management," or, as we prefer to call it around our shop, University Patent Administration.

Before going to the heart of my subject, it might be helpful to comment on the place of patents in universities. In other words, where do patents fit into the overall university activity?

As we all know, the primary function of universities is that of teaching and training students and of the development of new knowledge through research and experimentation. So certainly the primary function of a university is not to develop patents.

In order to achieve these objectives, universities strive to provide the climate, the atmosphere and the facilities for research.

So in that respect I think we can say that that is one concrete method of fostering and rewarding inventions.

The research activity is for the development of new knowledge, and any patents that may result from this endeavor are strictly by-products.

As you probably know, many colleges, universities and similar non-profit scientific institutions have established formal patent policies concerning the results of research resulting from their facilities and with their funds. In general, the patent policy provides for the faculty member or inventor to share in any income that may result from the patents. It is usually a division between the institution and the faculty member or the inventor.

This is another concrete way in which universities foster and reward invention.

Going directly to the problem of administration of university inventions, as you probably know, many institutions have established organizations for the administration of patents. Others have turned to Research Corporation for this service.

At the present time we have agreements with approximately 140 institutions. This represents a wide range from small liberal arts colleges to the very largest of the universities, as well as many non-profit scientific organizations, hospitals and similar institutions.

In general, these agreements are of two types:

No. 1, Research Corporation pays the inventor a fixed percentage of the gross income, and the balance is divided between ourselves and the institution.

The second type of agreement is identical with the first except that the income is divided between Research Corporation and the institution, and the institution pays the inventor his share.

In both cases the inventor's share is determined by the university.

In general, Research Corporation pays all the expenses in connection with the evaluation of inventions, obtaining the patents and exploiting them. The exploitation is usually through the medium of issuing royalty-bearing licenses to industry.

Certain unusual expenses, such as the cost of foreign patents and litigation to enforce patents, are deducted from the income before the division with the university. But the inventor does not participate in such payment of these expenses.

In all cases we strive to relieve the institution and the faculty of all the problems associated with patents. We simply tell them if they'll give us a disclosure of the invention we'll carry it from there.

As we all know, the administration of university patents differs in several respects from its counterpart in industry. First of all, the value of patents to universities differs considerably from that in industry. In some respects you might say that the values of patents to educational institutions are threefold.

First, patents may serve, along with publication in scientific journals, to establish dates of scientific contributions.

Secondly, they may serve to control the quality of products manufactured by licensees wherever this appears to be desirable.

And, third, patents may serve as a source of income.

The value of patents to industry, on the other hand, I think it could be said, lies almost entirely with the right to exclude others and for any trading purposes that they might have.

Another important difference in university patent administration and its counterpart in industry is that each university invention must be judged on its own merits without reference to improvements. When a university research project is concluded, the results are published, and patent protection may or may not be sought. In any event, the research program is rarely if ever extended for the purpose of developing improvement inventions.

On the contrary, in industry I think that a common and legitimate goal is to develop as many patents as possible and as many improvements as possible.

Many important university inventions have been covered by single

patents. I might cite as an example of this the recent invention made at Columbia University by Professor Townes of the maser and laser. That invention is covered by a single patent.

I think it is fair to say that, if that invention had been made by an industrial firm the basic invention would have been followed by numerous improvement patents.

The point I am trying to make is that in looking at inventions emanating from universities we have to look at what we have in hand and not what could be developed over a period of years if we had a team of people to put on it.

In the administration of university patents we turn to industrial firms, and we look for firms, first of all, that have good R&D departments as well as good manufacturing and marketing facilities. We try to pick out the best firm after all the facts are developed in connection with the invention. We, of course, look for people who are not only capable of manufacturing and marketing on a national but also on an international scale.

Most of the inventions we get from educational institutions, as you probably know as well as I, are in the so-called test tube stage. Universities don't build pilot plants; they are not prepared to guarantee yields. So it is imperative that we find someone who is in a position to do the considerable further development work that is necessary in order to bring the invention to a commercial stage. In fact, many of the inventions that we patent actually remain in the R&D departments of industrial firms for a period of years before they become commercial successes.

Although we have a large number of patents, I still consider our sample fairly small, but in a recent analysis of the five or six hundred patents that we have in our portfolio at the present time, and looking back for some 25 years, it appears from the time we file a patent application that it's about seven years before the invention is commercially successful, if ever. That is the average time lapse between the discovery, say in a university, in the inventions we handle, and when the invention is commercially useful. And I'm talking only about the cases that are successful.

As far as handling the disclosures, I suppose we go through essentially the same steps that people in industry do. We don't maintain any patent attorneys on our own staff. We use outside attorneys in private practice. We have a small staff, engineers, chemists, and one man trained in physics.

When we receive a disclosure, we review it, and if we don't know of any prior art that would anticipate it, and if it appears to be some-

thing that would be commercially useful, we turn it over to an outside patent attorney for novelty study. If it passes this test we proceed with the filing of a patent application.

In many instances, even before we file a patent application, we will turn to someone in industry to see if there is any industrial interest in the invention.

I might say that our relationships are excellent with industry, one reason being not because we charge low royalties, or anything like that but we make it quite clear we will rely entirely on our patent rights, so there is no problem of a confidential relationship. We don't have anything to offer except the patent rights. We don't pretend to have any manufacturing know-how. So we can go on that basis, and we find that industry is willing in most cases to take a good look at anything we present, even if we haven't filed a patent application.

Of course, if industry develops an interest, the next step is to work out a mutually satisfactory license agreement, and by the very nature of the inventions that we are handling this requires in many cases a period of exclusivity. This period of exclusivity varies considerably, but it is somewhere to five years or even longer in some cases. Exclusivity is granted to induce the licensee to do the necessary development.

Rarely ever do we get an invention that is such that everybody is knocking on our door and saying, "We want to market this." It has to be tested and proved and developed before it is ready for commercial sale.

As to other problems in the administration of inventions, one important problem, of course, is enforcing patents. On this score I feel we have been very fortunate. In our 50 years we have actually filed only three infringement suits.

In closing I might say a few words about Research Corporation. We are, as some of you know, a small foundation that was organized in 1912 on the basis of Dr. Cottrell's patent on the use of static electricity for separating solids from gases. This was a fairly significant discovery at the time.

It didn't lend itself to licensing to other people. People who were interested in electrical precipitators wished to buy them rather than to obtain a license to manufacture them. So although our people started out at that time with the idea of being consulting engineers and licensing this process, they didn't get anywhere because the invention didn't lend itself to that approach.

So they went into the business. A tax-paying subsidiary, Research-Cottrell, Inc., still is a leader in the precipitation business.

But that's the only invention that we have ever exploited ourselves. The others have been licensed to others.

Of course, the original patents have long since expired, but the process is still used now after a period of about 50 years.

Our income—all that we derive from the administration of patents for universities and also from our Cottrell subsidiary—is given out in the form of grants. Historically we have limited ourselves to the physical sciences except for a small fund in nutrition. Until about five years ago these grants were primarily of the so-called project type. In other words, a professor would outline in some detail what he wished to do, and he would apply to us for a grant, and a grant was awarded on that basis.

But in the last five years we have given a number of unrestricted venture grants. That is, some scientist will come to us or we will approach him and offer to support his work. A typical grant has been about $7,500 a year for three years without any outline of what he proposes to do. He's free to change his course of research any time he wishes.

Another approach that we have used in the last few years is to give a grant to a department or even a college to strengthen the research activity and the teaching of science. This is the type of grant we are emphasizing currently, although we still make some project grants.

There is one final word I might say about our grants program. There are no patent strings attached. Our grants are for basic research, and they rarely ever result in any inventions. If they do, the university and the professor are free to pursue whatever course they wish. The only thing we ask them to do is to publish the results of their work as soon as possible. And if they wish to patent, that's entirely up to them.

Thank you very much.

(Applause)

PROFESSOR OPPENHEIM: Thank you very much, Mr. Yates.

Our next invited contributor is Mr. John W. Simpson, Vice President of Engineering and Research, Westinghouse Electric Corporation.

It is my pleasure now to call upon him.

Mr. Simpson.

CORPORATE RESEARCH MANAGEMENT

MR. JOHN W. SIMPSON: My function here today is to represent—in the sense of a sample, not necessarily as a spokesman for—corporate research management. My remarks are based on the experience in Westinghouse. While I believe that, in general, our situation may be

typical of large, technically-oriented corporations, I acknowledge readily that attitudes and policies differ from firm to firm.

In the time available to me, I would like to outline our philosophy with respect to inventions, describe broadly our patent disclosure and award system, and finally describe the direction of possible changes in that system.

To a corporation, a patentable invention means basically one thing: a potential source of profit. Although its leading edge may make itself felt in various ways—for example, an offensive patent, a defensive patent, or even a prestige patent—it has real value to the corporation only if in the final analysis it influences profits.

As such, it must be viewed in much the same way as any other business commodity, for, although the product lines differ from firm to firm, the true business of any manufacturer is not the making of hardware, but the making of money, which, after all, is the basis of our free enterprise system.

I fear that a good many people tend not to appreciate this hard fact.

Also, too many people too often view the corporation as a remorseless machine which, carrying over the attitudes of an earlier day, consumes and exploits its employees, with only a poorly-sensitized conscience as its guide.

I submit that such thinking reflects an over-insulation from the realities of corporate life in these days of unprecedented rates of technological advancement.

Even apart from those dictates of corporate and individual conscience which insist that equity be served in the rewarding of employees' efforts, there is the ever-present pressure of competition for those people with valuable talents.

This factor alone, even if it is the sole factor acknowledged, serves to ensure a considerable measure of equity to the employee-inventor, for no company which ignores it will be able to attract or to hold for very long the kinds of people who will enhance its profits through their creative efforts.

The extent to which this minimum fair treatment is exceeded will, of course, vary from company to company. The fact of such variation is an indication of the judgment of different managements in protecting the interests of the stockholders.

In light of the earlier point—that patents are a business investment—I truly believe that a corporation which is legitimately subject to criticism for inadequately rewarding inventiveness has miscalculated the value of good patents, but has probably done so in over-zealously safe-

guarding the stockholders' money, not out of callous indifference to the reasonable expectations of the inventor.

I believe this because I, too, am acutely conscious at all times of the fact that our performance as management is measured almost exclusively in terms of profit, of dividends and value of stock, and we must preserve the indispensable ingredient of stockholders' money if we are to continue in business. All business decisions, involving patents and everything else, must be made with this consideration foremost.

This brings me to my second point, which is the manner in which Westinghouse endeavors to encourage and stimulate the disclosure of ideas by employees.

At the time of employment, we require our people to assign to Westinghouse "title to all inventions, improvements and discoveries" made or conceived while employed by Westinghouse and which fall within the existing or contemplated scope of the company's business. Prior inventions are excepted, but may be the subject of negotiation.

There is no hard and fast rule as to who must execute such an agreement; certainly we include engineers, scientists, and others who will be in a good position to innovate because of the nature of their work, the degree of their access to technical information and data, and also their working relationships with engineers and scientists, particularly in laboratory and development groups.

Although everyone makes suggestions on how to improve administrative efficiency, I can safely generalize in saying that useful inventions and discoveries come almost exclusively from our technical people. These are the ones with whom we seek patent agreements.

Although this assignment of title to patents is sometimes roundly condemned, the consensus is that it is justified by reason of contributions which the company makes: training, equipment, guidance, supporting service, and so forth.

A recently published survey of 70 inventors, who among them hold 453 patents, with another 209 patents applied for, shows a high degree of acceptance of this principle, so long as the assignment includes only those patents developed "using employer's facilities and/or pertaining to employer's product."

The purpose of our disclosure and award system is twofold: to encourage and to reward. Judging from various writings I have encountered, the reward aspect is probably the most sensitive area insofar as the inventor is concerned. And this is understandable, because it has a direct bearing on his income.

With a few rare exceptions, it is virtually impossible to predict the ultimate value of an invention at the time of its disclosure. Therefore, we are confronted from the outset with this choice: to reward only those inventors whose efforts do in fact result in increased profits, or to reward those inventors whose efforts show potential for increased profits, and with progressive rewards if, in fact, the early promise is realized.

This is not an easy choice. Even though considerations of equity might appear to weigh heavily in favor of the former—rewarding based on performance, as for example through royalty payments—there are other factors which come into play.

The principal argument in favor of the latter alternative—progressive reward based on successively better evaluations—is that it permits an earlier tangible return to the inventor. A typical invention might take five or more years to begin to demonstrate actual value and, assuming a royalty system, to produce added income to the inventor. The progressive system permits, at least in Westinghouse, three successive awards up to that same point in time, with the possibility of a major award once the value has been truly confirmed in the marketplace.

With the possible exception of those few highly prolific inventors who, over the years, generate inventions at a rate which fills the pipeline from idea to market and who are therefore less concerned with the immediacy of their reward, our experience has been that our people would rather receive progressive rewards which occur as close as possible in point of time to the fact of disclosure.

Although I cannot argue that the distribution of the awards would be identical under the two types of systems, we have elected to use the system which best accommodates the preference of the overwhelming majority of our engineers and scientists.

As to the effectiveness of our system, that is far less susceptible of measurement. In examining the records over the last 38 years, back to 1925, the single most important step has been the instituting of our disclosure system in the late 1930's. Successive innovations in the award program over the years have served to bolster the productivity rate and to check the tendency toward slow but steady decline.

Overall, we look for an average of one meritorious disclosure from each engineer and scientist each year.

This brings me to the final stage, which concerns the direction of future changes in our system. From the standpoint of the company, we want to generate more inventions, not for the sake of productivity statistics, but because, as I indicated earlier, inventions lead to patents which are items of value having a favorable influence on profits.

As of this moment—and I don't know whether or not the situation is peculiar to our company or to our industry—our inventiveness seems to be declining, at least to the extent that inventions per man are the measure. The productivity rate per se does not worry me particularly.

For one reason, the decline in productivity has been largely offset by the fact of a gradual increase in the total number of engineers and scientists in the company.

Another reason is that, at least in our recent experience, our most worthwhile advances have resulted from massive technical assaults in which the efforts of hundreds or even thousands of engineers and scientists have been focused on specific objectives.

An excellent example of this is the field of nuclear reactors. The range of problems that had to be solved was simply fantastic, involving virtually every physical science and an unprecedented appreciation of the interplay between materials, components, and sub-systems, all in the context of the ultimate use, whether in submarines or in central station plants.

Having worked closely with these people and their problems, I know that the skill and creativity which yielded ultimate success were of the highest order.

However, the inventions per man figures do not truly reflect this, probably because the majority of contributions were merely incremental parts of the much larger whole and, as such, not properly describable as inventions.

To the extent that we are more and more inclined to concentrate our efforts on problems which are not susceptible of solution by independent efforts of individuals or small groups who have limited resources, I would expect that our rate of inventions per man would tend to decrease.

However, if the decline in disclosure rate foreshadows a reduction in the number of truly good inventions by our people, then I have cause to wonder whether or not our disclosure and award system is really doing the job. Quantity will hardly take the place of quality. Therefore, I must assure myself that whatever system we employ yields the maximum possible number of important inventions.

We are considering several changes within our same basic system. These relate to a further shifting of the scaled rewards to a point closer in time to the actual disclosure, and an adjustment in the awards for multiple inventors. However, these are properly termed modifications rather than radical innovations.

Although each modification will represent an improvement, there

are no inherent features which tend to ensure that more good inventions will necessarily result.

In other words, I have reached the conclusion that our system is about as good as it is going to be insofar as the evoking of good inventions is concerned. Increasing the awards at the various stages might bring forth more disclosures, but, as I indicated earlier, I am not overly concerned with total numbers independent of quality.

We are, therefore, considering another approach, one which we hope will complement the disclosure and award system. There are, for each of our product lines, certain limiting conditions which act as a boundary on our performance. For one product it may be the corrosion of materials; for another it may be the heat transfer problems; for still another it may be a competitor's patent. This suggests that for each product line there is probably at least one major invention desired.

A second consideration is that work tends to become compartmentalized. For example, the people working on transformers are generally not current on the boundary problems of those working on turbines or radar, and vice versa.

Another way of stating this is that one group tends to become insulated from the problems of another group, whether they be separated by miles or the thickness of just one wall.

Recognizing that this situation does exist in a large, diversified company, I believe that a deliberate program to identify those most desired inventions and to publicize them among all the technical departments would tend to provide a stronger technical communications link at the engineer and scientist level. Hopefully, novel solutions would result. As a minimum, on some problems we should uncover solutions which are already available through technology known to or developed in another segment of the company but which heretofore has not been applied as broadly as it could be.

We have much to do before we can put such a scheme into effect. For example, we must acquire a certain finesse in describing boundary problems tersely, so that the compilation thereof is not so bulky and tedious that it discourages the voluntary interest which is so vital an element in such a scheme.

Personally, I strongly suspect that compulsory definition of these so-called boundary problems will serve to refocus attention on the areas of endeavor where success will be most profitable.

In effect, this will require a step back from today's immediate problems—the trees—in order to reappraise the larger total problem—the forest.

I will close now with a brief restatement of our position:

1. We look to inventiveness to provide solutions to problems and, thereby, to increase profits. A patentable invention is the preferred solution, for, among other things, it either assures us the exclusive use of the fruits of our labor or else provides additional income through licensing.

2. We reward the disclosure of inventions in a manner and on a scale which is satisfactory to our engineers and scientists. Failure to do this would be to mortgage our future, for we know that survival and growth depend on the talent we can hire and hold.

3. We are striving constantly to improve our disclosure and award system. We are always prepared to consider fresh approaches to the task of promoting solutions through innovation rather than through imitation.

Thank you.

(Applause)

PROFESSOR OPPENHEIM: Many thanks indeed, Mr. Simpson.

It has been my privilege to know personally over the years our next invited contributor. He possesses a happy combination of scholarly background and corporate experience, having been Professor of Electrical Engineering at the University of Pennsylvania, and later translating his knowledge into practical applications.

It is my great pleasure to present Dr. Irven Travis, Vice President of Burroughs Corporation of Detroit.

R&D DIRECTION

DR. IRVEN TRAVIS: Thank you very much, Mr. Acting Chairman, or should I say "Oppy."

Ladies and Gentlemen, it's a great pleasure to be here with you this morning.

A research and development program consists of two things, a set of objectives and a mechanism for achieving those objectives. The mechanism is the plant, the organization, the personnel, and so forth, to carry out the program. A research machine, as it were. And let me describe first an ideal research machine. This is what all the books say:

Its research director has done scientific work himself in the past and has earned his position on his scientific merits. This is known by the research staff, and, therefore, there is general respect for overall guidance. The building is new, air conditioned, had adequate provision for private offices associated with the laboratories. Laboratory equipment is available on requisition for any purpose whatever. The loca-

tion is suburban, near good schools, but close enough to a large city to take advantage of the cultural and advanced educational facilities afforded by the city. The organization is set up so the scientific personnel are relieved of administrative detail. Promotion and salary are based upon merit, with scientific capacity being given equal weight with management ability. Salaries are competitive—at least as great as offered by other companies for similar jobs. Peripheral benefits include family hospitalization with major medical, generous vacation, holiday and retirement programs, educational assistance consisting of both financial and contribution of time. Professional achievement is given full recognition. Publication of papers is encouraged. Personnel are given free time to attend conventions and to participate in scientific and technical societies. Special bonuses are paid for exceptional technical achievement.

Well, now, how can you lose? (Laughter)

With the talent of a team like that, in such an ideal environment, and with satisfactory policies, one might ask the question: Is not success assured?

Well, I said at the outset there are two features. There is the research machine, and there is the operation of that machine.

It is a comparatively simple matter to build a research plant and to staff and organize that plant. The effective operation to achieve profitable results for the company is another matter.

Before proceeding further, let me define research and development in the sense in which I use these words. There is curiosity-oriented research and development aimed simply at the extension of the boundaries of human knowledge without reference to possible future use, and there is need-oriented research which is aimed at the requirements of the corporation supporting the research to increase the profitability of that company.

It is this second aspect, need-oriented research, in which we are interested here.

There are four facets of research management which are pertinent:

1. The motives, the objectives, the need-oriented aspects of the research as viewed by management.
2. The constraints and conformity necessary on the part of individual researchers to operate within a framework which provides assurance that desired goals shall be attained.
3. There is the individual as an original, creative thinker who has his own conformity tolerance level.
4. And then there's the individual with his own set of values, hopes,

ambitions and dreams of personal achievement—in short, what he wants out of life.

It is in the effective reconciliation of management profit goals and attendant constraints, on the one hand, with the individual patterns of thought and personal interests, on the other, that research operation can be fruitful.

These two facets need not inherently be in conflict. It is only necessary that each be viewed with proper perspective and that communication and willingness to understand be good.

When the technical program has been spelled out in detail by top management and passed on to lower levels, the "why" must go with it. Communication to all levels of the total picture is necessary. Never talk down to the research and development man. Never lose an opportunity of broadening his perspective concerning the way his efforts may be translated into corporate profits, whether it be this year, next year, or in the years to come.

He must understand management objectives in the broadest sense and must understand why he is working on today's assigned tasks. He must understand how his own creative modification of these tasks can better align his results to the profit needs of the company. He must understand how his results, together with companion results of his colleagues, would be exploited by the company, and he should have a good idea of when and by whom.

With this type of understanding on the part of the individual, the need for constraints by management tends to fall away, and research direction is a very simple matter.

To manage technical talent, it is necessary to know something of the nature of the technical man who is to be managed. Ordinarily individuals are not alike. Creative technical individuals are even less alike than other individuals. Therefore, it is quite obvious that to try to establish a generic profile of research men is not meaningful except in the most superficial terms.

There are some general statements which I think have a certain amount of validity, and I will make a few such statements.

Whatever more tangible rewards he may receive, if the research man cannot take pride in his technical attainments he will be unhappy. He wants to know what is expected of him, but he does not want to be told how to do it.

He is intolerant of petty obstacles. Rigid control of his time or delays in the approval of purchase orders irk him exceedingly.

He will not cheerfully accept counsel from a superior unless that counsel has his complete technical respect.

Furthermore, each technical man has a certain level of creative talent. If he is creative, he does not think along conventional lines. The more creative he is, the more he thinks he should do his own planning and the less constraint he is willing to accept from others.

It is in this question of degree of constraint that we approach one of the most critical aspects of the relationship of the individual to the rest of his team and to his superior. If an individual is keenly interested and highly talented in a certain narrow technical field, you can be sure that whatever end objective is set for him it will be accomplished by his pet technique.

If his field is optics and you ask him to develop an automatic computer, his computer will not be of the old traditional mechanical type nor the newer exciting solid state type; it will be optical.

It is in the process of matching the task to the man that success or failure will be achieved.

The team leader should not try to change a creative individual. The likelihood of success is negligible. And if he were to change, it would be at the expense of destroying his creative talent.

Now, in any research and development program there is a spectrum of work ranging from very fundamental additions to human knowledge to the design of a product prototype. At the most fundamental end, objectives are understood only in the most general terms. Also, errors in obtaining these objectives are tolerable. A basic research result, not quite on target, is still likely to have valuable uses.

At the other end of the scale, however, the development of a product prototype, unless the prototype is manufacturable and salable at a profit, the money spent is almost a total loss.

It's clear that the rigidity of constraint in the first instance is minimal and that the opportunity for creativity is very great. In the case of the product prototype, the objective is quite accurately defined. Constraints to conform to the definition must be rigid, with the result that little opportunity for creative thinking exists.

Personnel must be assigned in this creativity spectrum in accordance with their natural inclinations. There must be a close match between the requirement for constraint and the willingness to be constrained.

The man who wants to develop and design for a specifically defined objective using proven principles and who is assigned to a job loosely defined and requiring great original thinking will be ineffective. He will try, but he will probably fail. He's unlikely to produce well enough to justify retaining him in such an assignment.

On the other hand, if a highly creative scientist is given a job

hemmed in by technical decisions already made for him, he will not even try. He will seek reassignment, and, failing that, he will quit.

In my opinion, there is no greater single source of frustration which compromises the effectiveness of the individual than a mis-match of the creativity of the individual and the creative opportunities of his job assignment.

So much for generalities. I have emphasized that in management of research each individual must be treated as an individual. It is quite futile to talk about individuals in the plural. One really must talk about an individual in the singular.

And in addition to the talent a man brings to his job, the talent which makes him intellectually qualified to contribute to research and development, he brings his emotions. He brings his enthusiasm, his zeal to accomplish. These are underlying forces peculiar to himself.

Every man wants something. He has a requirement or a profile of requirements necessary to his happiness. The more uncommon he is—and uncommonness is necessary in a good researcher—the less he will behave like a statistic. And sooner or later he will get what he wants or perhaps adjust his desires and settle for a reasonable approach to it.

What is it? It might be symbolic. Is it a key to the executive washroom? It might be materialistic. Is it a Cadillac or a home on Long Island? It might be a sense of having served. Is it the daily satisfaction of having added something to man's knowledge, the feeling that he as a part of team effort has increased the dividend to the stockholders? Or it might be a personal badge of achievement. Maybe he only wants a Nobel Prize!

Whatever it is, his superior in line of command had better find out what it is and give full weight to it in determining his assignments.

There is a song, "Getting to Know You, Getting to Know All About You." First-line supervision ought to apply that, in perhaps less romantic connotation than the lyricist intended, but he'd better get to know his man. All too often supervision calibrates the technical capacity of the scientist or engineer and lets it go at that. Depth of appreciation of the whole man is not easy to acquire, but it is vital in determining work assignments.

The dilemma is that scientific research programs must be conceived and carried out by scientists, and scientists are more interested in natural science and mathematics than in psychology, human relations and motivations—and yet the freedom from constraint required by the creative scientist makes it more necessary to understand him completely enough to pre-audit his probable course of action than in a situation which is more closely controlled.

There is a built-in difficulty here to which I think there is no simple answer.

I'd like to illustrate the impact of individual reaction by outlining briefly two case histories.

Bill joined our company in 1949 at the age of 23 at a salary of $4,500. He left in 1959 when he was making $17,200. He was happily married to a former fellow employee. They have two children. He has published a lot of papers. He had personal recognition. The company sent him to an international conference to present a paper in Europe. His wife went along. They had a ball.

He worked on small projects, then on bigger projects. His technical capacity was so great that he became a senior consultant so as to spread his considerable talent over a number of projects.

But he was always making somebody else's project a success. Professional technical achievement was not enough for him. He didn't have to worry about budgets, schedules, personnel problems, but he wanted to.

When I heard that he was planning to leave the company, I asked him to come to Detroit to talk it over. And the most significant statement he made in the four-hour luncheon conference was, "What I most want to do is to counsel people, to match them to functions in an organization of my own, just as you are doing now."

Another company had offered him a job as a project manager on a project of considerable size. There was no immediate opportunity in our own company for such an assignment. And, furthermore, we didn't recognize early enough the depth of feeling he had about project responsibility.

We had provided the salary, the prestige, the technical freedom, all the standards in the book, but we hadn't really understood him in giving him what he wanted.

I'm not lamenting this. I don't think it was a bad thing for either Bill or the company. It was not an unhappy result. We got ten years of his creative talent, from 23 to 33, and he got good job training and a better job.

Another case. Joe joined the company in 1950 at age 28, at $7,000. He had his master's degree. He got his doctorate through our company-sponsored educational program. He developed through normal channels of advancement to department manager in 1960. At that time he was getting $18,000.

He was a member of many technical societies. He wrote a number of papers. A number of patents were issued to him. He ran a good

department, and he had all the satisfactions that the other boy, Bill, had yearned for. And he was very happy on that score.

The technical output was original and voluminous, but for some reason or another his output never seemed to get into products. Many of his technical ideas got as far as to be included in a product proposal, but they never got on the market.

In my opinion, this was a matter of chance, and management felt that no criticism was due. But he left the company. There were some secondary personal reasons, but I don't think they were important.

I think the fundamental reason that he left was because he felt that after ten years he hadn't had enough impact on the corporation's profits. He was more demanding in this instance than any profit-conscious management ever thought of being. That's why he left.

Well, both Bill and Joe left with the blessing of the company. Candidly, I think turnover of this kind may be good. Perhaps it is good policy to bring in at lower levels of the organization much more technical talent than can be accommodated through promotions within the company. If during ten years of service a man can make important contributions to the company and develop himself to assume greater responsibility, then it may be good that he sometimes finds that opportunity in another company.

Efficiency of a research organization is like efficiency of anything else—the relationship of output to input. The output is profit or technical achievement, and the input is dollars. And each of these can be measured against the common parameter called control.

Financial control is well understood. Technical control is less well understood.

It's clear that if you don't control at all you'll have a maximum amount of expenditure, and, as you control finance, expenditures come down more or less in a parabola and become asymptotic to a certain minimum beyond which penny pinching can't save you any more money.

So control against dollars is a parabola.

Now, if you plot technical output against control, you will have an intercept at the Y axis a little way up, because without any control scientific people will produce something profitable, and as control is increased the curve goes up to a peak. And then when you have reached the tolerance level it falls off fast, when you try to control people more than they are willing to be controlled, and still expect them to be creative.

So I think it's clear that these curves indicate a maximum of output

over input with a fairly light amount of control reasonably well down the hyperbola but not too far up in the other direction.

So I think the lesson we learn from this is that you control with a light touch and that if you match the man to the job in the first place, no more than the lightest form of control is required.

Thank you very much.

(Applause)

PROFESSOR OPPENHEIM: Many thanks to you, Irven.

Has Dr. Spilhaus' plane landed by any chance?

(No response.)

Well, you'll have to tolerate a synthetic moderator for a little while longer.

Now, as we know, law and life touch upon all of the physical and social sciences. When I see the words "legal guidance," as a teacher of law my ears immediately tune in, and I know all of you will also tune in to our next invited contributor, Mr. John Hanifin, Manager, Domestic Patent Operations, International Business Machines Corporation.

Mr. Hanifin.

LEGAL GUIDANCE

MR. JOHN HANIFIN: Thank you.

Ladies and Gentlemen, those of you who were fortunate enough to attend yesterday's session heard two interesting observations, one from Mr. McLean, who expressed the opinion that large industrial organizations are not as productive of invention as smaller units. This was somewhat confirmed in the later talk by Mr. Don Schon observing in his study of the textile industry that the best inventions in recent years had come from individuals, small companies, or from sophisticated companies in other industries. The outside industry referred to was the aerospace industry.

What is the reason for this? Has it come to be that the traditional rewards of increased salary, promotion and recognition within the company are not enough?

This problem is being looked at in some rather high places. Senator McClellan has been quoted asking the question, "Should steps be taken to restore the patent system, at least in some measure, to its traditional role of rewarding the inventor?"

Recently a bill has been introduced in the House, H.R. 4932, to amend the Labor Relations Management Act of 1947. This bill would make it unlawful for any employer to require any employee to agree to assign patents to him as a condition of employment.

The bill, I understand, is not apt to be reported out of committee, but it may be an omen of legislation yet to come; that is, the patent system will again assume the role of primarily rewarding the inventor rather than the corporation or the organization to which the patents or inventions are assigned.

In other words, the reward systems that we are here discussing today may not be voluntary in nature in the future.

In my own company, a number of incentive programs have been inaugurated. Some are directed to patents, and others have different primary objectives but do have an effect on our patent operation.

The first two that I will discuss are not unique but I will mention them just to complete the picture.

One would be the outside submission program, wherein outside individuals, i.e., individuals not employees, can send suggestions in to the company for consideration. If the suggestion is adopted payment for use is made. Many corporations have such a plan.

The second program we have is an inside suggestion system, wherein our own employees can submit suggestions to the corporation for consideration. If the suggestions are used, appropriate rewards are given usually based on a percentage of the saving that results through adoption of the suggestion.

A little over two years ago we adopted an invention award plan. This plan has two aspects, one for quantity and the other for quality.

Under the quantity aspect, every invention accepted for filing of a patent application or for publishing earns points. (Many of our inventions are published in effect dedicating them to the public, and also aiding our own freedom of action.) The patent application under the plan is worth three points, the publication one point.

When a man has amassed a certain total of points he receives a cash award. The first level or plateau of points is 15 points and an award of $1,000 is given. As an individual amasses additional points, and reaches specified plateaus, additional awards are given.

Referring to the quality aspect, each company division makes awards of $1,000 each to those inventors in the division who develop an invention rated as outstanding. If there are co-inventors, each inventor gets a $1,000 award.

Some of the inventions that receive outstanding awards are recommended for special consideration by a corporate award committee, and there is no monetary limit on the amount that may be awarded for the corporate award.

To date we have had a number that received these special or distinguished corporate awards, the highest award being $40,000.

The next program I will discuss is an outstanding accomplishment award which is for those contributions that are not patentable but nonetheless have considerable value to the corporation. An example might be an engineer who takes a machine developed in a laboratory and does an outstanding job in getting the machine into production. He may not have contributed anything of a patentable nature but, nonetheless, the job is outstanding and an award is in order.

The next program, which is rather new—it's only a few months old but one that I am quite intrigued with—has been the appointment of IBM Fellows. Here prolific inventors, those who have a proven flair for invention, have been relieved of all responsibilities except to work on their own specialty. They receive a budget each year for supporting people, technicians and the like. And yet these IBM Fellows have no instruction as to what they are to work on except their own specialty. In other words, a man who is a specialist in optics should work in optics. A man who is a specialist in print mechanisms will work in print mechanisms.

We hope that the unusual freedom that is given to these IBM Fellows will result in even greater innovation on their part.

Now, in all this we have one problem, which from a legal point of view is rather difficult to answer, and that is with respect to inventions where the U. S. Government takes title. There is a question among patent attorneys as to whether or not it is legally ethical for a corporation to file patent applications on inventions where they do not have title. I suspect that this question will have to be answered by an ethics committee of the American Bar Association or some such organization to provide the necessary guidance.

Now, what are the results of this incentive program?

Well, I'm sorry to say that it's really too early to tell. Our invention award program, two years old, has resulted in much greater volume of invention disclosures. We have had an increase of 39 percent. The general opinion in many areas is that there has been no improvement in quality, but in one critical area, to wit, our Research area, the general opinion is that there has been an increase in quality. We are optimistic that the program will bear fruit in the other areas of our business.

More time is needed to evaluate the real success of the overall program. It may be that other programs will have to be tried and it may be that organizations will be forced into some programs by legislation.

However, for now, we are very optimistic and hopeful we have found a partial answer to the problem of the large corporation being as productive of invention as the smaller groups.

Thank you.

(Applause)

PROFESSOR OPPENHEIM: Thank you indeed, Mr. Hanifin.

I know we all recognize that the adage "the last shall be first" might have special application here, because I realize that, whatever order of presentations might have been determined, without invention there would be no need for legal guidance, R&D direction, corporate research management, or university patent management.

So I know we are all eager to hear from Mr. Sylvan O. Greenlee, Director of Research and Development, Guardsman Chemical Coatings, Inc., in Grand Rapids, Michigan.

Mr. Greenlee.

INVENTION

MR. SYLVAN O. GREENLEE: Thank you, Mr. Chairman.

I am not among those who believe that scientists are a special breed who must be managed in a different manner to that of handling other groups. There are those who have spent much effort in writing "interesting reading" reports about those few scientists who like to act differently, and such writers would have much to lose should they be required to admit that these stories would apply equally well to a similar percentage of other professional groups. It appears that these "special handling techniques" have passed through a cycle and are returning to normal techniques.

One needs only to list a group of ten or 12 outstanding scientists and examine their characteristics to find a spectrum of personalities not unlike a group in other professions. Can you imagine a Charles Kettering, a James Conant or a Roger Adams doing research on an isolated sland—an environment which many people still like to picture as being ideal for a scientist? If all scientists had the salesmanship and management qualifications of these three gentlemen, there would be little problem of their climbing up the management ladder.

Salesmanship is the most common characteristic in promotion of men in almost all walks of life. It is likely that there is about the same percentage of good scientists who would have made good salesmen as there are good salesmen who would have made good scientists. This puts the scientists at a disadvantage as a group. The problem then becomes that of developing techniques of giving the scientists equal opportunity with that given, for example, the sales people, even though the fruits of their work is more difficult to quantitatively assess and even though many of them are poor salesmen.

It was fairly common 20 to 30 years ago to hear company manage-

ment statements such as where the company would go in the future would depend largely on their sales division. Today company managements are more likely to say that their company growth is about equally dependent on the sales and the research and development divisions.

Some authorities on describing the management of researchers feel that creative minds would be poisoned and teamwork would be strained by the use of financial incentives—I strongly doubt this belief. It is not too difficult to develop financial incentive plans to tremendously increase sales productivity as individual performance can be readily measured. If a similar incentive plan could be developed for scientists there would be realized a stepped up productivity at least equal to that shown by sales incentive plans.

While stepped up performance of sales and research and development are probably of comparable importance to the competitive position of a company, it is my opinion that progress and security of civilization as a whole would benefit much more from acceleration of the research and development activity. What is good for the creative scientist professionally is also good for his organization and his country. Both the company and the government should then be extremely interested in the development of incentive plans covering scientific activity.

There are creative thinkers in all vocations. The creative people are not more intelligent than other similarly trained people in their profession, but they have special temperaments which enable them to use new tools more purposefully to solve problems.

Among highly trained researchers there are probably no more than ten percent who are truly creative. Since drive plays such a big part in creativity, a good incentive plan should enlarge this percentage and tremendously increase the productivity of each creative individual.

Profit sharing plans affecting all employees of a company have done wonders for the company progress. However, these plans do not serve to give special incentive to the creative scientist as he only has to look around him to see mediocre performance and creativity being equally rewarded.

There are some people who feel that highly creative people are not good members of a team. A few are not. Again write down a list of ten or 12 outstanding scientists whom you know, and you will find most of them have been outstanding team members.

Take a look at a highly productive research team in your own organization, and you will surely find one or two individuals who stand out in creativity. Yet they are good members of the team.

How can we locate these individuals to apply special incentives to

them? There's never been a time when it was more important to get the most from our creative scientists.

A study by the Industrial Research Institute some time ago resulted in the following listing, in decreasing order of importance, of methods of motivating creative scientists:

1. Provide recognition beyond salary, such as praise, publicized accomplishments, titles, and cash bonuses.
2. Provide adequate communications into company objectives, policies and problems.
3. Create professional environment, elevating and protecting dignity of scientists through publications and attendance of scientific meetings.
4. Provide inspiring technical leaders who are themselves recognized creative individuals.
5. Provide freedom to help select assignments.
6. The technical leader should develop close personal contact with scientists under his direction.
7. Apply pressure directly by creating atmosphere of urgency.

Another similar list worked up by the same Institute, in which the laboratory workers themselves listed their most compelling reasons for increased creativity, follows:

1. Substantial salary increase.
2. Promotion with increased responsibility.
3. Increased opportunity to select their own problems.
4. Additional assistants.
5. Opportunity to attend scientific meetings.
6. Flat bonuses.

Money or recognition is invariably at the top of such lists in the minds of scientists, and when you consider the home, the car and the standing in the community, money becomes a very important part of the recognition.

Even if the creative individual pays little attention to his salary, his wife will. She is an important member of the team.

Several research organizations have done a good job of establishing so-called "parallel ladders" of advancement for scientists through either supervision or continued scientific work, and many of those are working well.

One setup established, or a typical setup, is that of starting the scientist off with a title of being merely scientist, whether it be chemist, physicist, biologist; the second step might be research scientist or development scientists; the third step might be senior research chemist or scientist. Then fan out in the next step to manager of department or

research associate. The next step would be director of research or senior research fellow.

This sort of organization has been very helpful. However, it has its weak points.

There is a marked difference in the matter of freedom to follow your own interest as a scientist in the university atmosphere compared to the industrial atmosphere. On the campus it means that you are the elite, while in industry you're second-class as those going up the ladder of supervision are getting much more recognition.

The industrial supervisor may be promoted beyond the research center. He is constantly being consulted by top management. He has special respect to subordinates, helps make financial decisions, and attends more professional meetings. The manager obviously has more control of his working environment. The man going up the pure science ladder, on the other hand, is more likely to lose out to younger, more newly trained and more energetic men.

In scientific circles we take the stand that no suggestion is a bad suggestion. However, many of them cannot be harnessed to work. On the assumption that you people will be equally tolerant, I would like to raise the question as to whether or not an incentive plan for an important group of creative scientists could consist of giving them varying relief, partial, up to complete, from Federal income tax based on the magnitude of their performance through the Patent Office.

The relief might take the form of increasing size of exemptions. This would require a committee to set up standards and judge by those standards. The standards could not be tied to quantity of patents but to quantity and quality together. Quality, undoubtedly the more important factor, would cover commercialization and application of the invention.

Such incentive plan would be difficult to define and to administer; however, it would pay big dividends to civilization.

The incentive plan as now applied to many sales organizations has its difficulties too, and it has some negative effect on some other employees. But overall it pays big dividends to companies.

The loss of taxes to the government would be far outweighed by returns of taxes from increased productivity.

An industry would have more difficulty in applying such an incentive plan, as it would not include non-patentable work of equal or often more importance to the company. From the government's standpoint, the patentable developments would represent a very important factor in progress for all civilization.

Although this presentation has been directed towards an industrial

setup, an incentive plan based on invention would apply equally well to developments coming from the university and government laboratories.

Thank you.

(Applause)

PROFESSOR OPPENHEIM: Thank you, Mr. Greenlee.

As you notice, we come to Part B of this program, which consists of contributions from the Foundation research staff members.

Yesterday we heard from a number of such members in the other area, and we continue today with a group of contributors under this topic of organization context.

I want to say, just for a moment, that no one in the Foundation's activities knows this research staff more intimately than our Executive Director, Lou Harris. He has constant contact with them. But it has been my privilege, as adviser on research, to know them through my function in reviewing programs and in coming occasionally to conferences where they are present. Many of them are my long-time friends.

I want to pay tribute to the sincerity and depth of their purpose in giving us the part time, the only time they have available, to the work of the Foundation.

If you look at the last page of the conference program, you will have a description of their major professional status.

But, as we say, busy men sometimes are the ones who find time to do what perhaps men who aren't so busy aren't disposed to do.

So we certainly have benefited from the great fruits of the limited time these gentlemen have been able to give to the Foundation's research program.

And if there's any evidence in all of this talk about creativity that there are individuals who are motivated by their inner desire to find answers to problems in frontier areas, this is the kind of a group that exemplifies the point that not monetary compensation but the spirit of inquiry is the paramount force.

I will just simply call on my colleagues and associates. As I say, there's much that can be said about each one of them.

The first is a joint venture in which Professor Markham of Princeton has a research associate, Mr. Mansfield, and I understand from Jesse that he will be the first to make this presentation. So I am very happy to call on my colleague Professor Markham, and he will present Mr. Mansfield.

PART VIII — FOUNDATION RESEARCH CONTRIBUTORS

PATENTS IN EXECUTIVE R&D DECISIONS

PROFESSOR JESSE W. MARKHAM: I have often wondered why we spend so much time on these things, Oppie, I'm glad to have you explain it so well. In fact, I'm almost inclined to quit while I'm ahead. (Laughter)

You have heard the invited contributors. I infer from the format that you are now to sit back, relax, and listen to the uninvited contributors. (Laughter)

Mr. Mansfield and I have decided, because of the acoustics, that we will not do this as a duet but I will, rather, spend a little bit of time introducing him.

This project that we have, which is a continuing research project of the Foundation, is concerned with private business firm decision making regarding that rather global activity known as inventive activity. I emphasize both "private" and "inventive."

We're often inclined to overlook in this period of tremendous government budgets, great accent being given to government activity, that 98 per cent of all the goods and services of the American economy still are produced by private business firms. Therefore, their decisions are quite vital to the composition and the size of the national income.

We also hear a good deal about government support of research and development, but still about 40 per cent of the R&D total funds and perhaps even more of the R&D funds that affect us intimately are appropriated by private business firms, and about 75 or 80 per cent of what we call "inventive activity" is performed by the business firm.

The project that we are concerned with was started in a somewhat narrower vein. It was an effort to get at the impact of the patent system on the firm's decision regarding inventive activity. And it became rather clear to us about two years ago, as that project progressed, that to approach the business firm and ask it what impact the patent system had on his research and development budget, both its size and its composition, was very much like asking an 80-year-old man how he got that way.

If he were a vigorous drinker and smoker, he's very likely to attribute his fortunate old age to good liquor and to good tobacco. If he indulged in neither, he was very likely to attribute it to the fact that he was abstemious.

What it really added up to was that there were many, many factors that affect the R&D decision within the business firm, and we were constantly getting back on that project: "Well, it all depends on many other things."

It occurred to us at that juncture, therefore, that it's very important to find out what these other things are before you can really relate the patent system as such to inventive activity.

There are many of these variables already indicated in the economic literature, and they kept cropping up as we tried to inquire into the impact of the patent system on research and development and inventive activity.

There is a tremendous debate raging as to the impact, for example, of the level of market concentration on the R&D effort of a firm. Do firms that are somewhat protected from the more vigorous kinds of competition that is brought on by numbers tend to innovate or research and develop more vigorously than firms that are in that rather artificial area the economist calls a state of perfect or workable competition?

Another variable that clearly affects this is profitability. But again we don't know how this variable relates to research and development. More particularly, we are not sure of how causation runs here. Do firms that engage vigorously in R&D—and if they do it successfully—turn out to be highly profitable? Or do firms that are highly profitable for some other reason, because they have been successful on other counts and therefore have the profits, and in view of certain tax laws, become the ones likely to allocate more to trying the unknown and exploring into markets heretofore undeveloped?

Another variable is the stability, particularly the revenue stability, of business firms, one on which Mr. Mansfield is going to have something to say. Do firms that seem to be operating in a much more stable market environment, whether the level of concentration is high or low, tend to allocate relatively more funds to research and development?

And so it goes.

The capital intensity of the operation in which the firm finds itself. What is the capital-labor ratio? What is the impact of this perhaps on the research and development activity?

The technological base. Clearly we would expect to find more R&D allocated to space exploration than to basket weaving, to take two examples, because one technology we assume is pretty well exhausted in view of the age of the science of basket weaving.

Well, all of this may sound somewhat remote from the patent system, but this project is based on what I think is the unassailable and logical premise that sound policy toward the patent system is much more likely to be linked to comprehensive knowledge than to comprehensive ignorance, and I would submit that on many of these particular issues—

that is, the variables with which inventive activity seems to be associated—we are as of now rather ignorant.

Knowledge about these things does relate to tax policy, to antitrust policy, and to patent policy.

I probably should insert parenthetically here that progress on this project, while it is our "most important product," is likely to go pretty much according to the interest of Princeton graduate students with whom I happen to be associated at one time or another and to their availability of time.

We seem to have gotten on an even-odd year sequence. 1962-63 was a pretty good year. 1961 and 62 was not so good. 1960-61 was a pretty good year. And on it goes back that way.

This year Mr. Charles Mansfield has been trying to get at the statistical relationship between R&D and some of these variables that I have mentioned. And I have far exceeded my time allowance on this so I will turn the rest of our ten minutes over to Mr. Mansfield to give you some of the results of the project that he has been working on.

(Applause)

MR. CHARLES Y. MANSFIELD: As Professor Markham has told you, this project focuses on the R&D decision—that is, the decision to allocate funds to R&D as opposed to other possible alternatives.

Now, the patent incentive is designed to stimulate spending on R&D so far as business firms are concerned, and thus an understanding of the factors involved for a firm in choosing to allocate funds to R&D is important if we want to evaluate the efficacy of the patent incentive.

I have been concentrating on one particular question that has a vital influence on the R&D decision. This is the riskiness of R&D performance.

Now, in dealing with the question of the riskiness of R&D performance, I have limited myself to large firms. I am asking whether R&D performance by large firms is riskier than other production or expenditure undertaken by large firms.

And this question, the riskiness of R&D performance, is complicated by the fact that some R&D is financed by government and some R&D is financed by companies themselves, and the risks associated with the two types of financing are obviously not the same.

Now, what I have tried to do is to formulate a general index of riskiness that can be applied to any firm, and then I have taken firms with high R&D performance and tested to see whether these firms also rank relatively high on an index of riskiness.

For an index of riskiness I have chosen two statistical measures of fluctuations in net income as a percentage of net worth.

Using a sample of nearly 100 firms, then, I have divided these firms in three categories:

First, firms performing a relatively great amount of R&D financed by themselves.

Secondly, firms performing a relatively great amount of R&D financed by government.

And, thirdly, firms performing little or no R&D.

Thus, I used fluctuations in net income as a percentage of net worth as a measure of riskiness and asked whether high R&D firms typically scored higher on this measure than low R&D firms—that is, that their fluctuations in net income as a percentage of net worth would be greater.

The results of the study may be summarized as follows:

First, firms ranking high in performance of government-financed R&D were found to undergo significantly greater risks than both other types of firms by the measures I used. And this finding is probably explained easily by the fact that government contracts for R&D and the production work often associated with them tend to come in large lumps. Thus, the production of R&D financed by government tends to be more of a "feast or famine" business than production for the private market.

Secondly, firms ranking high in terms of performance of company-financed R&D were not found to undergo greater risks by my measures than low R&D firms.

And the explanation for this finding is certainly much more complex. The scale on which research is carried out by large firms and the effects of research in expanding industry demand perhaps both contribute to reducing the risk undergone by high company-financed R&D firms.

This finding certainly indicates that large firms performing a great deal of R&D are able to reduce the riskiness of research so that it is comparable in riskiness to an average of alternative expenditures by the firm.

I would like to close with one observation on the relationship between the patent incentive and the riskiness of R&D performance. The patent incentive raises the possible gains from R&D performance, but it does not reduce the possible losses. The possibility of large losses may inhibit spending on R&D, and the patent incentive does not alter the value of the losses that may be incurred.

This fact suggests that the patent incentive—or we might look into this at least—might usefully be supplemented by policies designed to

reduce the possible losses from R&D as well as to raise the possible gains.

However, the fact that company-financed R&D does not appear to lead to great risks in the case of large firms makes such a supplement to patent policy less necessary than it otherwise would be.

(Applause)

PROFESSOR OPPENHEIM: Our next Foundation research contributor is Professor James N. Mosel. His special area is psychology. Knowing him as I do, he's a most perceptive man across the whole spectrum of individual and social behavior.

It is a pleasure to call on him now to talk on organizational factors in creativity.

Jim.

ORGANIZATIONAL FACTORS IN CREATIVITY

PROFESSOR JAMES MOSEL: Thank you very much.

My duty is a very pleasing one to me but perhaps will not be so pleasing to some of you. I have set myself a task of summarizing for you in a few moments some of the primary conclusions which have emerged from the behavioral science study of organizational factors in creativity. Some of the conclusions from this work I am sure are going to run directly contrary to the more cherished values of some of the participants as well as the audience here today.

But controversy is perhaps good, and, in any case, I am sticking as close to the data as I can. And I am trying to reserve my own judgments for private communication rather than for communication here.

The particular subject matter which we are discussing is the behavioral factors involved in organizational structure and functioning which affect the creative process, the problem-solving process. And much of the work which I am reporting here represents a condensation of research done by Rensis Likert and his group at the Institute of Social Research, as well as some done by myself and a few others.

If I were to try to find one basic theme in all of this and put it into everyday language, it would be as follows:

Apparently the primary factor in a scientifically creative organization is a set of behavioral values (not simply announced official values, but ones which are implemented every day in behavior) which tend to put the major emphasis upon *what* is right rather than *who* is right.

Now, this is something which everybody likes to agree with right off. However, when you trace out some of the implications we find some people begin to demur.

First of all, this statement, while seemingly a harmless one which every moral, upstanding person would want to underwrite, runs directly contrary to some of the most basic principles in the classical doctrine of management.

First of all, the classical doctrine of management—or, as some like to call it nowadays, scientific management, which is classical management carried out to the second instead of the first decimal place—has as one of its most fundamental notions that of a pyramidal hierarchy of structure wherein power, authority and responsibility increase upward. And in such an organization "right" tends to be equivalent to position, authority, power and responsibility, not equivalent to the truth.

I think you all know what I'm talking about here. You have all had the occasion to argue with a superior, and the argument was quickly resolved when he said, "Look, I'm the boss, and what I say is right."

Now, this is a rather trivial example of something which is much more fundamental, a tendency in hierarchically built organizations, the type which classical management doctrine encourages and gives us a blueprint for, to equate right with position, with authority, and with responsibility. This tendency is incompatible with the basic principle which has emerged from the research I refer to.

Perhaps I can make this a little clearer if I take it from another tack.

The doctrine of management is the one which practically all of us use unconsciously whether we recognize it or not. We don't have to take Management 301 at George Washington University to learn this doctrine. It's taught to us in growing up. We learn it in the home room in school, in the cub scouts, and so forth. Here we learn division of labor, specialization, functionalization, staff and line, unity of command, chain of command, span of control. All these things we have pretty well learned by the time we're 15 years old. When we take Management 301 at George Washington University we learn the names for these things.

It's a little bit like studying grammar in the eighth grade. You see, you have already learned to speak English, and what you now learn are the names for all these things which you have been using for the first 13 years of your life.

So this is more than simply a book doctrine I'm talking about. It's almost a cultural point of view characteristic of most Americans.

Now, this doctrine really has as its explicit and most long-range objective the increase of constraints over the behavior of people in an organization so as to make them accountable and predictable. The

basic purpose here is to increase predictability so that we can fix costs, reduce overhead and meet schedules.

And we have such related disciplines as operations research and so forth which put this predictability on a very scientific basis.

But notice that what we're really aiming at is the introduction of controls and constraint which bring predictability. Constraint equals predictability.

The one area where this doctrine and this purpose have been very well achieved, of course, is at the assembly line level in the modern factory, where what a given worker does at any given moment has a very high degree of predictability.

Through another supporting doctrine, methods engineering, it is possible to reduce a man's work to a series of so many twitches, each with a carefully determined time, so that, given any worker, we can tell exactly how many widgets he will produce in a certain period around a certain average.

We call this kind of man a robot, but essentially the same doctrine, of course, is being implemented implicitly every day at management level.

Mr. W. H. White has given us the term "organization man" for the management analog of the robot. Instead of having time and motion study to determine sequence of twitches we have something which is called technically "policy guidance."

This, however, has the same effect. It has a tendency to pre-program, to determine decisions in advance of their occurrence just as time-motion study determines in advance of their occurrence the motions which an employee will make on the assembly line. But basically the strategy involved in both instances is the same.

Notice what is happening here. In increasing predictability by introducing constraints, we are essentially delimiting the number of alternatives which a man is faced with and programming his selection among those alternatives.

In theoretical terms, we are reducing the amount of "entropy" in the organization, entropy being the scientists' and engineers' word for the amount of unpredictability or uncertainty in a system. Just as systems of molecules have a certain amount of uncertainty, systems of people have a certain amount of uncertainty.

Thus we can think of organizations as having a certain amount of unpredictability too. What I'm saying is that the purpose of classical management doctrine is to reduce this unpredictability by reducing the number of alternatives, and by pre-programming the choices among them.

Many of the classical management rules, like standardization, specialization, functionalization, and so forth, are intended to bring this effect about.

All of this works very well for certain kinds of work—work whose character can be specified in advance of its occurrence.

This condition holds for the assembly line jobs. That is, we know what we want the worker to do at a particular point in the production process. We can specify the nature of the response which we want him to make in advance of its occurrence. And thus we can plan for its occurrence. We can program it, and we can introduce constraints which will make the appearance of this response highly probable.

However, when you turn to scientific research, creativity, and problem solving, one of the major discoveries of the research since World War II is that this vast doctrine of classical management is not very applicable to creativity and problem solving.

The reason is that creative activity is basically different from the type of activity that I have just referred to. The responses emitted by creative people have one essential characteristic: they cannot be specified in advance of their occurrence. If they could, they would not be creative. They would not be inventions. They would not be solutions.

This is a very important difference. You can only use the pre-programming approach, the introduction of highly predictable constraints, when the character of the response can be specified in advance. But in problem solving and creativity, by their very nature, this is not true. We don't know what a man will come up with when working on a problem or engaging in a creative act. If we did, the outcome of this would be known in advance and would not be creative.

Thus we see that one of the main reasons why the classical doctrine of management seems to be rather incompatible with scientific creativity is due to the fact that it expects the behavior of the performers to be predictable in advance, to be knowable in advance, so we can program for it in advance and introduce constraints which will legislate it into being.

There is a very interesting historical note here. Our doctrine of management had its major beginnings in 1900. Its founders were a group of men who were predominantly mechanical engineers and who were faced with the problem of organizing a productive type of organization, a factory. The thinking of these men, such as the Gilbreths and the Taylors and all the other villains who came after them, has grown exponentially and has become a very well recognized discipline, and, as I have said, even a component in our cultural life.

The result of this development is that we have learned to organize

and manage only one kind of organization. Apparently we have assumed that all organizations are equally susceptible to this one way we know. But this does not logically or necessarily follow at all.

There are different kinds of organizations, and there is nothing logically imperative in the idea that the method used for running one kind is the only method and should be applicable to all other kinds.

After World War II, scientific research and invention became big business and it became necessary to imbed them in an institutional context. In the past these activities had been carried out in garrets, universities, or on little research budgets in industry where nobody really worried too much about economic return. Now they have become big business and it has become necessary to organize them.

So what folks naturally did was to apply to scientific creativity the same rules, the classical rules of management which they had been using for factories.

And if people are honest about it, they will almost invariably tell you that they had quite a bit of difficulty making these rules work.

The usual explanation that was offered for this difficulty was that something is wrong with scientists and engineers, that this is an atypical group, a recalcitrant, obstinate group of no good, uncooperative eggheads. Something is wrong with scientists. They don't punch any timeclocks, and they don't observe the leave regulations.

I know of a job analyst who tried to analyze the job of a mathematical physicist one time and almost had a nervous breakdown in doing it. He followed the physicist around for three days, and he couldn't figure out what he did. He only had about three items in his notebook. The physicist drank coffee, slept, and scribbled on a blackboard, and that's all he did.

The analyst simply couldn't prepare a job description. And, of course, you can't classify a job until you can write a description of it.

So, the initial reaction to the problems of managing scientists according to the precepts of classical management doctrine was to conclude that there was something strange about scientists and engineers.

It is peculiar that it never occurred to anybody that the system which they were trying to impose on scientists was rather incompatible with the nature of the creative enterprise.

Recently there has been a growing realization that possibly the classical principles we use, the strict adherence to functionalization and standardization, the notions of chain of command and span of control and all the others, are somewhat incompatible with the nature of creativity, simply because creativity involves responses whose character cannot be specified in advance. We are trying to apply rules to

responses which require that they be specified in advance, when, in fact, they cannot.

So what we have done so frequently is we pick on the people who must emit these responses, the scientists and the engineers themselves.

Since my time has run out about three minutes ago, I want to try to draw some of my remarks together in a form which you can take back home and "bomb" others with. That is, I want to put my words in a packageable form which you can use to communicate to somebody else. Otherwise you're not that exceptionally large a group to warrant my saying all this. (Laughter)

I believe that the things that I'm saying here have a significance beyond this room, and I want to create a little of what communications students call "informational social communication."

It turns out, then, that in order to establish an organization in which what is right prevails over who is right, there must be two basic organizational ingredients.

First of all, there must be a reasonably high level of "organizational entropy." That is, there must be a great range of alternatives of actions available to people and a minimization of constraint. I don't mean complete withdrawal of constraints, nor do I mean completely entropic organization, because this is equally disturbing and equally nonproductive.

The point is rather that the amount of entropy, the number of behavioral alternatives which must be made available to people in creative type organizations, must be greater than that which is effective in productive type organizations.

The second apparently important ingredient is that there must be assurances which provide a high feeling of security in the face of risk-taking. That is, not only must alternatives exist but people must have the willingness to risk taking some of these alternatives. They must be willing to experiment, "to stick their necks out," to use a technical term. They must be willing to do all of this because there are assurances against any malevolent consequences of risk taking.

So we must create a rather strange type of environment wherein there is a great amount of latitude of action, and at the same time there are very few penalties waiting for you if you take advantage of this latitude.

Of course, no matter how you look at it, the formal characteristics of an organization which would permit these two factors are going to be very different from the kind which we have been accustomed to. It's not going to look so much like a pyramid. It's going to look more like a sphere—whatever an organization looks like when it's a sphere. It's

going to look like a screwball organization. Because essentially creativity, if you were to colloquialize it, is a screwball sort of thing, in that it does not hold a high degree of certainty and predictability. So naturally you have to provide some means for allowing the unanticipatable to occur.

Finally, one last thought. There has been considerable recent work done on the types of satisfactions and motivations of people engaged in creative work, and on this there is one cardinal point I want to leave with you. We must distinguish very carefully between two kinds of "goodies" which we give people in our efforts to create job satisfaction.

Some goodies merely prevent discontent. Other goodies create positive satisfaction. And these are two different classes of goodies.

So many of the things which have been offered as incentives to scientific research and productivity are not incentives to such at all. They are merely hygienic measures used to prevent discontent. The absence of discontent, as I believe the Greek philosophers pointed out, is not the same as positive content. Satisfaction is not simply the absence of dissatisfaction.

Many of the so-called job incentives are not incentives at all. They are simply things whose absence makes people unhappy, but whose presence does not make them feel particularly happy.

In other words, let's distinguish between hygiene and positive health.

For instance, many of the so-called fringe benefits are such that, if people do not have them, they feel unhappy about it. But if they have them, this fact does not make them particularly happy.

As to what are the positive incentives for scientific creativity, I'm afraid we know very little. We know quite a bit about how to keep scientists from being unhappy, but we don't know too much about how to make them happy. And these are two different problems.

Well, my job is over. My job is easy—to tell it. Your job is just beginning, and your job is difficult. You've got to do something about it.

Thank you very much for your time.

(Applause)

PROFESSOR OPPENHEIM: Well, I told you Jim Mosel was perceptive. I have learned not to add anything because, no matter what you say, he'll come up to the rostrum and tell you it just isn't so. (Laughter)

In the early 1930's I met Joseph Rossman. He was then in the Patent Office and editor of the Journal of the Patent Office Society.

Over the years Joe has never been able to suppress a desire to write and undertake studies. I remember, as you do, one of his earlier studies on motives of inventors, which I still use as a reference.

I also remember so well that, among the responses regarding incentives to invent, a number of inventors said it was just sheer laziness that accounted for their invention. Perhaps this meant that one who is lazy just tinkers and maybe invents something.

I hope this isn't going to be the overall conclusion of this conference! At any rate, it's a great pleasure to present my old friend, and I hope he doesn't hold it against me that I have revealed the three decades that I have known him, because we're both now ineligible for Jack Benny's "39" club.

Joe, glad to have you here.

COMPANY PATENT POLICIES AFFECTING EMPLOYEES

DR. JOSEPH ROSSMAN: Thank you, Oppie.

Ladies and Gentlemen, my topic here is "Company Patent Policies Affecting Employees."

The growing importance of company patent policies affecting their employee-inventors is reflected in recent articles, such as the one published in *Business Week* last March 23 which outlines the patent policies of ten companies. An article in the *New York Times Magazine* May 26, 1963 discussing space research points out that our technically qualified manpower is now a critically scarce resource. Furthermore, the government research activities in atomic energy and the space program are seriously depleting the technical manpower available for private industrial research.

Obviously, we must either increase our supply of R&D workers for private industry or increase the productivity of those now available if we are to continue the growth of our non-defense industries and to compete with industrial research of other countries, especially in the E.E.C., which is growing tremendously.

It is thus important for companies engaged in research to review and evaluate their policies with respect to their creative employees and to determine what, if anything, can be done to increase the output of such employees.

One of the objects of the employer-employee Foundation project which I suggested two years ago was to obtain data on this specific problem.

As I reported at our last year's Public Conference, we started a pilot study early in 1962 by sending a questionnaire to a random sample of companies to whom U. S. patents were issued during the fiscal year beginning June 7, 1960.

The published abstracts of patents appearing in the *Official Gazette*

issued from June 7, 1960 to June 27, 1961, starting with Patent No. 2,943,327 up to Patent No. 2,990,548, and ending with numerals –42, –52 and –61, were cut out and mounted on cards which constituted a random 3 per cent sample for this period.

The patents assigned to U. S. and foreign companies were segregated.

The patent numbers were listed in each letter sent to U. S. companies and the last six digits of the patents were listed on each inventor questionnaire. The foreign questionnaires were sent on aerogramme letters without any inventor questionnaire cards enclosed.

This sample contained 837 patents issued to U. S. inventors which were assigned to 495 U. S. companies. A total of 447 questionnaires were mailed to companies with known addresses with 1,118 inventor cards.

In the 3 per cent sample there were 118 patents assigned to 100 foreign companies to whom questionnaires were mailed. An additional 120 foreign companies were selected at random in order to increase the size of the foreign sample.

The sample included 312 unassigned U. S. patents, 46 patents assigned to the Government, 6 assigned to partnerships, 29 assigned to foreign individuals, and 40 unassigned patents to foreign inventors.

Incidentally, the total U. S. patents assigned to all companies during the fiscal year 1960 was about 70 per cent of all issued patents, which is an increase over the study that has been made by Federico showing that the company assigned patents were ranging from 50 to 60 to 65 per cent in past years but it seems it is now hitting the 70 per cent level.

A total of 110 (24%) replies were received from the U. S. companies. There were 385 (33%) filled in cards returned by the inventors. Out of a total of 220 foreign questionnaires sent, 83 (37%) replies were received.

Questionnaires were also sent to 74 Foundation members who were not included in any of the select patent sample we had, and 40 (54%) replies were received.

Incidentally, I should like to mention that although I am listed as being on the research staff of the Foundation, this is not entirely accurate. On account of pressure of my work as patent attorney, I had to inform Mr. Colclough last June that I would not be able to continue giving my time as research investigator.

However, as one inventor put it, an unfinished problem is a thorn in the flesh, and this thorn did compel me to work during weekends, evenings and holidays to make at least a factorial analysis of the replies and to compile the results.

I have prepared a summary report of 190 typewritten pages which I have just handed to Mr. Harris. I have compiled the company replies for each question in our questionnaire and have made a brief analysis.

I might say we received many interesting, forthright and thought-provoking comments. In fact, if Mr. Harris should merely publish these compiled comments, a wealth of valuable suggestive material would become available for analysis and further study. These comments contain data not available anywhere as far as I know.

In the few minutes allotted to me today it is utterly impossible to give you even a brief idea of the replies we received relating to the following topics:

1. Current patent policies of private U. S. companies for encouraging employee-inventors.
2. Patent policy changes made, if any, and their resulting effects in inventive productivity.
3. Standards and procedures used to evaluate inventive productivity of their R&D people.
4. Adverse effects, if any, in requiring assignment of inventions by employee-inventors.
5. Attitudes and suggestions made by employee-inventors for increasing their inventive productivity.
6. The comments made by foreign companies on the above subjects.
7. The effects of government-financed support for industry R&D on company patent policies.

We found that the prevailing company philosophy today in the United States is that R&D employees are hired and paid to invent; therefore, what they create is company property. Since R&D work today usually involves teamwork, special awards to selected individuals would hamper teamwork and would be discriminatory.

R&D employees receive regular pay checks and usual fringe benefits which means job security as against uncertain success of R&D projects and recoupment of R&D costs. R&D employees are given company facilities, equipment, materials and assistance in their development work, all at company expense, and at no financial risk to themselves. R&D employees who make patentable inventions are designated by name in patent documents which adds to their professional prestige.

Furthermore, in many cases the R&D people are permitted to publish papers in professional journals.

These statements I am making were repeated over and over again in replies which I received from companies reflecting the company

attitude toward R&D people, of which I am trying to give you the highlights.

Mr. Simpson here today gave you a very interesting picture of the Westinghouse patent policy, which is an excellent example of what one company might do. Mr. Hanifin gave you a very interesting outline of the International Business Machines Company patent policy which I heard for the first time, of the 15-point award system they have which brings an R&D man $1,000. And so on.

But we found in our returns that the company policies vary all over the map. There isn't a very clearcut single pattern which I might say occurs in the American industrial area. It depends on the companies involved, their products, their size, the management, and the character of their R&D people.

However, some patterns do appear. For example, in our sample, there were 62 companies out of a total of 106 that paid R&D employees nothing or a nominal $1.00 when the patent application was filed. 16 pay $50.00 on filing. 10 pay $100 on filing. And when issued, payments of $125, $150, $200, $250 and $300 were reported by individual companies. Two companies reported that they may pay as much as $5,000 as an annual special company award. Some companies have set up suggestion systems and special awards—by one company as high as $25,000—for employees who are not engaged in R&D. However, in our project we are not going into this area at all, which is a future project that we might go into.

One company pays the inventor of all sums collected in any one calendar year a graduated share of royalties received from licensees or a share of sale of a patent.

We sought to obtain data regarding patent policy changes in rewarding employee-inventors. As you heard today, some company patent policies are being reconsidered and being modified currently. Our data may offer some clues how effective rewards may be offered to R&D people for increasing productivity. There were 27 companies in our 3 per cent sample which stated that they made changes in their policies. Also, a total of 9 Foundation member replies indicated policy changes were made.

The combined replies indicated that 9 companies increased their payments to inventors which resulted in some increased production of inventions. No significant increase was found by 14 companies. Thirteen made no reply or had no data available for making any judgment. Two companies dropped all cash payments previously made. They found it was best not to make any payments when applications were filed by their R&D people.

So you see the pattern varies all over the map, and I might say company policies today are in a great state of flux. They are experimenting, testing, probing to see what they can do to get more invention production from their R&D people.

Just briefly about the inventor returns that we got, questionnaire cards (4″ × 5″) were sent to 1,118 inventors whose names appeared in the selected sample patents as previously described. We received 385 filled in cards. All but two of the inventors were employees of the company who assigned their inventions. Also, all but four of the inventors stated that they were employees and signed agreements to assign their inventions to their company.

One of the six questions asked was:

"In your opinion, can R&D employees be encouraged to produce more inventions? Yes_____ No_____. If yes, how?"

We had about a quarter of an inch of space to write the answer to this question but they turned over and wrote on the back. They found the solution to the problem of space, you see!

There were 28 "No" replies. There were 96 replies indicating cash payments or bonuses would encourage production. There were 20 who indicated a royalty or percentage of sales as desirable, and 18 indicated an incentive plan would be desirable.

Thus, nearly 35 per cent of the inventors thought tangible remuneration besides their salary would encourage more inventing. The general attitude of these inventors is that if the company makes profits based on their inventions, they should be equitably rewarded.

Not a single comment was made, however, just how the inventor should share losses resulting from unsuccessful projects. I suppose they would follow the Internal Revenue. They would take a cut on the profits, but not on the losses.

Freedom of research was indicated to be desirable by 18; professional recognition by the company was mentioned by 25—which I think is significant as pointed out by some of our previous speakers; a favorable creative environment by 19; more information regarding patent law and procedure was mentioned by 15; better communication regarding problems to be solved was noted by 14.

Various miscellaneous suggestions were made, such as attendance at scientific and technical meetings, permission to publish results of research, better facilities, as factors in stimulating productivity of invention.

Of course, these are well-known complaints which research directors hear all the time from R&D employees. They are always complaining about something, but that's natural. Otherwise they wouldn't invent.

A study entitled "Managers and Scientists" just published by Ralph M. Hower and Charles D. Orth, professors of business administration in Harvard Business School, based on actual case studies, points out the inadequate appreciation of human interpersonal relations in industrial research organizations which may hamper creative effort. They found that the orientation values of management and R&D do not coincide in many aspects. This disparity may be a source of hostility and frustration.

Management's personal orientation is that the executive makes decisions and issues orders down the line. Emotionally he is success-oriented as measured by the company growth and increase of profits. The R&D employee is success-oriented by his recognition as a scientist by his peers which is measured by his contribution to science or technology. Both have to satisfy their specific personal emotional needs and at the same time further the company objectives. Here is where they often fail to work together objectively, and they get at cross-purposes. They don't understand each other's emotional needs. The research man grumbles and management is not happy because the results aren't forthcoming.

Mr. Travis made his comments here about research directors. He almost indicated what they really need on the staff are not technical assistants but possibly psychologists to help them manage R&D people in their interpersonal relations.

In any event, my observation is that effective stimulation by management of R&D employees to create requires an appreciation of the factors involved in the creative process as well as a sympathetic understanding of the creative personality.

Incidentally, I would like to refer to one more book published by a research chemist John W. Haefele who is with Proctor and Gamble. The title of the book is "Creativity and Innovation" published recently by Reinhold Publishing Company.

He made a survey of the literature relating to creativity that has been published in the last few years, and he summarizes the results in this book from the viewpoint of management and the research worker. I recommend it highly. It is a very interesting book and gives many insights on the processes of creativity of the R&D person.

Creativity cannot be set in motion at will. The psychological basis of creativity has hardly been explored by psychologists, although in recent years this subject has received more attention by them. Most of available data today is crude and inexact. We do have generalized personality impressions of the creative person. He is a non-conformist, shows a high level of initiative and independence of thinking. He also

shows curiosity, self-discipline and a drive for accomplishment. He tends to become totally involved in his work.

The truly creative person generally is not a good organization man. That has been pointed out several times today. Yet as a company employee he is under pressure to adjust to organization life. The conventional restraints required by organization activities tend to impair his creativity because he loses more or less the freedom of action essential to creativity. He cannot always choose his own problem or satisfy his random curiosity without accounting for lost time to his superior or research director.

The problem for management is thus to provide a creative atmosphere taking into account the psychological factors of the inventor and at the same time not to impair the productivity of R&D personnel by requiring too rigid compliance with the work discipline that is imposed on non-creative employees.

My time is up. Thank you.

(Applause)

PROFESSOR OPPENHEIM: We are keeping fairly well on schedule. As you know, we started a little late. I don't want to inhibit our next research staff contributors, but if they find any way of helping us to come within reasonable reach of the 11:30 cutoff, which has already gone by, it would be appreciated.

Irving H. Siegel is one of our member jewels in the research contributor staff. He is so dedicated that he sacrifices himself and I daresay he has been sacrificing his family in the process of helping us in these frontier areas.

He will speak to us on "Individual and Joint Invention."

Irving.

INDIVIDUAL AND JOINT INVENTION

DR. IRVING H. SIEGEL: Every place I go I seem to have a taxi meter planted in my back. (Laughter)

I shall discuss one of several Foundation projects with which I have been associated. My remarks are intended to review and add to the evidence for a proposition which I have stated and supported in two articles in *The Patent, Trademark, and Copyright Journal of Research and Education*

My findings indicate the continuing dominance of the individual in patent production in two provinces that nowadays are characterized by team research, namely, the corporation and the technological frontier. Contrary to common opinion, single inventors persist even where formal research and development programs are commonly conducted on

a scale favorable to group organization of efforts. The patent output of single inventors typically exceeds the composite total of all joint inventors, sometimes by a very substantial margin.

In the first of my two articles, I noted that, for three large corporations that are commonly regarded as technologically progressive, the proportion of recent patents contributed by single inventors was in the neighborhood of two-thirds, and the proportion contributed by pairs of inventors was in the neighborhood of one-fourth. These three companies, incidentally, were IBM, Western Electric, and International Teletype.

On two familiar technological frontiers, atomic energy and transistors, sole inventors also were found to be dominant. They accounted for 56 per cent of the patents released by Atomic Energy Commission for nonexclusive, royalty-free licensing in a three and a half year period that I studied, July 1957 to December 1960.

An analysis of all of the 203 patents for transistors and related devices that were on record at the United States Patent Office in May-June of 1960 showed a much higher proportion contributed by sole inventors—four-fifths. Even trios of inventors were rather rare in this particular case, which is interesting in view of the fact that many of us remember the trinity of Shockley, Brattain, and Bardeen as having contributed the principal transistor inventions.

In the same second article, I showed that 51 per cent of the AEC patents released for licensing in 1961 were attributable to sole inventors. The proportion was higher, closer to two-thirds, for certain other distributions of AEC patents—for example, those patents which had actually been licensed by AEC upon request.

My second paper also showed that chemical patents may not be so different as they are often supposed to be from others. It is well known that joint research is common in industrial chemical laboratories and that most chemical patents are issued to assignees, generally the employers of the inventors. However, a frequency analysis of several hundred chemical patents reported in four successive issues of the United States Patent Office's *Official Gazette* showed that 48 per cent of the contributions were made by individuals, while teams of two accounted for 36 per cent.

I also discussed in the second paper other matters which I shall not take up now, like the incidence of individual and joint ownership. I will skip these—and thus make a concession to the time problem.

For the purpose of today's meeting I have also examined the lists of patents reported in the five most recent quarterly issues of the *IBM Journal of Research and Development.* Here, 458 patents are re-

corded, in the issues from April 1962 through April 1963, and, of these, 309, or 67.5 per cent, were generated by individuals.

An analysis of articles published in these IBM *Journals* and also of the abstracts published there of articles contributed by IBM employees to still other publications indicates the same type of dominance by individual authors.

Recent data for Western Electric Company show a similar pattern. Thus, two recent issues of *The Western Electric Engineer,* January and April 1963, showed that, of a total of 82 patents, 55, or about two-thirds, were contributed by individuals.

Similarly, another tabulation I made of all 257 patents released during 1962 by AEC for nonexclusive, royalty-free licensing shows the persistence of individuals, as noted earlier. Individuals accounted for 54 per cent of the total number of patents, whereas duos accounted for 30 per cent.

I shall not comment extensively on these findings because of time limitations. Those of you who are interested may wish to look at my paper on "Individual and Joint Patent Production" in the Summer 1962 issue of *The Patent, Trademark, and Copyright Journal of Research and Education.* To give you some idea of the directions taken in my analysis of the numerical findings, I should like to quote with slight changes a few paragraphs from that paper:

"Commonly, particular personal attributes are cited for scientific and technical achievement, but no list can be complete or absolute. Performance, after all, is also dependent on the nature of the task and on the facilitating and inhibiting features of the environment—not only on the inherent capabilities of people.

"The qualities deemed important for successful solo efforts of self-employed or employee-inventors are not necessarily the same as those required of research managers, project leaders, and so forth.

"In proper proportion, people with unglamorous qualities and relatively passive dispositions can and do effectively complement those with the better publicized, dynamic, positive research virtues. Indeed, in creative enterprise, as in other activities, there seems to be room for all of Riesman's inner-directed, outer-directed, and tradition-directed personalities.

"Two more comments should be made here. First, inherent personal capabilities that are brought to a creative situation are modified by the new experience itself. That is, education is, like invention, an outcome of the process of interaction of people and their environments, including other people, so that any initial list of individual qualities undergoes progressive change. The second point is the importance of

internal tension or conflict for creative activity. Invention depends, that is, not only on the collaboration, but also on the opposition of, certain personal traits. In the same way that the elements of external environment encourage or inhibit personal achievement, the interplay of intrapersonal factors, including the passive traits, also contributes to success or failure."

In conclusion, I shall read some of my earlier remarks on the group:

"Any combination of individuals that has a spine of common purpose may be regarded as an organism, but such a group also constitutes a specialized environment for personal expression and interpersonal exchange by its members. When a productive group is called creative, it is implicitly accepted as an organism, but the adjective could justifiably be reserved to the members themselves, especially to those credited with the achievements that comprise the group's distinctive output.

"Creativity, in other words, might well be retained as a personal attribute that can be intensified in a carefully contrived environment, which includes a proper blend of colleagues, suitable equipment, attractive rewards and working conditions, and skillful leadership.

"Indeed, the essential problem of leadership is to encourage identification of individual with group aims insofar as possible, to encourage maximum self-satisfying performance along the line of group interest, and to control dysfunctional personal actions and interactions.

"In steering the course of the group, its leadership also has to look outward—that is, to take account, for example, of competing groups and of the objectives sought and constraints imposed by still higher echelons of management."

Thank you.

(Applause)

PROFESSOR OPPENHEIM: Thank you, Irving.

Now we come to the final topic among the Foundation research contributions, namely, technology and productivity, by Edgar Weinberg.

We are always happy to have with us representatives from the Government as their major activity. And it is our great pride in finding that they are willing to help us in this enterprise of the Foundation.

It gives me great pleasure now to call upon Mr. Edgar Weinberg.

TECHNOLOGY AND PRODUCTIVITY

MR. EDGAR WEINBERG: Thank you, Mr. Chairman.

Ladies and gentlemen, in the past year there has been growing interest in measures to stimulate a faster pace of technological change in

industries that have not directly benefited from government-supported research for defense or space activities. Mr. Rossman mentioned this movement a little while ago.

This new concern about the status of civilian technology in part comes in the wake of the passage of the Trade Expansion Act and the pressures, potential and actual, of increasing foreign competition. Technological changes which could lead to greater productivity and lower costs in such industries as textiles and machine tools are seen as a means of maintaining and expanding markets.

Among the Federal measures being discussed today are the encouragement of industry and university engineering extension services, government support of R&D in selected civilian industries, and greater dissemination of the results of government research to private industry. One objective is to close the gap between leading and lagging firms and industries.

Some of the Foundation's research on the role of patents in large and small business that Dr. Siegel is directing is particularly relevant to any discussion of the stimuli to technological progress. One conclusion that emerges is the importance of highly motivated individuals within large organizations as well as small. Provision of laboratories and apparatus does offer a favorable research environment, but a relatively small number of talented individuals in final analysis are indispensable for the inventions and innovations that are achieved.

For example, in a case study published in *The Patent, Trademark, and Copyright Journal*, Winter 1959, about the invention of the transistor, one of the great classics of modern research, we quoted a well-placed observer at Bell Telephone Laboratories who concluded:

"The investigators were not a closely organized and firmly directed team; they were talented individuals working on matters of great personal as well as mutual interest."

I have also investigated a case which is classical in the old-fashioned sense. This is the case of the engineer, an employee of one of the largest airlines, who invented without formal research support the first automated reservation system.[1] He related:

"We had three advantages—knowing the problem, not knowing how it could not be solved, and a limited group of one person working on it. A working model of the invention was built using parts immediately at hand. As a matter of fact, much of it was done in a basement workshop."

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[1] "A Case Study of an Automatic Airline Reservation System." Bureau of Labor Statistics Report 137 (1959).

The persistence of the Sole inventor which Dr. Siegel has just discussed stands out in information compiled on some recent patents in the machine tool and textile industries, two traditional fields of technology. The pattern is similar to that found by Dr. Siegel on the frontiers of electronics and atomic energy. Thus, 82 per cent of 226 patents on numerical control of machine tools are credited to single inventors. And of 136 patents on non-woven fabrics, a new field of technology involving the paper and chemical industries, 68 per cent were attributed to solo inventors.

Needless to say, invention is only one link in the chain of activities that comprise technological change. Economists are giving increasing attention to innovation and diffusion where the entrepreneurial ability of managers and owners is among the governing factors. Such talents are no less creative or rare than the scientific curiosity or inventive ability of engineers and scientists.

Nor can we really overlook in any study of the factors affecting technological change the resistance to or the acceptance of greater productivity on the part of workers, some of whom may be displaced. We are becoming increasingly aware that rapid technological change can make obsolete numerous occupations and jobs requiring serious personal adjustments.

Thus, acceleration of invention, innovation, and diffusion would be a most complex process, involving, among other factors, the provision of appropriate motivations and awards for individuals of various skills, the achievement of subtle relationships within organizations, both large and small, and the development and maintenance of a harmonious interaction with the economic and cultural environment.

During the late 1940's French visitors who came to study the sources of America's productivity growth were impressed with such intangibles as our "mentality of progress." A British team noted the intense competition, "not only in industry but in all walks of life." Today we are giving much more attention to more tangible factors underlying productivity growth, namely, the skill and knowledge of our labor force and the need to make it more adaptable to changing technological opportunities. Accordingly, improvements in the education and training of blue collar and white collar workers as well as engineers and scientists become increasingly important as conditions of technological change and productivity growth. "Our educational objective," Dr. Lloyd Berkner recently said, "must be the advancement of each member of the community to the limits of his intellectual capability. This is the demand imposed by the technological revolution of today."

Thank you.

(Applause)

PROFESSOR OPPENHEIM: Thank you very much.

PART IX—PANEL DISCUSSION AND QUESTION PERIOD

We now come to the panel discussion and question period. While you are formulating questions to be addressed to the panelists, I now would like to open the floor to the panelists themselves, if any of them have any questions to address to one another on a reciprocity or other basis.

So may I have any indication of any interest on the part of a panelist to address a question to a fellow panelist?

Yes?

MR. GREENLEE: It seems to me that so often there are disagreements, and we find that if we get the same definition we're not too far apart.

I was interested in Dr. Mosel's development of the program of creative and research people. I think what he evolved was that the program for researchers is very different. And the program for a sales group could be looked upon as very different from other groups. So I wonder if part of the disagreement isn't often on how to handle a different program in production, in sales, or in creative research.

I'd like to make one other comment on a statement that Dr. Rossman made. I believe he said that creative people do not make good managers. As I think he defined it, I would agree. Similarly defined, I would add that salesmen do not make good managers. Patent attorneys do not make good managers. Production people do not make good managers.

I don't know what the percentage is, but I think if you take maybe—I'll pull a figure out of the sky—25 per cent of your salesmen, they will make very good managers. If you take 25 per cent of any other group, including scientists, you'll probably find that they're good managers.

I don't think anyone questions the ability to manage by such people as Charles Allen Thomas, James Conant and many others you can name in the creative field.

So I think all too often we're inclined maybe with creative scientists to take them as a group when what we're talking about is a low percentage which are social misfits. If we would take a look at sales groups, lawyers, and other groups, we would find a similar relationship.

PROFESSOR OPPENHEIM: Mr. Mosel or Joe Rossman, who have been mentioned specifically, do you have any response or reaction to what Mr. Greenlee has just said?

PROFESSOR MOSEL: Do you want to speak first, Dr. Rossman?

DR. ROSSMAN: I have no comments.

PROFESSOR MOSEL: Well, I want to make one point rather clear, I don't think anybody knows, and I certainly don't know, how we should organize a creative activity. I'm trying to point out that we don't know how to do it.

Ten years ago I didn't know how to do it either, but if this question were asked of me then I would have been foolish enough to give an answer. I would have told you how to do it. (Laughter)

But today I must really plead ignorance. We can see what the specifications are but we don't know how to meet the specifications.

DIRECTOR COLCLOUGH: Jim, just a little louder.

PROFESSOR OPPENHEIM: Perhaps you'd like to come to the rostrum.

PROFESSOR MOSEL: It's just as well that the mike wasn't alive.

Look at it this way. Let's take an analogy which will give a fresh point of view on the question. Say you were confronted with the problem of organizing a concern whose objective it was to produce master works of art. How would you do it?

Now, this is an equivalent question. This is creativity in a different medium. But many of the same processes are involved from the point of view of the producer of this creativity.

Now, how would you organize a firm whose job it was to create great paintings? And when you state it in this way, so baldly, you want to put your hat on and go home.

I don't know what the answer is except to point out one part of it which we probably have some answers to:

All of the organization in which the research is imbedded need not follow the same rules which are applied to the research activity. This means that the research tends to be a specialized subsection of the organization—a little subculture with a different set of rules and values. You're going to get some scar tissue developing along the boundary, to be sure. What we have to do is provide some way to minimize this scar tissue.

This doesn't mean that you have to rebuild the whole organization along the same philosophy that you'd use in managing scientists and engineers.

Some people have mistakenly thought this, however. You must not try to make the same rules hold for both creative and non-creative activities.

Just how you imbed research, which is basically a dissonant activity, in a larger culture I don't think anybody really can say.

One point further. I agree with Mr. Greenlee who said earlier that scientists and engineers are not basically different from anybody else. They just *act* differently. And the reason they act differently is be-

cause the nature of the research enterprise requires them to act differently.

Our problem is not really a matter of accommodating the organization to some weird type of personality nor vice versa. Our difficulty lies not in the idiosyncrasies of engineers or scientists but, rather, in the idiosyncrasies of what they do.

It is a process we must adapt to, not personalities.

And I also agree very much with the comment which has been made that out of any group of human beings you are going to find ten or 25 per cent who will make good administrators, good managers, and so forth, and that not all scientists are "bad."

Sometimes we make a scientist or an engineer a supervisor, and we get a bad supervisor and lose a good scientist.

I think we have to figure out how to avoid that problem too. I think that this problem is, in principle, a solvable one. It is a matter of personnel selection and identification.

But on the larger issue I must really plead ignorance and would appeal to you people to be the first to do research on how to organize research.

PROFESSOR OPPENHEIM: Is there any other question by a panelist to a panelist?

(No response.)

If not, we will now entertain questions from the floor. If you have a booming voice it won't matter whether you come up to that mike, which I hope is live.

Yes, sir?

QUESTION: One of our speakers yesterday implied that monetary rewards for inventions tend to restrict communication between R&D people because of suspicion that one would get the advantage of getting credit for the invention. I wondered if Mr. Simpson or Mr. Hanifin could comment on whether this has transpired at Westinghouse or IBM.

PROFESSOR OPPENHEIM: Who wants to field that one?

MR. SIMPSON: Part of the very nature of your question, as I understood it, makes it impossible to answer, in that you concluded that information was withheld because of a fear. It's difficult for anybody to know how much information was withheld.

But certainly I have no feeling that this is a major problem.

As long as I'm up here, I would like to make a number of comments, one with respect to Professor Mosel's talk. It was a little difficult for me to determine whether he was speaking from facts or opinions, because he really mentioned no facts, mostly opinions.

I was unable to determine, for example, what types of research laboratories he was talking about, because certainly most of the opinions he had reached bore little or no resemblance to the research laboratories with which I have been familiar.

I'm sure that there must be a great deal of fact behind it, and I hope I will have the opportunity to have access to those facts in the future.

I was struck by one remark that I believe was made by Mr. Weinberg with respect to a desire on the part of some elements of government to bring the lagging firms up to the leading firms—in the area of invention, I presume, or other things. I'm not sure but what I would consider that harmful to the economy of the country, because it most certainly would destroy the incentive for advancement if the all powerful government were going to seek to level us all again. There would be little incentive for anybody to stick his neck out to try to get ahead.

In deference to the other people who have something to say, I will close on that.

PROFESSOR OPPENHEIM: Mr. Hanifin, do you wish to add anything to this?

MR. HANIFIN: Well, in response to the direct question, our experience has been quite the contrary. Now when someone comes up with an invention they are very prompt in disclosing it to us. If they come up with something, they communicate with the patent department and we're glad to get the information.

PROFESSOR OPPENHEIM: Yes?

QUESTION: I believe that the question was—I'm not sure, but I would like to ask that question—whether the information between scientists or between engineers is not stifled by this monetary reward of $50 or $100 per application. Not whether it's communicated to the patent department but whether it's communicated from one engineer to the other. In this area is there damage done?

PROFESSOR OPPENHEIM: Do you have a particular panelist in mind?

QUESTION: Same gentlemen.

PROFESSOR OPPENHEIM: Just up for choice. Who would like to respond?

Mr. Hanifin.

MR. HANIFIN: Our experience has been that our engineers do communicate reasonably well with one another. As a matter of fact, when a disclosure is turned in to the patent department it is digested and it is sent to interested people throughout the company. This, of course, aids the communication.

PROFESSOR OPPENHEIM: Dr. Rabinow.

MR. RABINOW: Thank you for making me a doctor which I am not.

I would like to make several comments, the first is about the question of quantity versus quality which has come up several times yesterday and today. There seems to be a belief that there is no relationship between quantity and quality of inventions whether made by nations, by particular people, by groups, or by individual inventors.

I suggest that you read the article by William Shockley published in IRE about six years ago entitled "On the Statistics of Individual Variations of Productivity in Research Laboratories." In this paper, he states that there is a direct relationship between quantity and quality, that is, the more quantity a man puts out, the better is the quality. This is true not only of inventions, but also of art, of music, and of writing. He gives examples of the Nobel prize winners who produced a great many papers. And this was true, apparently, for all great writers and all great musicians. And while I hate to put ourselves publicly in the same class, this is also true of inventors.

I think this applies to nations and to laboratories.

I would like to address my next remark to Mr. Hanifin of IBM. It is quite likely that when you didn't find that the quantity was related to the quality, you met a special case where the quality inventions have already come to light earlier and only some new and trivial ideas appeared later. I think that in the future, the reverse would prove to be the case.

I would like now to discuss Mr. Simpson's remarks about the value of money, the profit motive in the laboratory.

I would not normally attack a speaker, but his comment and the point of view affects research laboratories very strongly, and I disagree most violently with his statements that the main purpose of a corporation is to make a profit. I think it is the main purpose of an investor to make a profit. It doesn't follow that a corporation has to make a profit first and make a product second.

I think it is the purpose of a company to serve the nation and to produce a service, or to produce a product. And I think any corporation that thinks it's more important to make money than to concentrate on making a good product, or any corporation that chooses the money against the product, in a close choice, is doomed to failure.

I have been a consultant to several large corporations and there is no doubt in my mind at all that the big companies that are well run have managements that are very proud of the things they do and are also proud that they make a profit doing it.

This difference in emphasis is not trivial.

For example, Bob Sprague likes to make good condensers, and, I

imagine, he also likes to make money making them. But I know that making condensers of even slightly lower quality, even if this meant making more money, would be distinctly against his grain.

The whole subject is very important because if the theory of money being the only criteria, or the main criteria, is carried into the research laboratory, you would probably in the long run kill it.

A research laboratory particularly, should be interested in a product for its own sake and the money should come automatically.

My final comment I would like to address to Dr. Mosel's statement, which I admired so much. He poses an interesting question. He says you know what we have to do to keep scientists from being unhappy—giving them good wages. And I agree with him that giving them individual rewards is not necessary. I think that in due time IBM will abandon its point system.

I think that rewarding inventors in this manner is not fair. If you do this to inventors, why not to everybody else? Why not give out other awards of points for other work?

Good salaries seem to be good enough reward. An occasional medal or some other award for outstanding achievement certainly is in order, also.

I agree with Dr. Mosel then that if you keep them from being unhappy, you have done a large part of the job. Now the question is: What makes them happy?

There is a song in "Camelot" that says that the way to make a woman happy is just to love her. Nothing else, just to love her. And I think that if you ask me how to start a laboratory and have a good laboratory—and I have worked in good and bad laboratories—I would answer that the way to do this is to have a director who loves science for its own sake, not merely for profit. He has to be a man who understands science. He has to be a good scientist, preferably, but he has to love the product, invention and scientific achievement.

If you ask me how to start a company to produce great art, my answer would be get the best art lover in the country, above all, a man who loves art very much, and let him pick the artists. If you can find a man who's also a decent human being and an administrator, you're luckier still.

(Applause)

MR. SIMPSON: Could I make a comment?

PROFESSOR OPPENHEIM: Yes.

MR. SIMPSON: I'd like to make a comment here to straighten out a misinterpretation of my remarks. I do not consider having a good product as incompatible with the making of a profit, because the making

of a profit per se is the follow-on result of the things that you mentioned.

What I was pointing out is that, because, in effect, as a servant of the stockholders, the company's ultimate aim is to make money, they can't lose sight of the fact that the way to do that is through creativity, invention, making a good product, handling their people correctly.

Those things are not ends in themselves. It is not an end in itself to have a good product or a good this or a good that. The end result which derives from doing all these things correctly is to carry out your duty with the stockholders and management.

MR. RABINOW: No, sir. The end result is to produce a good product, and if you can make a profit on it that is fine. The end result is not to make a profit. This is not what a corporation's purpose is.

PROFESSOR OPPENHEIM: Mr. Howard.

MR. FRANK HOWARD: The underlying question, of course, for this whole panel discussion has been: What is the desirable incentive for inventors?

The question was asked whether the providing of a direct financial incentive for an employee-inventor tends to work in the opposite direction by creating a tendency to withhold disclosures and not cooperate. That question I have tried to answer for myself over a long period of years.

The German law beginning about 1942 made the provision that company contracts for the assignment of invention by employees were invalid, that the employee must have a separate fair compensation for each invention assigned. That is the one change in the basic law of Germany which the Nazis innovated which has been continued by the Federal Republic. It has not only been continued, it has been strengthened and all details worked out. There is now the additional provision that the income tax rates in Germany, which are relatively high, are reduced by one-half for such compensation as is received by an inventor in return for the assignment of his invention. So you have a double benefit to the inventor in the German corporation. He is entitled to receive separate payment for his invention on assignment to his employer, and he is also entitled to treat that payment as a special type of income on which only one-half the normal tax is paid.

Now, what has been the effect? The opinion is mixed after this long interval. I have followed it closely in three very large companies and in one middle-sized company.

In the middle-sized company there have been some noticeable tendencies toward concealment of inventions by the inventor until such

time as he is sure he has gotten so far with it no one else could claim they should share it with him.

In the large companies that tendency does not seem to have been important.

There is still divided opinion in Germany on whether the requirement for separate compensation for employee inventions is or is not on the whole a good system. I believe, however, that a majority opinion is that it is a good system, that it has tended to promote increase of invention in Germany.

Thank you.

PROFESSOR OPPENHEIM: Yes, ma'm.

MRS. HELENE DEJONG: I was quite shocked by Mr. Simpson's statement that in his company there is a mandatory expectation of one disclosure per researcher each year. It seems to me it has an element of compulsion which I feel is quite contrary to the true nature and conditions of creativeness.

In the same area of compulsion I would place Professor Mosel's reference to predictability and the introduction of restraints. And the suggestion in the McClellan proposal to prohibit the transfer of title copes with it.

Also I notice Mr. Greenlee's reference to an atmosphere of urgency.

All these are elements of compulsion which are not known to bring creativeness to full flower.

In the light of all this I would also like to remember what Professor Mosel said in his remark that social scientists do not really know the solution and that it does not lie only in material rewards. But it seems to me that it is fair to assume that it lies somewhere in the area of unlimited time, freedom from details and from the stresses and demands of daily life. Further, we also know that some of the most famous inventions took years to come to light and several more years to be developed and improved.

And now I want to go back to what I first said. This mandatory expectancy in Mr. Simpson's company of one disclosure a year. In this connection I noted that Messrs. Hanifin and Travis stressed more the human conditions and the human elements in their expose of prevailing conditions in their respective companies. In this connection, I would like to ask these two gentlemen whether in their companies there also is such a mandatory expectancy as to quantity in the definition of performance.

MR. SIMPSON: We don't have a mandatory expectancy. It has just happened this way. Therefore, because it has happened that way so

many years, we believe it's predictable that it's going to happen again. We don't insist on it or demand it. It just happens.

MRS. DEJONG: What if a person does not perform in this respect in one year?

MR. SIMPSON: Some people make a hundred, and some make none. On the average it turns out statistically, with that number of people, to be about one a year.

MRS. DEJONG: It seems to me that you pointed out it is expected of one researcher.

MR. SIMPSON: I expect it will happen each year because it happened last year, and the year before, and the year before.

MRS. DEJONG: Therefore, it has become habit, has it not? Custom?

MR. SIMPSON: It just happens. I don't demand it or insist on it. It just happens.

MRS. DEJONG: Thank you.

PROFESSOR OPPENHEIM: Yes, sir. Time is getting limited so I'm going to try to entertain more questions instead of asking for too many of the counterpoints.

MR. BURKE WILFORD: I'm Burke Wilford. I'm representing the American Society of Inventors here, which is a group in Philadelphia, which hopes to become useful nationally.

I notice you are concerned mostly here with the captive inventor.

Now, what we are interested in is how do large companies assimilate ideas from the outside, and how can you get more confidence in the average inventor to present his ideas?

This is a very fertile field where there is no productivity now, or very little, and we should encourage it.

I'd like to ask that of Professor Travis.

PROFESSOR OPPENHEIM: Well, in his absence, I notice there are two companies that I think from all standpoints are considered large, Westinghouse and International Business Machines. Do you want to start that off, Mr. Hanifin?

MR. HANIFIN: IBM has an outside submission plan where a person can submit his suggestion whether patented or not patented, for consideration.

When submitted, the information is usually forwarded to various groups in the company that may be interested. If any of them are interested, recommendations are sent back to the headquarters group, and an agreement is made with the submitter.

Beyond that, we spend considerable time in the company insuring our machines are clear of infringement. Any time that we find we

may want to use a patented invention, the patentee is contacted and an agreement is usually concluded with him.

MR. WILFORD: Do you have any difficulty with the engineers due to the fact that the invention is from outside the organization, that they resist it? The "not invented here" complex? The inventor should have a conference with the Engineers as well as the Patent Department.

MR. HANIFIN: I suspect we have some of that, but evaluations are obtained from a number of different groups and hopefully we keep any such resistance to a minimum.

MR. WILFORD: Thank you.

PROFESSOR OPPENHEIM: It certainly is most gratifying to note the number who still want to address questions, but I suppose, as is always customary, we have to have a cutoff point, since, as you know, we do have Part X, the inventors' round-table. It may be that after that there will be further time for the additional questions which may be related to that subject.

We had anticipated a seventh-inning stretch and break, but I have just received word that a motion has been made, seconded and unanimously adopted that we go on without interruption. The peril, as you know, for people like myself who come from the Middle West and for those of you who are accustomed to a 12 o'clock lunch, is that you might have a reflex action and think it's lunch time. So we'll go right on with the inventors' round-table and take a break if you wish to get up and stretch while the participants come to the platform.

I thank the panel for their excellent discussion in this first phase of the morning's program.

DIVISION B—INDIVIDUAL MOTIVATION

PART X—INVENTORS' ROUND-TABLE

PROFESSOR OPPENHEIM: Gentlemen, we're now ready to proceed with the inventors' round-table. As you know, I have been substituting for Dean Spilhaus, and I'm only a part-time moderator.

John Green is well known to you. I think if there is a category of professional moderators, he would by all means qualify for that role. He has served in that capacity, as well as in his other activities, for the Foundation for so long.

So without more ado, all of you knowing John Green and his official status and many achievements, I turn the meeting over to our next moderator.

MR. JOHN C. GREEN: Thank you, Dr. Oppenheim.

The panelists today share the audience's needs as far as the men's room and the luncheon are concerned, so I think we are going to move into this portion as fast as we can.

I would like to dispense with the biographies. These are all estimable gentlemen here. They're married, respectable, and went to school, all that sort of thing. They have received many distinctions. But, most important, they are successful practicing inventors, and they have been sitting here for a couple of days listening to what has been going on. Now they are going to give us a critique and also their own version of the needs of the inventor.

We will give each of them about five to ten minutes to talk, and then if there is time available we will have a question and answer period back and forth.

So let's start in with Dr. James Beggs, a well known electronics engineer from General Electric.

MR. JAMES E. BEGGS: Gentlemen, I should like to preface my remarks by saying that I feel very honored to have been invited to this meeting where so many interesting and worthwhile papers have been presented.

If I have contributed anything in the matter of creativity in my work at General Electric, considerable credit must be given to two desirable working conditions that I have enjoyed. One of these has been the freedom that has been granted me to work on projects of my own choice. The other has been the help and cooperation I have received from my co-workers.

General Electric allows their research and development staff to do some work of their own choice. This freedom of action permits a worker who gets a new idea, or observes an unexpected phenomenon, to take the time and expend the effort to more fully study or evaluate it.

I should like to relate an example of how this freedom of action can result in innovation of value to the employer. A few years ago, my work was involved chiefly with the design and development of small microwave receiving tubes. At that time, the local power company installed a new generator in their system that resulted in a high level of interference to my home radio reception. Because of my interest in the subject, I was able to study the character of the electrical interference and to test devices for suppressing it. The final result of the work was the development of a shielded loop antenna that could eliminate most of the interference. The built-in antenna used in most radio sets today was the outgrowth of this work. In this case, the freedom to work

on a project of personal interest resulted in an innovation of commercial value to my employer.

Even at times when I have been doing work on a government contract, I have been fortunate that I have been able to carry on diverse activities that in several cases led to innovation in other fields of interest to both my employer and the government. Thus, I feel that innovation is fostered by providing an inventor the time and facilities to work on projects of his own choice.

The second desirable working condition is that of having the full help and cooperation of co-workers. This help is freely available when a worker's progress and salary are determined by a wide variety of factors including number of patents, disclosures, suggestions, cooperation with others, etc. By giving co-workers full credit for their contributions, their status is enhanced and they are more willing to help solve other problems.

An example of a cooperative effort that resulted in manifold innovation occurred during the development of a new metal-ceramic tube that was required for a microwave application. With the help of metallurgists, a new metal, titanium, was chosen for the tube structure. A ceramist designed an insulating material with the same expansion characteristics as that of titanium. A chemist identified gases that were evolved and aided the ceramist in removing their source. A physicist studied the electron emission problems, and an electronic engineer worked out circuit configurations. This cross-linking of problems and solutions resulted in patent disclosures being written in each field of endeavor. The interaction of ideas from the different fields of effort bred innovation in each field. The degree of cooperation and resultant innovation might have been greatly reduced where compensation is based chiefly on the number of patents or disclosures that are produced.

I have made these few comments in an effort to show how my own experiences tend to confirm some of the views presented by several of the speakers who have appeared previously.

(Applause)

Thank you, gentlemen.

MR. GREEN: Thank you, Dr. Beggs.

Before Dr. Beggs came up, Harry Mayer said to me on the side, "This man is a real inventor. He has a long record in electron tubes and in radar and all that sort of thing." And I'm very pleased to relay this information.

I also want to say that all these gentlemen up here are real inventors.

Our next inventor is Dr. Henry Kalmus. I remember a story about him. I'm not sure it's true but I'd like to find out.

He was chief scientist with a big corporation out in the Midwest who came to Washington to recruit Jack Rabinow. And he and Jack went out to dinner, and Jack ended up by out-talking him and recruiting him for the National Bureau of Standards. (Laughter)

MR. RABINOW: May I interrupt? They offered me a thousand dollars more than I was making and I offered him two thousand dollars less than he was making, and I won.

(Laughter)

MR. GREEN: Then that is a true story.

Well, Henry has combined a successful career in industry and government and is now Chief Scientist from the Diamond Laboratories.

Dr. Henry Kalmus.

DR. HENRY P. KALMUS: This story is really true.

Now, as an inventor and as a supervisor of inventors, I'd like to suggest a little way to improve the productivity of your laboratory.

You know, there are three phases in the life of an inventor. First in high school. Every inventor starts already inventing in high school. He doesn't know much about physics. He doesn't know much about prior art. So he's an extremely prolific inventor. He invents things that have been invented before. He invents perpetual motion machines. He has absolutely no inhibitions. He is an excellent inventor.

Now, then, comes the next phase. He goes to college. He learns physics, and he gets impeded. He develops an inferiority complex. He sees other people are very smart.

Now, what happens is that his outlook has swung the other way. First it's very positive; now it's negative. And slowly he grows up, and he knows his own limitations, and he becomes really productive.

What can we do? Of course, we cannot "create" inventors. Inventors are here or they're not here. But we can fix this servo loop of his. In the first phase we can apply a little bit of damping, and we can tell him, "Study. Read good periodicals and learn physics and keep this great invention activity for a little bit later."

And later on when the servo loop has swung the other way we have to increase his self-confidence. As Jack mentioned before, we should love him. We should love his inventions. We should show it to him. We should admire him. Nothing helps more than to be admired by a man whom he admires. So we make it easy for him to grow up and to increase his productivity. And this way you can increase the productivity of the people who are working for you.

That's all I wanted to say.

(Applause)

MR. GREEN: Well, we had a speaker from the electronics industry, and I think it's fair to say that Dr. Kalmus is heavily weighted in the electronics. Let's move over to another field, petroleum, and ask Dr. William Sparks, Scientific Adviser at Esso Research, for his views.

Dr. Sparks.

DR. WILLIAM J. SPARKS: Members of this Conference on Incentives for Invention, I have found this meeting highly interesting and inspiring. My first reaction to the conference was the inference that some change needed to be made in our patent system. That does not mean that we need to change the patent law, but certainly the inventive environment can be improved.

For example, under the patent law an inventor's name is on the patent as issued. That is law. Many times his company announces a new development and refrains from mentioning the inventor. The public gets the impression that companies make inventions, and the inventor loses his desire to invent. That is social practice.

The American Institute of Chemists is putting on a campaign at this time to convince company management that properly crediting the inventor is in company interest.

Now, on this panel I probably represent the big organization inventor more than anyone else. I have worked for the largest paint company, the largest automobile company, the largest chemical company, the largest government and now the largest oil company in the world.

In agreement with Mr. Pierce, I have never observed at any level of management in any of these companies a lack of desire to get and to use patents.

My research friends in other companies say, "Bill, what is the matter with us? We're not getting enough patents per dollar spent in research."

Mr. Beggs was not very enthusiastic about direct increase in incentives for the inventor. The so-called divisive effects in group effort in an organization would be like giving Mickey Mantle a higher salary and ruining the morale of the New York Yankees. It doesn't happen.

Yesterday Mr. Pierce said that other rewards could be found. He was rather vague. But Mr. Rice brought it right out in the open. The reward is to give them an office with a rug on the floor, curtains on the windows, and a private secretary and to call them executives. That is what is being done.

It is like the president of a university in the enthusiasm of the

moment rushing out on the field, giving the star football player a Phi Beta Kappa key and making him professor of philology.

Wouldn't it be better to make invention a satisfying career in its own right?

With the increasing complexity of our society, the needs for management become greater. With the increase in management of our society the complexities become greater. This rationalization of Parkinson's Law has special bearing on our subject.

When the baseball team here in Washington isn't doing well, the manager is fired. In research organizations we don't fire the manager. We merely pile on another layer. Management is becoming the goal of research and the ambition of scientists. Our non-managerial inventor rates low in his research community, even contrary to announced organizational policy.

I suppose you have all heard the story of the bright young executive from General Electric who went out on a recruiting mission at one of our great universities. He met the professor, described the type of bright, athletic, dynamic, personable, affable scientist that he wanted to hire. The professor said, "What if we had another Steinmetz?"

The young executive replied without hesitation, "Oh, we would not hire him."

I could say a lot about incentives for invention. I'm going to start at the top level. We need imagination here in Washington. We need inventions, useful inventions, to give this nation "vigah." C. P. Snow talked of the intellectual and scientific civilizations which could not speak to one another. The situation is worse than that. We have scientists who belittle the inventor whose discovery laid the basis for their later interpretation of his results.

Other than company presidents, why are there no outstanding inventors in our National Academy of Sciences? Was that the intention of Abraham Lincoln when he founded the NAS in 1864? He is the same Lincoln whose motto is written over the Patent Office entrance door, "Patents add the fuel of interest to the fire of genius." Lincoln himself was an ardent supporter of practical science. How could his dream of a complete Academy be fulfilled?

Ladies and gentlemen, I propose that along with the National Academy of Sciences and National Academy of Engineers there should be established a National Academy of Inventors. Its job might be to provide a damper of objectivity to the unbridled stampede to spend our tax money on more and more so called basic research.

More seriously, an Academy of Applied Arts could give recognition

to those who have made a career of creating new contributions to our gross national product and would make available to the Government under Congressional Charter the most objective minds in the Nation.

(Applause)

MR. GREEN: Thank you, Bill.

You know they use this term "independent inventor," and every inventor I have known, whether it was Bill Sparks in Esso or Dr. Beggs in GE or anybody else is independent. And I think Bill just demonstrated it.

But we also have independent, independent, inventors, our next speaker, Dick Walton, is one of these. He is in business for himself, and he is successful. In fact, he is so successful that he had a page 1, column 1 story in the *Wall Street Journal* a couple of months ago in which they recounted his exploits.

Dick will tell us the special problems he faces in dealing with the business community.

MR. RICHARD R. WALTON: Members of the Conference, I first wish to commend the Foundation on this wonderful meeting and pioneering job they are doing in the gathering of data and information. It certainly is a long-felt, essential need.

I speak as an independent inventor in the relatively narrow, nowadays unglamorous, field of textiles, laundry, paper, and nonwovens.

Our country is reaching a peak in the dramatic reappraisal of our creative potential and its utilization. The mere changing of the tailfins of our cars or superficial design of our products is no longer sufficient to compete in the world in which we live. The implacable yardstick of the Common Market, the automation (not the low wages) in Japan, the influx of high quality European inventions are the handwriting on the wall. And though this should sound pessimistic, it is really a very healthy and timely thing that is happening to our country; and I believe that after the many lush years following the war the ground is fertile for locating and using the true creativity which has always existed.

I think a clarification about motivation is in order. Many people strongly believe that individuals will have good ideas, will make inventions, and will even take out patents without a strong profit motive in mind. I agree with this completely. The sheer pleasure of owning a ribboned patent, or being known as someone who has an invention is often sufficient satisfaction.

But here I must sharply differentiate. I do not believe that the inventions or ideas or patents expressed above is what we so desperately

need. We need successful innovations, and by successful innovations I mean high calibre, valuable inventions (or ideas) carried through to successful manufacturing and sales.

As to the motivations of innovation, I wish to state categorically that there is no great and successful industrial innovation that has not been accompanied by a very strong profit motive. The inventor is pushed from behind by the spector of want and failure, but he is pulled forward by the opportunity of large gains if successful. Actually, in speaking of motives, probably the nicest of them all is the profit motive. Many great inventions have been made in anger, to get even, because of hurts or humiliations. It must be remembered that an inventor's family probably suffers the most because of the poverty which they are forced to undergo, without the compensating inner drive which the inventor himself has. It must also be remembered that there may be a very small line of division between the potential inventor and the clever law breaker who lands in jail. They are both creative people, and it has been the near criminal inventor who has made things so difficult for the sincere inventor.

A valuable innovation requires a rather unusual individual or chain of individuals and events. An innovator is a dreamer and at the same time must be a practical realist. He must have an intuitive market research sense, else why should he work for years on a new development, for which any intelligent man could tell him that there is at the time no market. And this is something we often forget, there is no obvious market for a true innovation during the majority of its development.

An innovator may be quite lazy but have great energy and determination for the ephemeral thing in which he so strongly believes. Salesmanship is vitally important in an innovation. As Dr. Schon said yesterday, a modern corporation is the most efficient organization to manufacture, distribute, and sell high volume products and automatically, by definition, becomes antagonistic to true innovation. It might be well to add that the independent innovator has as good a chance of selling a large corporation as does the engineer employed by the corporation. But here the motivation is quite simple; fear that a competitor will successfully use the invention can be stronger than the desire to market the invention for its own sake. I have great admiration and sympathy for the executives who must make the decisions on outside inventions, because they are taking the great risks.

I believe we have more than ample creative talent; we certainly have the needs and problems, and we have the industries which desperately

need new products. What then keeps the independent inventor and our creativity separated from the industry which needs them? I may not be accurate about the details, but I believe that Kodachrome was invented by two school teachers and the ballpoint pen by a mortician. Obviously, no self-respecting executive could ever hire two school teachers and a mortician with the expectation that they would come up with inventions like these; and even if they did, their company probably couldn't have used these inventions because they would be foreign to their field of product interest, and they probably would have been shelved. By this example I wish to indicate that unusual creativity will frequently come from people outside a corporation.

A few suggestions I would like to make which might help in solving this problem. First, a common meeting ground for the creative people and the corporations. (Specifically not a place to evaluate patents and inventions per se.) Second, the elimination of the mutual distrust that exists between the corporation and the individual. And third, enhancing the role of the inventor in our country with a view toward eliminating the Rube Goldberg appellation which so often is placed upon them.

A common meeting ground might be The Patent, Trademark, and Copyright Foundation of The George Washington University or the Academy of Applied Science in Cambridge, Massachusetts. Either of these organizations would be an excellent focal point for the meeting of industry and inventors. Certainly it would be no problem to register the inventors; they will be more than anxious to establish this relationship, and certainly industry is anxious to find truly creative talent. The real problem though will be that of screening the integrity of the inventor, not his ability. I believe it is this wall which divides the companies and the individuals.

As John Green will remember during World War II the National Inventors' Council received many abstruse, complicated solutions to very essential problems. There would be pages and pages of some electronic solution for a death-ray that killed at 1000 yards and only weighed five pounds, a device the army desperately needed. The Council found it was much simpler and cheaper and quicker to go see the man that sent in the solution rather than attempt to evaluate it themselves, because the man is the invention, because an invention is a living, dynamic thing, and we could judge the integrity of the invention by the integrity of the man who had conceived it. I recall many years ago when I inadvertantly heard that a company was checking on me personally through a bank, and I was completely mystified because I

had no reason to think that they were interested in me in any way. I found later that this company made a policy of checking on the integrity and character particularly of inventors because it saved them so much time, heartache, and legal expense.

Second, the elimination of the distrust that exists between the corporation and the individual. There isn't a major company in the country that hasn't been badly lacerated by one or more encounters with outside inventors. They have very good reason to be cautious about any contact with the amateur inventor. By the same token, there isn't an amateur inventor who doesn't believe that the railroads stole his grandfather's invention which would have been worth many millions of dollars. So this mistrust also exists among the inventive fraternity.

Personally, I have never even remotely had an invention stolen. I think companies today are so frightened of the individual that they wouldn't make the slightest move in that direction. Besides, it is so difficult to give an invention away today, why should anyone steal one.

I believe that the common meeting ground, whether it be the Foundation or the Academy above could immeasurably help to remove this distrust by a training course or service for chosen applicants.

The basic causes of the mistrust are usually the lack of knowledge on the part of the inventor; such as an unrealistic value which he places on his invention, his lack of knowledge as to the great expenditure of time, money, effort and risk that a company must make in developing his invention, his inexperience in making searches and working with good patent attorneys, his lack of realization in the necessity of salesmanship, the essential need of a good model to thoroughly prove the validity of his concept. He can be taught these things. He can easily be instructed in the art of making a contract, how down payments, royalties, and minimums have very commonly accepted values. How an inventor, if he has confidence in his invention, should partake of the risk along with the company rather than demand large initial sums of money. I believe that a relatively simple course of instruction or counseling could go a long way toward removing this barrier.

The third point, enhancing the role of the inventor, should not be too difficult to do because I believe that publications would be pleased to cooperate if the proper material were made available.

Somewhere during high school or college we are smothering or losing our creative people, and perhaps if inventing could acquire more prestige, it would give these young people a goal to strive for. Inventing is hard work, suffering, and there is no reward for failure.

It must be remembered that the inventive person is too frequently the odd ball in his class who somehow fails to fit in, sees the world through different eyes, is interested in only one or two subjects and rarely makes the honor roll.

The foregoing represents only a start toward the utilization of our talents; but if we concentrate on the individual, locate him and counsel him but not pamper him, the valuable innovations must follow for which he must be rewarded.

(Applause)

MR. GREEN: We have had a social invention here. In approximately half an hour these four gentlemen got the program back on schedule. (Laughter)

QUESTION AND ANSWER PERIOD

We now have ten minutes for a question and answer period. Is there anyone from the floor who would like to lead off?

Surely, Harry.

MR. HARRY MAYERS: I would just like to assure Dr. Sparks that the man who refused to hire a second Steinmetz has been fired by the man who invented him. (Laughter)

MR. GREEN: Next comment?

MR. MARSHALL SITTIG: I'd like to offer a comment. I will offer this for everybody else's consideration. Mr. Mosel finally concluded that the two essentials to creativity and to inventive creativity were an organization having high entropy—in other words, a high order of disorganization first—and second, high security in the face of risk taking.

I was intrigued with this, because I have worked with industry about 20 years. Currently I work for Princeton University in the administration of University patents.

Certainly those two factors describe a university. In other words, high entropy. You have an essentially inverted organization chart with the faculty co-equal on top and whatever else is left beneath it. (Laughter) Sincerely. That's the way a university is organized, the way Princeton is organized.

Then the business of security in face of risk taking. You have got that through the tenure-of-faculty concept.

Yet, interestingly, considering those two things, I think universities are probably one of the poorest producers of patentable inventions that we have.

So I submit that whether it's the business of financial motivation, and so on, I don't know, but I just offer that commentary on his two basic criteria. I say that they don't make a case.

DIRECTOR COLCLOUGH: As his colleagues we will pass the word along to him at George Washington University.[1]

MR. GREEN: My uninformed reaction is maybe it's because they live in an uneconomic environment.

MR. RABINOW: I think he said that these were the necessary requirements but not the sufficient requirements.

I'd like to repeat a remark I heard from Dr. Goldman, one of the research directors of Ford. He said one of the interesting things about having a research laboratory is that you don't know what business you're in. He believes this literally. Now, if you're really going to support research, you might as well give up the idea of making a particular product.

The Ford Company, for example, found themselves in the tool business because somebody came up with an interesting new tool that's making money for them.

You really cannot tell what you're going to be doing ten years from now if you really have a good R&D laboratory because one thing you know for sure is that you will not be doing exactly what you are doing now.

And this is a very hard thing to swallow for conservative companies.

MR. GREEN: Dr. Sanders.

DR. SANDERS: My only observation was perhaps this was really a confusion of semantics. What I think Professor Mosel had in mind was creativity, and we confuse patents with invention or creativity which is even broader than invention which in turn is broader than patents. Really many new ideas do not lend themselves to patents or they are not patented but still they are creative.

MR. HOWARD: This is a perhaps rather insignificant practical point, but I am sure the inventors know that under the 1954 amendment of the income tax law the purchase price of their invention is treated as capital gains, not as income, even though they be professional inventors as is our friend Mr. Walton.

Now, the second point I'd like to mention is that the Administration in its request for changes in the income tax law suggested that this be

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[1] Mr. Sittig's remarks were brought to the attention of Professor Mosel who responded as follows:

"Mr. Sittig is implicitly making two assumptions; namely: (*a*) Creative activity is equivalent to patent-producing activity, (*b*) The business of a university is to produce patents. I see no reason for accepting either of these assumptions, so I am not surprised that universities, while they meet my conditions for creativity, are not highly productive of patents. From my viewpoint Mr. Sittig's paradox is no paradox. The purpose of universities is to discover and disseminate truth—and truth is rarely patentable."

changed. They wanted receipts from the sale of invention to be taxed as ordinary income.

Up to this moment the House Ways and Means Committee has decided against that.

It has even gone further and extended to such proceeds of sale of invention the benefit of the maximum capital gains tax reduction. That is, it comes down to 19.5 per cent instead of 25 per cent on a three-year basis.

As I remember, that is the present situation. But there is no security in that because the Administration perhaps will still fight for their original view.

Anyone who has an interest in that should perhaps keep it in mind.

The third point I'd like to make is we have had suggestions here, and there is quite evidently at least some growing opinion, that corporations should provide more substantial direct awards of some kind to their employees for assigned inventions.

Even where that is now done—and it is done now to quite a substantial extent, although the awards are rather small,—it is usually not treated as purchase price of the invention. Corporations find difficulty in reconciling the theory that they are buying the invention with their fundamental theory that they already own the invention and the award, if made, is a mere "tip" being given for delivery of something already owned.

The result of such legal reasoning is that the award is taxed at income tax rates instead of at capital gains rates.

Thank you.

MR. GREEN: This question of the tax aspects of invention, of course, is one in which this Foundation is actively interested. Those of you who heard Dr. Bangs and Dr. Creed yesterday know the Foundation is in the forefront on this matter I believe it is instrumental in changing positions on the Hill on this very point.

MR. RABINOW: John, one point. One of the reasons that the Department of Commerce is now recommending that this law be changed—and I have this from a friend in the Department—is that they found out that the number of inventions and that American inventiveness has not changed since the law was passed. Therefore, there is a move in the Department of Commerce to change the law.

The general feeling is this. They gave the inventors special tax loophole in that if he sells the invention and gets royalty income, it is called capital gains. They have found there has been no significant change in the number of patents issued per person, per period of time,

or per anything else. They, therefore, feel that they might as well go back to the old system and collect tax money.

MR. GREEN: Let me say first you're not talking about the Commerce Department.

MR. RABINOW: No, the Commerce Department made the decision first.

MR. GREEN: It's changed since I left there a month ago.

MR. WALTON: I forgot the most important point of my talk. When I was categorizing the innovation I meant to say categorically that there is no innovation of any great value that has not been accompanied by a very strong profit motive.

Now, I'm talking about a completed, finished, sold invention that's selling over the shelves. Somebody in that chain of events wants to make a profit very badly. And these are the kind of inventions that our country needs. We don't want them on the shelf.

So I say the profit motive is the nicest word I can use to describe motivations in this field.

MR. GREEN: Burke?

MR. WILFORD: Being an inventor myself and a handler of other inventors, I have made notes. As we have spent most of our time on the corporate problems of how to encourage him, I want to kind of state the basic inventors' problems.

The first problem is it's very difficult for an outside inventor to even scrape enough money together to get a decent patent structure. This may take him five years to get some basic patent.

Then, when he has that, its validity is immediately contested, and there is no simple way that he can, without going to the Supreme Court or the Court of Claims have that validity established.

Now, another matter inventors resent tremendously is the fact that the government gives you a patent—say he thinks in his own mind it's rather basic or should have been basic if the claims have been properly drawn—and then, particularly if he hopes to collect from defense work or from a manufacturer that's doing defense work, immediately when he gets into discussion there are a whole raft of lawyers of the services and the Justice Department trying to break down his patent structure and drive him away from any real hold on his true invention.

I think inventors have the idea if the government gives them a patent that no one in the government should have anything to do with trying to break it down. He's perfectly willing to pair himself off against civilian efforts to do this, but to have his government give him a patent, in which he has probably had to beg and borrow every cent

he can to get it, and to have every section of the government working against this is discouraging.

Now, another matter I think this will do more to establish real creativity in this country, leaving out entirely the legal details. Something should be done to overcome the three things that always confront him:

First, "It won't work." It usually takes a couple of years to convince people the idea will work, and will be timely.

I know in the case of the helicopter in the Navy the chief aerodynamicist was paying someone else something like $15,000 to write a report that no helicopter over 5,000 pounds would ever fly. And yet within a year and a half after that my associates built a transport helicopter that weighed close to 10,000 pounds, and flew well.

It is really difficult to convince people. For instance, now we need submarine aircraft carriers. Yet our difficulties with submarines will militate against preliminary design information being contracted for. This is not a new difficulty, but they just don't believe it will work.

Second: Then you come up with, "There's no written requirement." This is the next thing. This takes operational studies. Third: And then, when you get through that, "Well, we'll have to wait until next year's research budget."

So that your most important thing that could be done governmentwise to encourage invention, both with big business, with small business and with individuals, is an understanding with the creative mind, the inventor, creative scientist, the innovator. If it's good enough to start to develop it's good enough to have an understanding with the individual at that time and not wait until production is established.

There is a law now or an opinion that the government does not have to pay people who have brought a development to a point where actual development starts. This should be changed, production takes too long.

Now, the third thing, and I want to stop with this: We all realize that if you go through all the three things—that it will work, that there is a requirement, and you finally have got it started, and let's say there is $100,000 spent in the development field—the inventor should be tied to that development. Too often he's cast aside and he has to wait three to five years while someone works on the development making mistakes or wasting lead time.

I had a case with Christie and his son where the Army, not willfully, not knowingly, but some eager beavers in the tank department, took his idea and they spent I think three or four hundred thousand dollars. They put it on the biggest tank they had. It should have been tried

on the lightest design. The result was the whole development was held back ten years.

The inventor must be hooked in with the development, at least as consultant, and work for a percentage of the work.

So, with these three things, I would like to see the Foundation study the problems of the inventor, not just the problems of the company that's trying to handle the inventor, whether he be part of the organization or outside it.

And I think this will bring about what Dr. Sparks has suggested, which is the most constructive one I think, that there should be a National Academy of Inventors.

MR. GREEN: Thank you, Burke.

That is a pretty complete wrap-up of the problems of the inventor dealing with the government, and maybe it's a good time to bring this part of the program to a close and turn it back to Admiral Colclough.

DIRECTOR COLCLOUGH: Before bringing the Conference to a close, I ask your help in spreading the word that, as you will note in the *Digest*, the most recent issue, which is in your folder, on September 1, 1963 the Foundation's name will be changed to The Patent, Trademark, and Copyright Research Institute of The George Washington University.

This came about after careful study of the name by the Advisory Council, which then recommended to the Board of Trustees of the University that "Research Institute" today is regarded as a more appropriate description of this organization's work than the present title, with no change in the organization or objectives.

I might say—not too lightly either, since one of the great problems of nonprofit organizations is raising funds—there are many people in this country who identify the word "Foundation" with giving money, not asking for it.

I repeat the appreciation for the splendid contributions made to this Conference by the invited and the Foundation research contributors.

I also extend again on behalf of all of us our congratulations to Dr. Joe Barker, the recipient of the Kettering Award.

But now, principally, at this closing moment I want to thank all of those who participated in this Conference, all of those who attended and participated so heartily, because, in the final analysis, in discussions of vital matters such as this, the attention and participation of those who are attending the Conference are vital.

So thank you all again, and the Seventh Annual Conference stands adjourned.

(Applause)

(Whereupon, at 1:08 p.m., the Conference was adjourned.)