ANALYSIS

BNA's
PATENT, TRADEMARK & COPYRIGHT JOURNAL

1977-78 Legislative Review and Outlook

Concern over energy, the economy and the social security system left the First Session of the 95th Congress with little time for legislation dealing with intellectual property, but the forecast for the Second Session is a little brighter. It can reasonably be anticipated that during the upcoming year Congress will work on fashioning a uniform government patent policy, overhauling federal drug laws, including trade secret protection for drug data, and "fine-tuning" the new copyright law, P. L. 94-553, now in effect.

Committee Reorganization

The decision by the Senate Judiciary Committee to abolish its Subcommittee on Patents, Trademarks, and Copyrights and vest jurisdiction over intellectual property matters with its Criminal Laws and Procedures Subcommittee (see 323 PTCJ A-23) was an early hint that the Senate would not initiate any major legislation involving patents, trademarks, or copyrights. This realignment was adopted, presumably, to accommodate the desire of Senator John L. McClellan (D-Ark.), chairman of the Criminal Laws Subcommittee, to remain active in the patent reform field. Senator McClellan's death on November 28th has, therefore, created a void in a key leadership position and might result in a further reshuffling of legislative assignments. (See 356 PTCJ A-20.)

Government Patent Policy

Serious disagreement within the Carter Administration and within Congress as to the allocation of patent rights resulting from federally-funded research and development contracts makes it impossible to predict anything other than that this issue will get a thorough airing during the next Session. Legislation, supported by the Commerce Department and industry, has been introduced in the House of Representatives, (Thornton, H. R. 6249) under which any resulting patent rights would presumptively belong to the contractor doing the federal research. The Government would be left with a nonexclusive, nontransferable, irrevocable, paid-up license, as well as "march-in" rights to order the licensing of a patent if it isn't being actively pursued to commercialization. See 324 PTCJ A-6, 325 PTCJ A-4, D-1. Hearings before the House Subcommittee on Science, Research, and Technology are scheduled for March.

Crying "foul," supporters of the so-called title policy, which would allow the Government to retain ownership of R&D inventions, hope to derail what one has characterized as "one of the most radical, far-reaching, and blatant giveaways * * *." The waning days of 1977 saw several proponents of the title policy testify before the Senate Small Business Monopolies Subcommittee. (See 358 PTCJ A-11.) Antitrust Division chief John H. Shenefield spoke out forcefully for the title approach and was backed up by Federal Trade Commission Chairman Michael Pertschuk.

The battle lines have thus been drawn. As it appears that the views of Commerce and Justice are irreconcilable, President Carter may be forced to make a major policy decision. While the side the Administration ultimately supports will obviously have a major advantage in having its views enacted into law, Congress may continue to dodge the issue as it has in the past.

Patents

No attempt at comprehensive patent reform legislation, similar in scope to S.2255, was made during 1977 and the upcoming year should be no different. Congress' inaction can, in part, be explained by the rule changes adopted by the Patent and Trademark Office, most of which took effect on March 1st. See 298 PTCJ A-12, E-1, 308 PTCJ A-11, and 314 PTCJ A-1, D-1.

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Send
Joe Keyes
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Reviewing Patents on Life Forms 3/14/78

General Electric's victory securing the right to patent a life form that it developed in their lab should trigger a sweeping review of the patent process. Currently it protects technologies that produce harmful social and biological consequences. Such a reassessment could transform the patent process into a tool for controlling technologies.

That could be achieved by requiring each patent application to include an impact statement detailing the expected consequences of commercialization of the idea. Such a document would be similar to the environmental-impact statement that is now routinely prepared for federal projects.

After submission, a patent application and consequence statement would be screened. Those ideas that could have a deleterious effect on either social or biological systems would be referred to a patent forum composed of an interdisciplinary group. The forum would have the power to reject the patent if it found that its negative consequences would be greater than its positive contribution.

Without the security of a patent, harmful inventions would not be commercialized and no incentive—other than technological devilishness—would exist to encourage production of the new product.

The creation of a patent forum could give real power to people who have been pushing technology assessment. Too often the technology assessment and environmental-impact-statement process is simply an impotant paper exercise.

SAM LOVE

Chevy Chase

Glennon

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Francis Boyer *

A BASIC PHILOSOPHY FOR U. S. GOVERNMENT PATENT POLICY

The disposition of patents deriving from research subsidized either in whole or in part—by the government, poses many complex problems. The country is fortunate that, under the able chairmanship of Senator McClellan, the Senate Subcommittee on Patents is making a thorough study of this whole difficult question.

So many viewpoints have been expressed, however, that there seems some danger of our not being able to see the forest for the trees. A sound government patent policy is more likely to result if, in spite of the many difficult technical details, one main principle is firmly borne in mind, namely that the best policy is one which accomplishes the *maximum utilization of inventions for the benefit of the public.*

Is it not apparent that this is the keystone of a sound policy as to government ownership of patents? If complete government ownership will produce the maximum utilization of inventions our policy should be based upon complete government ownership. If, on the other hand, leaving patent rights with or granting exclusive licenses to the contractor will more expeditiously bring about the development of inventions for public use, this should be the system.

With "maximum utilization by the public" as the criterion, certain facts would appear pertinent:

A. Our American patent system is almost universally considered as being one of the most potent factors producing this country's industrial and scientific progress. It is based on the time-tested premise that the granting of marketing exclusively for a given period of time is the best way of bringing new inventions to the public.

* Chairman of the Board, Smith, Kline and French Laboratories.

B. If his reasoning is sound, it is obvious that it should apply to the health field to the same extent that it applies to other fields.

C. In its economic effects, compulsory non-exclusive licensing is equivalent to an abrogation of the basic principle of the patent system. Any policy based on non-exclusive licensing must be based on an outright denial of the efficacy of patents as a factor in our progress.

The following testimony of Dr. Howard I. Forman before the McClellan Subcommittee hews straight through the many complicated questions involved. His concept that inventions are national assets and his thesis that maximum utilization of inventions is of paramount importance to the country are indeed major contributions toward the evolution of a sound government patent policy.

Howard I. Forman *

STATEMENT BEFORE SUBCOMMITTEE UNITED STATES SENATE †

Mr. Forman: My formal written statement more completely identifies my background of experience. But briefly today I would like to say I am a patent attorney and political scientist living and practicing in Philadelphia. I appear here today in a dual capacity—first as president of the Philadelphia Patent Law Association and secondly as a private individual.

The formal written statement which, Mr. Chairman, you have agreed to have incorporated in the record, contains a statement by the Board of Governors of our Association regarding S. 789, S. 1047, S. 1809, and S. 1899, together with the report and recommendations concerning those bills by our Association's committee on Government patent policy.

To conserve time I will read only a portion of the statement of the Board of Governors.

They "earnestly commend the terms of Senate Bill 1047 which would bring to an end the unauthorized taking of patent rights by the Government except when national security requires."

They "also earnestly commend the provisions of Senate Bill 789 and 1809, but not in the precise form presently proposed."

Rather, "they very greatly hope that these two measures might be consolidated and then streamlined in accordance with the accompanying recommendations of our committee on Government patent policy. If such a consolidation could be effected, the resulting system would be flexible enough to permit accommodation to widely varying circumstances.

"On the other hand, it is our view that S. 1899 is unduly rigid in its terms, and that it would provide a

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less effective means for stimulating real advancement, since it would increase the number of instances in which the patent would be owned by the Government and would therefore afford no real protection to a licensee."

That is the end of that formal statement.

The rest will consist purely of my personal views.

In my formal statement I indicated at some length and in some detail my reasons for favoring adoption of S. 1047 and for believing that, of the three remaining bills, S. 1809 comes closest to representing the kind of Government policy we should have.

I made some specific suggestions for amending S. 1809 in some instances by adopting provisions set forth in S. 789. But I will not go into them now, for I trust that the Subcommittee and its technical staff will glean them from the written statement and can best weigh the merits of the respective suggestions upon making such a review.

Mr. Chairman, only a few weeks ago, on June 18 to be specific, I delivered a talk entitled "Government Patent Policy in the United States" at the Ninth Annual Public Conference of The George Washington University Patent, Trademark and Copyright Research Institute. I sent copies of that talk to you, Senator McClellan, to Senator Burdick, to Senator Hart, and to your Subcommittee's chief counsel, Mr. Brennan. I requested then, and I would like to request now, that that paper be incorporated as a part of my testimony before this Subcommittee and I hope you will consider this favorably.

Senator McClellan: It may be received and published in the record.

Mr. Forman: I believe that the prepared statement which I submitted prior to June 1st and the talk I just referred to amply set forth my general views on Federal patent policy and my specific views on the bills you are considering here today.

I would like now to dwell only on the main reasons why I believe legislation of the kind embodied in S. 1809 comes closer to being in the public interest than any of the others, and why S. 1899 is the farthest of the three

bills from being in the public interest.

The proponents of legislation represented by S. 1899 make these three principal claims. One—the public should not have to pay a second time through royalties or higher prices for inventions which arose out of research and development which was at least in part paid for out of Government funds. Two—numerous Government originated unpatented technological advancements have been used by industry. Hence the argument that a patent is a necessary inducement to development of inventions for commerce by industry is invalid. Three—leaving patents in the hands of Government contractors only tends to increase the size and wealth of large corporations, making them more monopolistic, more and more culpable of antitrust violations, and more likely to adversely affect small business.

My answers to these claims follow.

I believe that if the public could be given the whole story, without the headline-hunting labels such as "Billion-dollar giveaways," the average person would agree with me.

With respect to the first point—in the long run this country and all of its people stand to benefit far more if more and more inventions are utilized—that is, made available for use by everyone—than if they are allowed to lie fallow because no one wanted to take the risks of investing in their development.

I for one would gladly pay an extra premium in royalties or higher prices in order to get the benefit of a new laborsaving device or possibly a lifesaving invention, or something which increased my standard of living. I would much rather get those benefits even if my taxes did help pay for the inventions than to run the risk of not having them at all.

Gentlemen, would you object to such so-called "double payments" if they resulted in the development of a cure for cancer or even if it just doubled the mileage you could get on a gallon of gasoline in your automobile, especially when you realize that, under our patent system,

after a stated number of years the invention will be in the public domain?

I know I would certainly not object at all.

I would like to point out an illustration I have repeated many times before many groups to show what I think is the real issue here, or at least one of the major issues.

Our technological inventive ability in this country is necessarily limited. There are only so many inventions that can be made in a given year. For simplicity's sake, I like to consider this in simple round numbers.

We can make, let's say, a maximum of a thousand patentable inventions in a year, 70 per cent—

Senator McClellan: What do you mean make a thousand inventions? Who knows how many inventions may come this year and how many next?

Mr. Forman: We do not know, Senator, of course. This is merely a simplified hypothetical illustration to explain a point.

Senator McClellan: All right.

Mr. Forman: Let us say that in any given year only a thousand inventions are made in this country. They constitute the total productivity of the inventive genius of the entire nation. These inventions are national assets. What we do with them may determine the country's future. They certainly will determine the progress of the country, and maybe even determine the very existence of the country itself.

Now, if 70 per cent of all the money spent in the United States for research and development goes into Government contracts—and if we roughly correlate this in terms of numbers of inventions—this could mean that the future benefits to our nation from 70 percent or 700 out of the thousand inventions are going to be resolved when you settle this question of Government patent policy.

Now, how many of those 700 inventions can we afford to let go down the drain because no one wishes to undertake their development? We never know but that one of those inventions might be the cure for cancer; or it might be the means for causing the establishment of a new

industry; or it might be the answer to some national defense requirement. Because we never know, it is important that we do whatever we can to develop every one of those inventions that we can possibly utilize—and not just be satisfied with a "paper" invention.

With regard to point two, of course patents are not necessary inducements for the development of all inventions. Industry constantly brings to the market-place relatively simple, unpatentable inventions for which there is much demand. When there is very little investment required, there is no great worry about competitive risks, and no concern over the likelihood of imitators coming out with cheap imitations after an expensive investment has been made in research and development by someone else.

Now, if the Government wishes to finance all the risk taking research and development work in its own laboratories, as when the Department of Agriculture makes a new plasticizer out of an epoxidized oil, or develops a new dialdehyde starch, it is a simple problem to find manufacturers for those kinds of products. Such situations only prove how important it is for the manufacturer, who has to invest his own money to develop an invention, to have it protected by patents.

There are always people who are ready to imitate after the developmental risks are no longer a factor.

The real difficulty is in finding manufacturers who will undertake to develop an invention when the research and development is expensive and the risks of success are extremely great.

Now, I would like to cite an actual case history which I not only know about—I was actually involved in the negotiations which I shall describe. I filed the full case history with the chief counsel for this Subcommittee.

This involved an invention which concerns the saving of life. It had to do with extending the shelf life of blood-bank blood. This is the blood that the Red Cross and other agencies gather and then put on a shelf. It goes bad in 21 days under normal circumstances. You normally cannot prolong its useful life as whole blood.

In the case of open heart surgery, in the case of situations where you are trying to get blood to the far corners of the world, 21 days often is not enough. It is important if you can extend the life of that blood by another week, another month, or longer, because blood is a commodity you just cannot get any time you want it.

Now, The Jefferson Medical College of Philadelphia had some surgeons who were interested in trying to develop a way of extending that blood life; they received some grants from NIH, and they tried to do this job. They found themselves at an impasse. They could not solve the problem. They had come up to a point and they found out that they were not getting over the hump.

They went looking for somebody outside, an expert who could help them. They found such a man, an experienced ion-exchange chemist known the world over. He happened to be there in Philadelphia, working for the company where I happen to be employed. He was asked if he would help. His services were volunteered gratuitously, and many thousands of dollars of his time and materials were given to the institution. Eventually, the problem was solved, an invention happened to be made, and the invention has proved to be patentable. The question is—will this invention get out into the public, will this invention be developed for use by people all over the country? It has worked in the laboratory, and the technical people have gotten past the point where they think and know it will be useful for saving human lives. But there are considerable risks in the development. Nobody can guarantee that this invention, when tried out in mass production, is going to work successfully.

The Jefferson Medical College and our company, both of which have had no background, incidentally, in developing this type of invention, went looking for somebody who had the experience and the interest. We found only five laboratories in the country, five commercial companies, that had the required background of experience. They all decided it was too great a risk to get into. Only one of them decided to take the chance and that was Baxter Laboratories of Morton Grove, Illinois.

Senator McClellan: Well, now, they have the exclusive right to it?

Mr. Forman: No. sir—I have not come to that. If I may, I will bring it out in just a moment.

Senator McClellan: All right. I will be patient.

Mr. Forman: Baxter said they were interested, but they made some computations and figured it would take a million and a half dollars to bring it from the point where it was at Jefferson Laboratories to the point where they could put it in the hands of physicians and surgeons throughout the country.

They asked what the patent situation was. We went down to NIH to try to straighten this question out, because under the grant Jefferson could keep the rights, provided they had a patent policy of their own whereby they would exploit the patented invention. This is the general policy in connection with such grants.

But when it was pointed out that our company, because of its employee, had also been a participant, a joint inventor here, the question was raised would we yield our rights, or how else should the situation be handled. They did not know because they apparently had never dealt with that kind of situation, and there was no provision in the H.E.W. regulations which covered it.

We had some discussions with the Surgeon General and finally it was pointed out that, under the October 10, 1963 Memo and Statement of the President on Government patent policy—which stresses the desirability of utilizing all inventions in the public interest at every possible opportunity—it was for the good of all, in the public interest to get this invention out of the laboratory and do everything that could be done to make it available to the public. They agreed—they said all right, finally—"We will agree to permit Jefferson to grant a five-year exclusive period to develop this invention—five years from the time that the Food and Drug Administration and the Division of Biological Standards approve this invention for public use." This much time, it had been estimated by Baxter, would give them a chance to

recoup about 30 per cent of that million and a half dollar investment. They figured that they would take their chances on recouping the rest of their investment and making a profit on it in the non-exclusive period after the exclusive period expired, relying on their "lead time" to put them in a competitive position.

Incidentally, I ought to point out that the grant was for about $15,000 and our company invested about an equal amount, $10,000 or $15,000 at that point—or a total of about $30,000. As Dr. Price pointed out earlier this morning, relatively small sums generally are needed to make a given invention. But, as in this case, a million and a half dollars would be required to reduce that invention to the point where it could be used by the public.

Baxter agreed to accept the license with the five-year exclusive period.

Then the Department of Health, Education, and Welfare decided that this was not sufficient. They said—it is all right to give a five-year exclusive and then say it will be opened up non-exclusively to any other manufacturer who wants to make this later—"But suppose, Baxter, you use some of your background inventions that you had before you start work on this development, or suppose you use some new ideas that you make in the course of investing your one and a half million dollars—these inventions might be desirable or necessary to the production of the end product of your development that is acceptable for the commercial market. Without those added ideas, what good will a non-exclusive license be to a potential second or third producer after your exclusive period ends? We would like you to yield those rights to the public, too."

Well, this was asking Baxter to give up its commercial birthright. It may have spent many millions before on some of the ideas that they had in their own research department. Besides the one and a half million dollars they were planning to spend to reduce the invention to a practical embodiment was their own money. Why

should they share rights to inventions which may be made through research done entirely at their own expense?

Well, after two years of arguing up and back, Baxter finally said they could not afford to take the risk under the supplemental conditions imposed by H.E.W., and they withdrew.

I might point out that this example well illustrates how important it is to give developers of inventions the inducement of protection against cut-throat competition for at least a limited period of time in order to get people to take on the development of inventions which involve great risks as to the chances of success.

Senator McClellan: Now, if I understand you, in that instance—what was the name of the company?

Mr. Forman: Baxter Laboratories.

Senator McClellan: They finally agreed that they would undertake it for a five-year exclusive right?

Mr. Forman: Yes, sir.

Senator McClellan: But then the question arose if there were any, I would call them, by-product inventions, fallout inventions or discoveries, who would get those? And the Public Health Service wanted—the Surgeon General—they wanted Baxter to agree that the Government should have those.

Mr. Forman: No, sir. They wanted the equivalent of that, but technically it worked out a little differently. They merely wanted Baxter to agree that it would provide non-exclusive licenses to anyone who decided later to make the final development, the final invention.

Senator McClellan: And they were never able to get an agreement?

Mr. Forman: That is right.

Senator McClellan: Now, what has happened? Is the product being used now?

Mr. Forman: Not yet.

Senator McClellan: Oh, is it still not on the market?

Mr. Forman: It is not on the market, but we expect that it might be, and for this reason.

Our own company, having gone as far as it had with its gratuitous contributions to the making of the invention, and fortuitously having acquired a small pharmaceutical manufacturing company—just prior to Baxter's withdrawal—decided that it would try to carry on the work for awhile rather than let it die, and this work has actually been going on there ever since.

But we went back to the Surgeon General to explain the situation and he very cooperatively reconsidered the problem. We pointed out that like Baxter, we could not afford to invest that kind of money since this is a very perilous type of invention, and there can be no guarantee that it is going to work or that it will be accepted by the medical profession when it is placed on the market—and they withdrew the supplemental requirements that they had imposed the year before.

Senator McClellan: On Baxter?

Mr. Forman: Yes, sir. And the way it now stands, it is merely on the basis that the invention will be maintained exclusively jointly by the company and Jefferson for five years. After that it is open to the public, anybody who wants to can use it.

Senator McClellan: How much is it going to cost you to develop it?

Mr. Forman: It won't cost less than one and a half million dollars the way it looks, because from the investment already made, and what is predicted, it will easily run that amount, probably more.

Senator McClellan: How many years is it going to take to perfect it?

Mr. Forman: I cannot predict that. Our scientists are unable to tell us yet. We hope within the next year or two, but we cannot say.

Senator McClellan: You don't know how soon you can get the product perfected?

Mr. Forman: No, sir. I do not know that, sir.

Senator McClellan: Well, in the meantime, are lives being lost, by reason of that invention not being available?

Mr. Forman: Well, it is hard to predict whether or how many lives are being lost. But you have to think of it in these terms. Each open heart surgery may use ten or a dozen pints of blood. It is not easy to get live donors for a particular operation when needed by the surgeon. It would be a great boon if he could have blood on the shelf for several months. The same thing would happen, for example, if we were going to ship blood to Vietnam. It would quite possibly go bad before they could use it on the battlefield.

Senator McClellan: In other words, it is very beneficial, or will be very beneficial in the health field if this process can be developed to where blood can be preserved for a much longer period of time than it can be now, is that correct?

Mr. Forman: Yes, sir.

Senator McClellan: This is a current illustration in this field.

Mr. Forman: This is so current, this is happening today. The agreement was completed last December.

Senator McClellan: Now, if I understand you correctly, you did offer this to all companies in that field, all the laboratories.

Mr. Forman: Jefferson did. They tried and found only five that said they could do it, but only one actually volunteered to try.

Senator McClellan: Well, of course, I would regard this as a kind of an extreme case, would you not? This is not just an ordinary situation.

Mr. Forman: It is hard to answer that question, Senator. I do not know what you mean by extreme.

Senator McClellan: Well, maybe that is not the proper word. You would not encounter the same problem ordinarily in the processing of a new drug or a new technique in medicine, would you? Or would you? I don't know.

Mr. Forman: As long as there is a great risk, and the probability of failure is great, you are going to find fewer

and fewer companies wishing to invest money, time, and personnel in developments of that type.

Senator McClellan: All right. Proceed with your statement.

Mr. Forman: With regard to that third point I made, about the position taken by the proponents of S. 1899, this is my answer.

If there is a legitimate danger to our society in concentrating too much wealth and too many opportunities to get wealthier in the hands of a limited number of corporations, the answer may lie in the Government's finding ways and means to give out its contracts to as many other parties as possible. But once the contractors are selected, preventing companies from obtaining patent rights out of Government contracts may not solve anything. Such a policy may only deprive the Government of worthwhile contractors or may result in contractors devoting their second best personnel to work on Government projects while reserving their best people to work on their own commercial projects so that they could keep title to inventions arising out of them and thereby get some protection for their investment.

Now, I understand from being here previously that the Subcommittee would like to have examples of contractors who have refused to take contracts because of this principle. I know how difficult it is to produce examples like this, although we privately hear about them all the time by people representing one company or another.

I did, however, go back into the records of the Mitchell Subcommittee, which in August to December 1959 had hearings with regard to proposed amendments to the patent provisions of the Space Act. At that time one of the congressmen who was sitting on the committee asked specifically for a documentation to prove that particular point. The man he asked, who happened to represent the American Patent Law Association, did come back some time later with letters submitted by five companies, and these can be found referred to in the printed report to those hearings for P.L. 85-568, page 412. The

five companies were the Electric Storage Battery Company of Philadelphia, the National Research Corporation of Cambridge, Massachusetts, Corning Glass Works of Corning, New York, AMP, Inc. of Harrisburg, and Bowmar Instruments Company of Fort Wayne, Indiana. All five said that because of the title-taking clauses they would not accept NASA contracts—I think most of them had to do with the then new Project Mercury.

If we want to know why it is difficult to get companies to stand up and be counted as they did, perhaps the reason is that the same congressman, upon receiving these letters, wrote back to the presidents of those companies and said—"This is your position as it has been represented to us, but surely there must be some mistake—this would make it appear to us as if you are not interested in cooperating with the Government of the United States on this important project."

Each of these companies wrote back and reaffirmed their position in no uncertain terms. But, nevertheless, this news did get around the country like wildfire, and I think because of it, as much as anything else, Senator, many companies that might otherwise come forward have refrained from doing this because they fear such intimidation and possibly reprisals in the form of being blacklisted from working on future contracts with the Government.

Now, gentlemen, it appears to me that this last point is the crux of the entire platform upon which Senator Long stood when he introduced S. 1899. All the other points are merely subsidiary or corollary to his concern over the possibility that retention of patent right by Government contractors will permit them to get a stranglehold on our economy.

As Senator Long said on May 14, 1965, in introducing S. 1899—and here I quote two brief paragraphs from page 9027 of the Congressional Record for that day, he said—"Mr. President, this is not merely an economic problem. This concerns our liberty and freedom to the extent that, through the granting of monopolies, areas of

our economic life are barred to many of our citizens, to that extent is our freedom abridged.

"Scientific and technological research conducted or financed by the United States Government represents a vast national resource, which could equal or surpass in actual or potential value the public domain open to settlement in the last century. Because the control of patent rights and inventions resulting from such activities means the control of the fruits of this resource, it is the function of the Government to make the results of research available for use by the entire American public which has made this research possible."

I agree one hundred per cent with this last portion of the statement by Senator Long. It is the function of the Government to make the fruits of any research, which has been subsidized even only partially by Government funds, to the public at large. The real issue is how is this to be done so as to do the most good for the most people.

Should it be done under the time-tested operation of the American patent system, with its inducements for private investment of capital and labor? Should it be done by the Government itself through its own building and operation of plants, followed by market distribution and so forth? Or should it be done by the Government's free dissemination to every one of the rights to practice the inventions?

If there is any doubt in Senator Long's ultimate objective, regardless of anything in S. 1899 which may appear to the contrary, this doubt is eliminated by his embracing the philosophy spelled out by his assistant, Mr. Benjamin Gordon, in the article which was reprinted in the Congresshional Record following the printing of S. 1899 at pages 9031 to 9033.

In the final paragraph concluding the article, which was devoted to a comparison of "Government Patent Policy and the New Mercantilism," in which Mr. Gordon sees in the policy of leaving title with Government contractors a strong similarity to the mercantilism of the

Middle Ages, he say, "If this comparison elicits the reply that the national interest requires monopoly grants as a necessary stimulation of enterprise, the question arises whether the price we are paying is far too heavy, even if the means could secure the end, for involved is the sacrifice of the citizen's economic freedom."

Now, this philosophy of Mr. Gordon, which Senator Long has apparently endorsed, indicates a belief that the operation of our economy under our patent system is not in the public interest.

Senator Buddick: Is that an article by Mr. Gordon?

Mr. Forman: That is the concluding paragraph of the article by Mr. Gordon. Yes, sir.

Senator Burdick: It appears in the Congressional Record?

Mr. Forman: Yes, sir.

Senator Burdick: What is the date of that?

Mr. Forman: May 4th.

Now gentlemen, with 70 per cent of all R and D funds now being financed by the Government, such a belief by the proponents of S. 1899 would seem to be an important first step in the elimination of our patent system altogether.

This, gentlemen, I submit is the behind-the-scenes real threat of that bill. It would be the beginning of the end of a system designed to induce people to invest labor and money to make risky inventions worthwhile.

As the Senate Subcommittee on Patents, I think this threat should be kept in our minds when you review the merit of all the bills under consideration.

It does not matter to me what manner or means are employed to conserve and promote the utilization of our inventive productivity. That productivity is limited. It is one of our greatest national assets. What matters is that every worthwhile invention should be given every possible chance of being developed for use by the people, all the people.

In conclusion, let me point out that I speak not for the patent system, not for the patent profession, not for in-

dustry, not for any segment of these. I speak only as a citizen who has for almost 20 years studied and critically observed the developments in the field of Government patent policy, and who is seriously concerned over the possibility that a good deal of our limited inventive productivity will become wasted if not developed under the inducements offered to all the people under the patent system.

This is what will happen under a law like S. 1899 which will tend to take title to most of the inventions made in the United States and put them in the public domain where interest in developing them will lag if not fade into insignificance.

It will not happen under S. 1809 because that bill will tend to leave title with the contractor in a maximum number of situations—that is, I might say, a maximum number consistent with today's political opposition caused by the "patent giveaway" theorists.

S. 1809 tends to assure maximum utilization of the invention by means of compulsory working and/or compulsory licensing requirements. This is good. In exercising those prerogatives, the Government will exercise its true and proper functions. As a contributor to the development of the inventions, the Government is in partnership with the contractor. As a partner, it has certain rights. In this case, it is not to share in cash profits, but in seeing that the other partner puts the inventions to the widest possible use so that the public will benefit thereby. That is the Government's right and obligation. That compulsion is as far as the Government ought to go in promoting utilization of the inventions in most cases.

S. 1809 is not perfect, it needs amendments. I have proposed some in my formal written statement. Others have been suggested by those who have testified before me. Nevertheless, I see in S. 1809 the basis for legislation which comes closest to being the most sensible, workable compromise that has a reasonable chance today of being acceptable to the Congress and also to all who are critical

of the general philosophy, as well as the specific provisions of S. 1899.

Gentlemen, S. 1809 is in the true public interest. S. 1899 is not.

Thank you very much for this opportunity today to speak.

Senator McClellan: Thank you, sir.

Senator Burdick?

Senator Burdick: Of course, counsel, you understand that you are merely giving your opinion—that if the Government retained title to these contracts they would lie fallow. That is just an opinion of yours.

Mr. Forman: Yes, sir. Of course it is always an opinion until we have a chance to demonstrate that it becomes a fact.

Senator Burdick: You and I know that the Patent Office is full of patents owned by private individuals that are lying fallow. The whole thing is to get together an economic package that is worthwhile producing.

Mr. Forman: That is correct, Senator. And that is why I urge upon you, sir, and upon your colleagues that you have got the greatest opportunity and I might say, the greatest obligation under the Constitution, to do something about it. With all these inventions coming out of Government research, as long as you have got this policy written in S. 1809, whereby the Government will keep a watchful eye under compulsory working or licensing requirements, and make sure that the inventions are put to use by the contractor who retains title—you have done all you should want to do in order to get them into use.

Senator Burdick: You have no assurance that because title is in the name of a private person the invention is going to be put to work.

Mr. Forman: You are absolutely right. But you will have that assurance if you let the contractor keep title subject to the restriction that, if he does not put them into commercial use, he will lose the right to keep title. The

chances are that the contractor in many cases will work the inventions if he knows that the Government will take them and give them to somebody else, or compel him to grant licenses to another party.

Senator Burdick: What period do you recommend for that?

Mr. Forman: I have recommended a five-year period.

Senator Burdick: This is something new.

Mr. Forman: Well, it is not exactly new. It has been written about, it has been proposed. This has actually been going on in many countries around the world. Compulsory working and compulsory licensing are not new. They would be new to the United States.

Senator Burdick: In other words, your suggestion will be that, in these Government contracts, where the equities will justify it, to permit the individual contractor to have title, but if he did not exploit it in five years, it would revert to the public.

Mr. Forman: That is right. It would either revert directly back, that is it would be placed in the public domain, or maybe some arrangement might be made whereby the Government would say, "Let's find somebody else who is interested in working." That is all I am pleading for. Get the invention into public use.

Senator Burdick: One of the things that bothers me, when you gave this example about this blood rejuvenator, whatever it was, that even though that private patent might have been issued to the name of a private company, there is no particular assurance that the $2 million would be spent by them, either.

Mr. Forman: Senator, let's take that one step further. Consider what happens to any patented invention made by private investment—where there is no Government investment and no Government rights at all. Under our patent laws, there is, of course, no assurance that the invention will be worked. You are absolutely right. However, this is in accordance with the contract, the bargain that the Government has made with the patentee, in return for his having publicly disclosed the invention—instead of trying to keep it as a trade secret, as they did in the medieval period. He is being told, "You can have the right to exclude others from manufacturing this invention. We will limit you, however, to a period of 17 years. You have got to make of it whatever you can and wish in that period. At the end of 17 years it is in the public domain"—which has always seemed like a fair deal.

Now, that is in the private sector.

We have no way of giving any further compulsion to make the inventor or patent owner—who puts out his own money, his own time and services and so forth—to make him use the invention. That is true. There is no special compulsion other than the fact that each day he fails to work the invention, while possessing the right to exclude infringers, brings him closer to the end of the patented term, when anyone thereafter will be able to complete with him without fear of being stopped by a lawsuit.

But you have an additional lever here. You have got this right. I say the Government is a partner in this invention. It has made a contribution to the invention. The equity is there.

I have long ago recognized this.

But I say it is wrong for the Government to take title, and then do nothing with it. You have got a choice to make. It is a basic decision, which must be made, a basic philosophy which must be established at this point.

Is the Government going to adopt a policy where we take title to so many inventions? If we are not going to do something with them, this is wrong.

Senator Burdick: Just a moment. That is an assumption that nothing is going to happen to inventions whose titles are acquired by the Government.

Mr. Forman: We have to operate on that assumption. The point is, if you enact legislation so that the Government ends up with a massive collection of inventions, it has a basic choice to make. Either it works them or it doesn't. If it doesn't work them, it is possible that nobody

will. If it does work them, this will be a fundamental change in the philosophy of our society. Do we want the Government to get into business on a mass scale? If we do, let's take title to all the inventions and put the Government in business.

If the Senate and the House decide this is best for the country, then let them go ahead and write it into law, but they should at least recognize and clearly state that this is what they intend to do.

Senator Burdick: No one wants the Government in business. They are taking these patents for the people.

Mr. Forman: That is a fallacy, sir. I believe the whole theory of Senator Long is wrong. He says this will not happen. But that is precisely what will happen. If the Government does not exploit it, as S. 1899 says it will, the only other choice is to leave it open to the public. And I can only predict complete failure. You say this is an opinion. Of course it is. But can we take the chance? Can we take the chance that thousands of inventions every year will go unused? If we do, the Government will only be adding to the very problems which you pointed to yourself.

Senator Burdick: You acknowledge that thousands of private inventions are going unused.

Mr. Forman: I don't question the point. If this is wrong—maybe the solution is, as has been suggested, to shorten the 17-year period. We cannot discuss this now. But if the Congress thinks it is too long a wait, shorten it. But the point is because that is bad or wrong, do you want to aid and abet it by adding thousands more patents under Government contract situations, and put them in the public domain, where nobody is going to use them? If we do, our technology will end up so far behind Russia's we will never be able to catch up with them.

Senator Burdick: I don't agree with your conclusion. But I will say that the five-year limitation has added something intriguing to the record.

Mr. Forman: Well, sir, I hope you will find it acceptable as a substitute for the title-taking philosophy of S. 1899.

And this hope also applies, of course, to your colleagues who have favored the proposal by Senator Long, whom I admire—I said so in my statement—I think he has done a great service because he has brought this tremendously important matter to the attention of all—even though I think his solution is dead wrong. But at least he recognizes the problem. He and I agree on a fundamental point, namely that our main objective should be to get the inventions into the public's hands. But we should not do this by opening them up to everybody. Almost everyone who has testified here has told over and over how this will kill the inducement to convert most inventions into commercially useful embodiments.

Now, if you cannot accept it, if the examples you heard are not sufficient, then write something like what I have advocated into the law—and I think S. 1809 already has it. If it has not, it is in S. 789. Write in a provision whereby the Government can do something affirmative about these inventions—instead of just leaving them to anybody, instead of going into business and manufacture—let the contractors keep them. But if he does not do something with them for the public good, let the Government take them back and find somebody else who is willing to develop them. Or if that does not work, then put the inventions in the public domain.

Senator McClellan: Thank you very much, sir.

The Subcommittee has held five days of hearings on this subject, and the bills that are pending. We have heard 26 witnesses. A number of statements have been submitted for inclusion in the record. Although I want to expedite the Subcommittee's action on this subject, I also wish to receive the counsel of all those who have a contribution to make.

Therefore, additional hearings may be held. Incidentally, the Chair today is sending out a letter to each senator asking if he has any witnesses that he thinks could contribute anything to this. I do not want these hearings to close denying anybody whatsoever from having the opportunity to fully present their viewpoints.

The hearings will be recessed subject to call. That does not mean that this is going to be prolonged indefinitely. I am trying to expedite them to a conclusion, but without setting anybody off who really thinks he has a contribution he thinks can be made.

The Committee will stand in recess.

New Trademark Working Manual

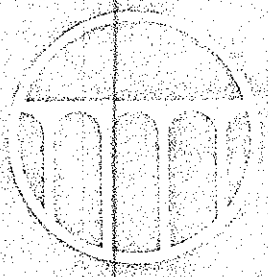
The U. S. Trademark Association has announced the publication of a new working manual dealing with practice before the Patent Office. The manual entitled "Notes from the Patent Office" has been compiled in a loose-leaf volume with handy index tabs to allow for additions or replacement sections if the practice is changed by new legislation or rules.

The 320 page volume is broken down into four major sections and covers the procedures of applying for trademark registrations, prosecuting registrations, the types of registrations allowed and statutory requirements after registrations are issued. Service, collective and certification marks are discussed in addition to trademarks. The responsibility of the registrant in maintaining his rights after a registration issues is spelled out.

An important supplement is the Class Definitions that are keyed to the Classification of Goods. Each class is broken down into the detailed goods that fall within the class and is a most valuable reference in the filing of applications.

"Notes from the Patent Office" (320 pages) is available from The United States Trademark Association, 6 East 45th Street, New York, New York 10017, for $12.00 per copy and price includes supplements to be issued through August of 1966.

NATIONAL ACADEMY OF ENGINEERING



TECHNOLOGY TRANSFER AND UTILIZATION

TECHNOLOGY TRANSFER AND UTILIZATION: Recommendations for Redirecting the Emphasis and Correcting the Imbalance

A report prepared by the
COMMITTEE ON TECHNOLOGY
TRANSFER AND UTILIZATION
of the
NATIONAL ACADEMY OF ENGINEERING
for
THE NATIONAL SCIENCE FOUNDATION

NATIONAL ACADEMY OF ENGINEERING
Washington, D. C. 1974

NATIONAL ACADEMY OF ENGINEERING

The National Academy of Engineering was established in December 1964. The Academy is independent and autonomous in its organization and election of members and shares in the responsibility given the National Academy of Sciences under its congressional act of incorporation to advise the federal government, upon request, in all areas of science and engineering.

The National Academy of Engineering, aware of its responsibilities to the government, the engineering community, and the nation as a whole, is pledged to do the following:

1. To provide means of assessing the constantly changing needs of the nation and the technical resources that can and should be applied to them; to sponsor programs aimed at meeting these needs; and to encourage such engineering research as may be advisable in the national interest.

2. To explore means for promoting cooperation in engineering in the United States and abroad, with a view to securing concentration on problems significant to society and encouraging research and development aimed at meeting them.

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4. To cooperate with the National Academy of Sciences on matters involving both science and engineering.

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6. To recognize in an appropriate manner outstanding contributions to the nation by leading engineers.

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SUMMARY

With a few exceptions, the vast technology developed by federally-funded programs since World War II has not resulted in widespread "spin-offs" of secondary or additional applications of practical products, processes, and services that have made an impact on the nation's economic growth, industrial productivity, employment gains, and foreign trade. In this report, a committee of the National Academy of Engineering studied the transfer and utilization of this kind of technology with a view toward solving critical national problems and providing greater public benefits.

After examining 25 federal departments and agencies, the committee found: Although federally-funded research and development totaled $17 billion in FY 1973 -- of which nearly $1 billion went into the collection, processing, and dissemination of information about the resulting technology -- only $43 million (or 0.25 percent of the total R&D budget) was spent to stimulate substantial and profitable secondary uses of the technology.

One major recommendation, accordingly, calls for shifting the focus of federal concern from simply telling commercial users and local governments about promising technologies to actually transforming technical information into ultimate uses that fulfill public or private economic and social needs. To do this, the committee proposes that the federal government spend about $1 billion annually to correct this imbalance.

The committee identified fundamental inadequacies in the process of technology transfer and utilization. To overcome these shortcomings, it suggests that the government, in collaboration with innovators, suppliers, and users, adequately define the opportunities in terms of specific needs or ultimate uses, market characteristics, economic payoff, and public benefits, and match these opportunities with the available technology.

A key element that the committee recommends in order to carry out utilization activities is the provision of incentives and tools such as adaptive engineering, seed financing, and marketing assistance.

The report declares that in no way do the recommendations mean to imply that the federal government should become a competitor to the private entrepreneur. The federal role should be, the committee states, one of stimulating and assisting, not one of inhibiting or discouraging the nation's industrial sector.

In carrying out its charges and developing its findings, the committee assumed that there was a substantial amount of useful technology generated in federal laboratories that is potentially available for wider public benefit. The committee suggests that this hypothesis must be tested by the National Science Foundation, the agency that commissioned the study.

Finally, the committee questions whether experimentation is a necessary prerequisite to the implementation of the policies recommended in the report.

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TECHNOLOGY TRANSFER AND UTILIZATION

INTRODUCTION

Background. Through its Experimental Research and Development Incentives Program (ERDIP), the National Science Foundation (NSF) is responsibile for gathering evidence concerning various incentives that the federal government can use to increase the application of science and technology for the public benefit. At the initiative of ERDIP, the Foundation requested the National Academy of Engineering to establish a Committee on Technology Transfer and Utilization (COTTU). The committee began operating in July 1973.

Charges. In specific charges to the Academy, the NSF requested that COTTU:

- Identify the major federal agencies that have conducted programs directed toward technology transfer and utilization;
- Determine and describe the methods used by those agencies in advancing the programs;
- Evaluate effectiveness of these methods;
- Assess the extent to which these agencies have evaluated their own methods; and,
- On the basis of the background information developed, recommend policies that the NSF or the federal government should consider.

Scope and Viewpoint. In continuing discussions with the NSF and independently as the study progressed, the committee agreed that it should attempt to identify those attributes of the process and programs that limit the secondary and/or additional applications of government-generated technology; make constructive suggestions for overcoming these constraints; outline feasible federal initiatives that would significantly speed up technological utilization, and, finally, recommend a new approach and direction for the NSF's experiments that are designed to increase the knowledge of the inadequately understood process of technology transfer and utilization.

The committee believes that an acceleration of technological developments, consonant with economic forces and responsive to the perceived needs of the country, can result from a revision of certain federal policies and procedures. It also believes that this would, in turn, contribute to the solution of some critical national problems as well as provide other benefits.

Membership. The 15 members of the committee have diverse expertise and experience. As innovators, suppliers, and users, they have conspicuous records in technology transfer and utilization. They represent various professions -- engineering, law, economics, investment banking, large and small business management, and applied research. This diverse background enabled the committee to address not only the pragmatic managerial and socio-economic aspects of the problem, but the institutional implications as well.

Methodology. In carrying out its charges and developing its findings, the committee surveyed the relevant literature, identified 25 federal agencies conducting programs of technology transfer and utilization (Appendix), interviewed officials of these agencies, evaluated the written responses of selected agencies to a questionnaire, held wide-ranging discussions during three committee meetings with virtually full attendance, and particularly drew upon its own accumulated professional experience and judgment.

During its deliberations, the committee did not fully agree on every point under discussion, but there was complete agreement on the major themes and the final recommendations.

For a meaningful study base, the committee developed three fundamental postulates:

(i) On the basis of current knowledge, it is possible to take steps toward improving the transfer and utilization of technology.

(ii) There is a substantial amount of useful technology generated in federal laboratories potentially available for wider public application.

(iii) It is in the national interest to stimulate the transfer and utilization of technology from the federal government and its contractors in order to meet present and anticipated needs by other users and thereby foster economic and social growth in the United States.

While the committee has been mindful that the expressed concern of the NSF is with technology originating in federal laboratories, the basic process of technology transfer and utilization is also applicable to the products of research from universities, research institutions, industrial laboratories, and other sources, whether or not such activities are supported in whole or in part by federal contracts or grants.

LIST OF TERMS

Technology - The application of scientific knowledge or engineering designs or processes; any hardware device, equipment, or system; special laboratory or test facility; or specially trained person.[1] Also services and ideas are included. In general, it is the body of scientific and engineering knowledge of how to make something that will be purchased in the marketplace.

Technology Transfer - The process of collection, documentation, and successful dissemination of scientific and technical information to a receiver through a number of mechanisms, both formal and informal, passive and active.

[1] U. S. General Accounting Office, Means for Increasing the Use of Defense Technology for Urgent Public Problems (Washington, D. C.: U. S. Government Printing Office, December 1972) p. 5.

The transfer process begins when it has been established that a technological advance has significant relevancy in a directed or different application and that a necessary adaptation can be made. The process occurs naturally between participants who understand what has to be done to permit effective utilization.

Technology Utilization - The process through which government research and technology is transformed into processes, products, or services that can be applied to actual or potential public or private needs. It may also mean the secondary or horizontal application of a technology that has been developed for a particular mission and, after modification and diversification, fills a different need in another environment.[1] Utilization is therefore a broader concept than transfer, inasmuch as it emphasizes the ability and/or willingness of an entrepreneur from either the public or private sector to apply an available technology to an ultimate use or the creation of a marketable end-product or service.

Innovation - The process that broadly ranges from the invention or conception to marketplace acceptance.

[1] Ibid. It should be noted that the General Accounting Office used this as the definition for "technology transfer," but the COTTU members felt this function was more appropriately part of "utilization."

Innovator - The one who introduces, champions, and/or manages new technology whether or not he is the actual inventor or discoverer.

Supplier - The one who applies technology to produce a product or service. The concept refers to the manufacturer or adapter of a technology (usually a private sector, profit-making company or a consortium of private firms, or under certain circumstances, a partnership of public and private entities).

User - The ultimate purchaser of the technological product or service. The concept refers to the final consumer, which implies that the product or service is purchased and then applied in a useful way.

STEPS TOWARD TECHNOLOGY TRANSFER AND UTILIZATION

The transfer and utilization of technology is a complex, non-linear process, comprising a number of dynamic steps that occurs in varying degrees in a substantial portion of American industry today. Understanding this process is essential to understanding this report. COTTU has defined the steps as follows:

- Collecting, organizing, and storing the results of research and development (R&D) -- i.e., the technology.

- Publishing and disseminating the R&D information.
- Identifying a need and evaluating the technological requirements that must be met to satisfy it. (At this point the potential users are identified and the technology adapted or modified to meet their needs.)
- Matching of the available technology with the specific need or ultimate use, determined with the aid of the potential users.
- Executing a continuing series of relevant cost-benefit analyses.
- Defining the market potential and the other parameters that should help to determine the potential utilization.
- Examining the possible consequences that may result from fulfilling the needs and their impact.
- Locating the potential "suppliers" who are able and available to translate the technical information into practical reality.
- Determining resources and other requirements necessary for suppliers to produce the product, service or process.
- Associating the suppliers and users so they can agree on the standards, characteristics, performance, and constraints of the product, service or process.

- Performing the adaptive engineering necessary to develop the product or service or to acquire any missing elements.
- Establishing a business or implementation plan to determine production and operational costs.
- Acquiring the necessary financing.
- Creating a marketing plan, production of the product, service or process and implementation of its sale at a price a purchaser will pay.

These steps, the committee recognizes, are not a rigid or orderly structure. In some cases the sequence may be different or random, in others certain steps may overlap. Some steps may require modification and iteration to meet particular circumstances. For instance, there may be several competing teams or combinations of users, suppliers, and innovators pursuing similar objectives, and at some stage particular participants may drop out, change course, or make some other accommodation.

The committee also realizes that the process of technology transfer and utilization as defined here may not be applicable to every case. The importance of each of the steps varies according to the nature and character of the market pursued and the personal or collective perspective of the innovators , suppliers, and users.

Both in the private sector and the public sector, the problem of technology transfer involves a linking of the technologies at one extreme with needs at the other by means of a complex "brokerage process." At the technology end, there is a body of knowledge which results from R&D for primary mission purposes but, nonetheless, has numerous potential secondary or horizontal applications. At the other end, there is a set of societal needs that will utilize some combination of the technologies. Once these needs are defined, the brokerage process serves as the catalyst to help match the needs to the technologies. This mechanism is characterized by a randomness, a many-to-many coupling, and a great deal of entrepreneurship which sets the process apart from the more orderly situation in which a single mission need is recognized from the beginning.

Initial technology utilization occurs when the customer or user makes the first decision to purchase a product, service, or process in a significant quantity. Full transfer and utilization happens when widespread public benefits are realized, regardless of whether the benefit is direct or indirect (e.g., an indirect benefit may be an increase in productivity through improved efficiency).

I. INADEQUACIES OF FEDERAL TECHNOLOGY

The vast technology developed by mission-oriented federally-funded projects since World War II has not generally resulted in highly visible "spin-offs" of widespread secondary applications. Beyond such notable innovations as jet aircraft, antibiotics, radar, nuclear power, and other developments in electronics, chemistry, and health care springing from a few agencies, the committee was unable to identify major secondary contributions from federal R&D programs to the gross national product, level of employment, balance of trade, corporate profitability, industrial productivity, or the quality of life in the United States.

While the Department of Agriculture often is cited as a major contributor to technology transfer and utilization, the committee considers that the agency's basic output responds directly to its mission and therefore results mainly in primary applications. There are other civil agencies that also perform R&D, resulting in primary applications.

The methods generally used by federal agencies for transferring technology involve the passive techniques of collecting, screening, indexing, storing, and disseminating scientific and technical information upon the specific request of a potential user. These methods are not fully effective because they depend upon: the ability of the prospective user to define the technology he seeks; the procedures used to search and

identify the requested information; the format in which the data is provided to the requester; as well as the skill of the user in assimilating the knowledge, evaluating its relevance, and adapting the technology to meet a specific need.

More active methods which involve personal interplay between innovators and potential users, frequently assisted by third party change agents or multidisciplinary teams, are used less often by the federal government. When used, they tend to be more effective than the passive methods. Nonetheless, these active attempts by the federal government have also proven inadequate for the most part.[1]

In examining the problem, the committee assumed that two factors could limit the secondary or horizontal applications of federally funded technology:

- An insignificant amount of federal technology has been revealed which could be economically used in secondary or horizontal applications, providing widespread public benefits.
- A plethora of structural and institutional barriers exist in the federal government and the private economy to prevent the efficient and effective utilization of this technology.

[1] U.S. General Accounting Office, op. cit. pp. 8 and 13. Cf: M. Frank Hersman, "Technology Utilization in the Public Sector," in Science and Technology Policies: Yesterday, Today, and Tomorrow, G. Strasser and E. M. Simons, eds. (Cambridge, Mass.: Ballinger Publishing Co., 1973). pp. 79-93.

The committee was not charged with addressing the first assumed factor, and accordingly offers no opinion about its significance. Instead, it has accepted the hypothesis that useful technology does exist in the federal laboratories. However, the committee strongly feels that this hypothesis must be accepted or rejected and recommends that the NSF or another appropriate federal agency:

> *Now, and periodically in the future, test the assumption that there is a substantial amount of useful federally funded technology available for beneficial, widespread secondary application by conducting a survey of selected federal laboratories, using a team of experts representing a variety of disciplines, as well as the technological innovator, supplier, and user; also determine if comparable technology from other sources is already available or being used.*

In the event that little or no significant technology can be found through the above approach (or if technology from any other source is known to be available) then any effort to overcome structural and institutional barriers in federally-funded programs is considered impractical. Still, federal efforts to overcome analogous barriers in the private sector would be worthwhile because useful technology does originate there.

Hence, the committee extensively investigated the second assumed factor, particularly as it applies to

the federal government, and determined that significant barriers exist to the effective utilization of technology. It identified two critical impediments within the federal government which are, in general, classified as:

1. Inadequacies in the process for satisfying user needs with potentially promising federal technology, and
2. Inadequacies in the environment for fostering effective secondary utilization of this technology.

The remainder of this report deals with the committee's specific conclusions concerning these inadequacies and recommendations for corrective action.

II. OVERCOMING THE INADEQUACIES

The federal government must pay attention to the weaknesses in the process of secondary utilization of technology.

For utilization to be successful, the government must make certain that:

- *Proper emphasis and balance is maintained between transfer and utilization.*
- *Worthy projects are defined and selected, and*
- *The steps of the process are taken in a consistent and comprehensive way.*

The committee's policy recommendations are intended to point the direction of an appropriate government response that could motivate both the private sector and the non-federal public sector to transfer and apply technology for greater public benefit. The recommendations are designed to avoid undue government intervention, organization, or bureaucratic obstacles. In addition, the proposed policies also lend themselves to experimental evaluation.

Emphasis and Balance

Of the $17 billion spent during FY 1973 on federally-supported R&D, $935 million went into the collection,

organization, and dissemination of technical and descriptive information.[1] Nearly $43 million of that amount -- or 0.25 percent of the total R&D budget -- was authorized to encourage technology utilization. (Figure 1) *The committee therefore concludes that the government must redirect the emphasis and correct the imbalance between the transfer and utilization of technology by increasing the funding for application, adaptation and utilization to at least the same level as that expended for information collection and dissemination; namely, about $1 billion.*

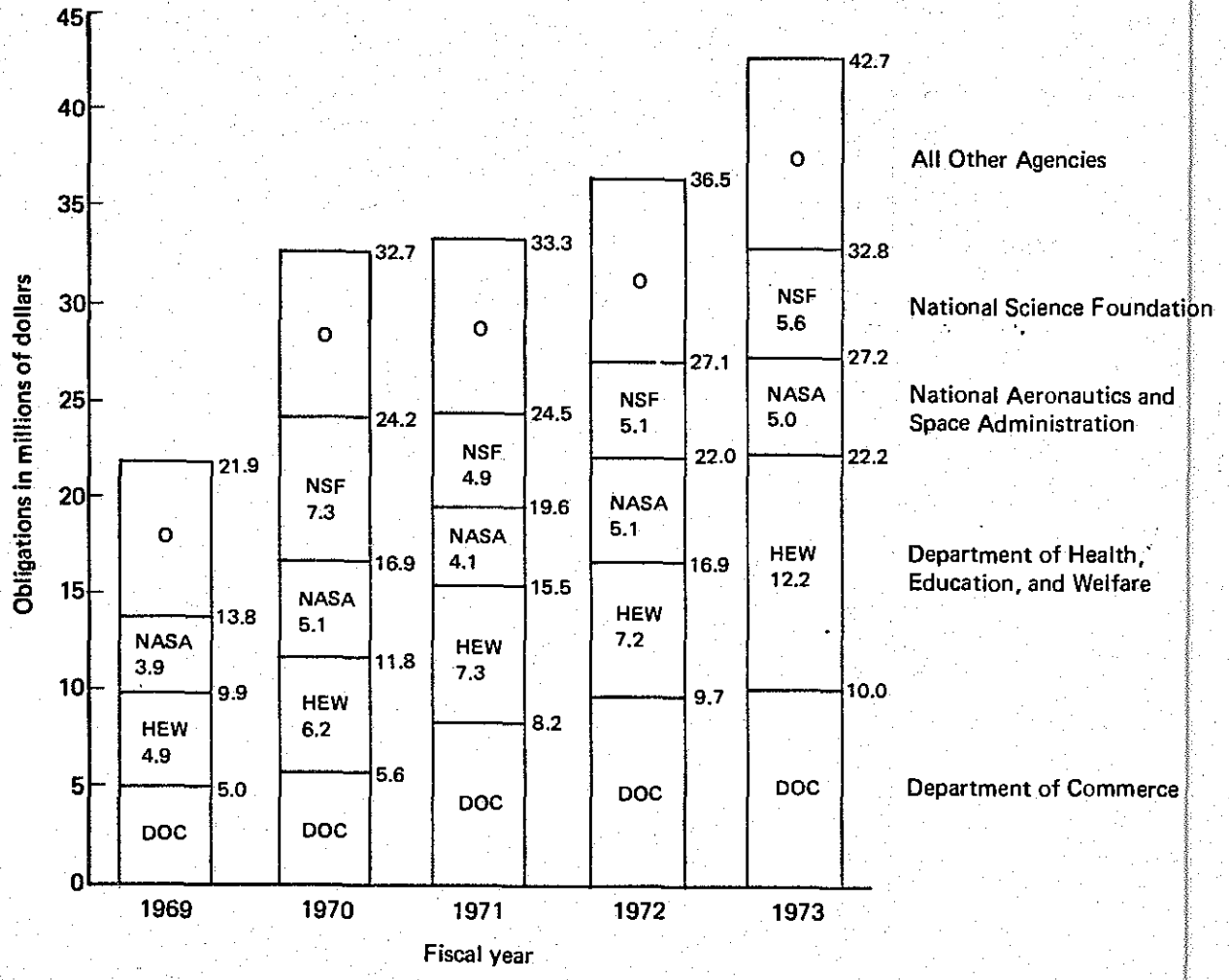
While it is true that most federal agencies have adequate programs for the dissemination of scientific technical information, in support of their internal mission, the committee perceives a real need to make the information more widely available by actively improving the public awareness of its existence and the available sources from which it can be obtained. *The committee therefore recommends that the government: 1) improve the management of federal activities concerned with dissemination of scientific and technical information by consolidating and standardizing their input and retrieval capabilities, 2) enhance the public awareness of the information sources, and 3) make the information available to users at a reasonable cost.*

[1] U. S. Government, Report of the Ad Hoc Group for Federal Obligations for Management, Processing and Transfer of Scientific and Technical Information Data and Technology, FY 1969-73, Prepared for the Office of Science and Technology, Executive Office of the President, Sept. 1972; Washington, D. C.: Government Printing Office, Vol I, p. 90. (Private communication from Office of Science Information Service, National Science Foundation).

FIGURE 1
Between FY 1969-1973 the total obligation for technology transfer and utilization activities has almost doubled, even though its percentage of the annual funds for scientific and technical information activities remained almost constant.

	Fiscal Year				
Obligations (In millions of dollars)	1969	1970	1971	1972	1973
Total Scientific and Technical Information Activities	677.9	740.9	849.3	914.3	935.1
Transfer and Utilization Activities	21.9	32.7	33.3	36.5	42.7
(Percent of Total)	(3.2)	(4.4)	(3.9)	(4.0)	(4.6)

This means that of the total federal budget, approximately 0.02 percent of the estimated obligations for FY 1973 were to be utilized for technology transfer. This is equivalent to 0.25 percent of the FY 1973 federal R&D budget.[1]



Technology transfer and utilization by agency[2]

[1] *Ibid.*
[2] *Ibid.* p. 91.

Selecting Worthy Projects

While the federal agencies generally understand the need to measure the impact of their technology transfer programs particularly with respect to economic payoff and public benefit, few agencies have actually done this on a regular basis, either from the start to establish the potential or as feed-back to determine the effectiveness. Rather, they have tended to measure program output in terms of the people contacted, publications, or study contracts completed. These measures bear little relationship to potential or actual success of the total process of technology transfer and utilization. The committee acknowledges that the process is lengthy, and that direct measures of performance may take considerable time, and that rational measures of potential benefit as well as accountability do not now exist for federal programs of technology transfer. Even so, the committee recommends that the government *require that projects of technology transfer and utilization, prior to the commitment of major federal funding for any implementation activities, should demonstrate:*

a) Reasonable evidence of the potential widespread public benefit,

b) Potential for significantly bolstering the economy and easing pressing national problems, while recognizing, of course, that priorities may change,

c) Little likelihood of causing lasting adverse impacts that are unacceptable when contrasted to the likely benefits,

d) Reasonable agreement among the prime participants (innovators, suppliers, and users) on objectives, benefits, roles, responsibilities, and milestones.

In sum, the government should make periodic reviews for each authorized project of technology transfer and utilization, possibly at progressive steps in the process, to ensure that the four standards listed above are met and that the extent of public benefits are ascertained. Moreover, a specific means for assessing compliance should also be developed.

The spirit of this recommendation is one of a balanced, dynamic and positive outlook rather than negative or static approach. It is aimed at providing some measure of control for the government. Moreover, this recommendation should not be implemented in any way that will, per se, retard or discourage the transfer and utilization of technology.

The committee knows that it is essential to make substantive reassessments of federal projects for technology and utilization. One body of experts may differ with another in agreeing on what is a worthwhile and justifiable undertaking by the federal government.

As it happens, federal activities seldom go beyond beginning steps of the complete process of technology transfer

and utilization which is necessary to bring the fruits of technology to the marketplace. In its study of federal agencies, the committee found:

- Inadequate attention is paid to the definition of opportunities that are indicated by market studies, cost-benefit evaluations, and measurements of potential impact.
- Insufficient effort is given to organizing certain prime participants, such as the innovators, users, and suppliers, for the purpose of matching technology with needs.
- Insufficient support is offered to adaptive engineering, financing, marketing, and other steps to implement application.

Technology in the form developed by mission-oriented federal laboratories is almost never quite right for transfer into the marketplace.[1] This technology gap exists largely because none of the participants want to assume either the technical or financial risks of product modification, market analysis, and start-up of a pilot operation. Where all the steps in the normal process have been fostered by federal

[1] Cf. David D. Rutstein and Murray Eden, Engineering and Living Systems (Cambridge, Mass.: MIT Press, 1970).

agencies in a kind of "pump-priming" enterprise, there have been payoffs -- notwithstanding the debates that often rage about the adequacy of return on the taxpayers' dollars.

Many federal agency officials are sensitive to the market pull. Accordingly, NASA states:

> "The best method to consistently achieve optimum technology utilization in the private sector is to constantly look at the technology as a firm in the private sector would -- as a means to either make or save money. As long as that perspective is kept in mind and every effort is used to create awareness, the transfer, and more important utilization will occur." [1]

A similar sentiment was expressed by the Department of Commerce, which is a potential supplier of non-engineering elements of technology transfer and utilization:

> "Lack of dependable market and technical information appears to be a significant barrier to the exploitation of new technology. This suggests that the simplest and most straightforward service that government can provide is to act as a source of such information. There is little reason to believe, however, that this approach alone would be sufficient to achieve optimum technology utilization in the private sector." [2]

Although there is an appreciation of this problem in government, little is done about it.

[1] Letter to COTTU from Jeffrey T. Hamilton, Director Technology Utilization Office, National Aeronautics and Space Administration, October 18, 1973.

[2] From the Department of Commerce's answers to the COTTU Questionnaire dated November 1, 1973.

Since the present federal programs of technology transfer and utilization have not been adequately addressed for their total success, the committee recommends that the government *recognize and implement these programs by making certain that any existing or experimental programs embrace the following fundamental activities of the process:*

a) Dissemination of the results and applicability of R&D -- i.e., the technology.

b) Definition of the needs, markets and impact of implementation -- i.e., the opportunity.

c) Organization of the participants -- i.e., the innovators, users, and suppliers who, together, must define the opportunity and match it with the available technology from federal and non-federal sources.

d) Implementation consisting of adaptive engineering, financing, marketing, purchasing and anything else required to produce widespread public benefit profitably and effectively -- i.e., the lubricants or tools.

III. CREATING THE PROPER ENVIRONMENT

Overcoming the weaknesses in the process of secondary utilization of federal technology will not, per se, lead to more beneficial new applications. Attention must be paid to creating a better environment, by the federal government taking steps to ensure that its policies and programs encourage innovators, suppliers, and users of technology to work together in developing worthwhile secondary applications.

Specifically, the government must:

- *Empower and make adequate funds available for federal agencies to advance secondary utilization activities.*
- *Provide incentives and tools, including coverage of technical and financial risks to the participants in the process of technology transfer and utilization.*

Empowering Federal Agencies

At present there is no overall policy guidance or direction for the transfer and utilization of technology from either the executive or legislative branches of government to federal agencies. The single omission

commonly noted is the legislative authority and/or budget line item which would support the required manpower and other costs as well as provide desirable visibility.

In its study of 25 federal agencies, the committee found that their mandates and programs vary widely. Some have specific legislation without programs, others the reverse. Some have modest resources, others do not have specific budgets. And some, while possessing ample authority, accord their programs low priority.

The absence of a proper legal mandate is the single most important constraint preventing agencies from setting up adequate programs. Many agency directors are understandably wary and apprehensive about programs without explicit direction or adequate funding.

Moreover, there is a lack of personnel slots and no specific Civil Service Commission job descriptions exist for those engaged in technology transfer-utilization activities. This is a factor inhibiting the implemention of programs and the recruitment of expert personnel. There are, in addition, no tangible rewards -- often only disdain -- for those civil servants who work in technology transfer activities that are not basic to an agency's assigned mission.

Without a federal policy designed to overcome these constraints, there will continue to be a poor environment in which to accomplish the objectives. Therefore, the committee recommends that the federal government:

- *Empower appropriate federal agencies to set up explicit programs as an added part of their missions with specific charters and guidelines for embarking on these secondary or horizontal application programs.*
- *Make technology utilization a line item in the budgets of federal agencies in order to provide appropriate funding.*
- *Create new Civil Service designations and job descriptions to cover personnel with program skills and expertise. The Civil Service Commission should recognize the profession of technology utilization agent and establish a separate classification series within the General Schedule system from beginning positions to senior executive levels.*

In no way do these recommendations imply that the federal government should become a competitor to the private entrepreneur. The federal role should be one of stimulating and assisting, not one of inhibiting or discouraging the nation's industrial sector.

Providing Incentives

Until now there has been inadequate concern about financial risk, lack of patent protection, or other start-up problems that impede the private sector's ability to bring technology to market. To encourage industry to adapt the products, processes, or services for the marketplace, the government should:

- *Develop and refine tools that will improve a) the identification of high potential technology, b) the predictive process such as market research and c) user need analyses, particularly in enhancing the reliability for defining the opportunity.* [1]
- *Provide some assurance against undue risk to potential financial sources during the start-up or implementation stage of development of innovative technology.*
- *Make available, selectively and experimentally, adequate, inexpensive, and imaginatively bold financing to users in the private and public sectors in order to accelerate the direct*

[1] Cf. Arthur D. Little, Inc. and Industrial Research Institute, Inc., Barriers to Innovation in Industry, Prepared for the National Science Foundation, September 1973. This report concludes that marketing is the principal impediment in the translation of ideas or inventions into our economy.

implementation or to stimulate financial institutions to provide greater investment in new technology enterprises.

- *Grant exclusive licenses for government patents to private companies or negotiate other properietary arrangements where the private use of government technology cannot be obtained otherwise.* [1]

[1] In those cases where the exclusive license is important, it will show up very early in the process and be seen as a barrier to technology utilization at that point. The committee recognizes that this issue is being litigated in the federal courts and this recommendation may become moot depending on the final adjudication.

AFTERWORD

The committee recognizes that this study was by intention limited in its scope -- i.e., it was not expected to design experiments for new ways to transfer the technology from exisiting federal storehouses into the private and public sectors. Nevertheless, the committee does believe -- and some of its members strongly feel -- that any such experiments should be based upon the recommendations of this report, particularly those dealing with carrying out all the steps of the process of technology transfer and utilization, selecting worthy projects, and providing appropriate incentives.

> *The committee also considers that most of its policy recommendations are both appropriate and feasible for adoption by the federal government without prior experimentation. In fact, experimentation would seem not to be a prerequisite to the policy implementation, since sufficient experience is already available from public and private efforts.*

Further, some committee members believe that any federal experiments should concentrate on technologies that are likely to solve the nation's priority problems -- e.g., fuel and mineral resources, energy efficiency, environmental protection, nutrition, health care, etc.

To this end, the NSF should consider seeking joint experiments with mission-oriented agencies to identify the most promising technologies originating in federal laboratories and advance those technologies through the whole process of transfer and utilization.

Even if the NSF should test the assumption but fail to prove that significant and applicable technology exists in federal laboratories, this should not deter the government's effort to seek out potentially applicable technologies from whatever source. Ultimately, the widespread utilization of any technology depends upon the successful accomplishment of all or most of the steps in the process of technology transfer and utilization.

Although the process is still not fully understood, it has been a remarkably useful strategy for the nation's industrial community to achieve worldwide preeminence. Accordingly, some members of the committee emphasize that the orderly involvement of informed people in the process will result in new challenges and directions for future research of immense promise for the nation's welfare.

APPENDIX

Federal Agencies Surveyed By COTTU
Between August and November 1973 [1]

* * *

ATOMIC ENERGY COMMISSION
Office of Industry Relations

DEPARTMENT OF AGRICULTURE
Agricultural Extension Service

DEPARTMENT OF COMMERCE
Maritime Administration
National Bureau of Standards
National Oceanic and Atmospheric Administration
National Technical Information Service
Office of Telecommunications
Patent Office

DEPARTMENT OF DEFENSE
Office of the Secretary
Air Force, Air Force R&D Laboratories
Army, Office of Research and Development
Navy, Navy Technical Information
Naval Weapons Center, DOD Technology Transfer Consortium

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
National Institute of Education, Office
of Research and Development Resources
National Institute of Mental Health,
Development Branch
Social and Rehabilitation Service,
Division of Research Utilization

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Division of Building Technology and Site Operations

[1] The names and addresses of 21 of the 25 agencies surveyed by COTTU were drawn from Federal Technology Transfer, a report prepared for the National Science Foundation, Office of Intergovernmental Science and Utilization, by Todd Anuskiewicz of the George Washington University, dated August 1973, pp. 71-73. The other 4 agencies were added by COTTU when it was learned that significant technology transfer activities were carried out by them.

the moments when, in loneliness, a man thinks of the bright words he could have said, but had not found, and hates those who robbed him of his courage. The misery of knowing how strong and able one is in one's own mind, the radiant picture never to be made real. Dreams? Self-delusion? Or a murdered reality, unborn, killed by that corroding emotion without name —fear—need—dependence—hatred?

Roark stood before them as each man stands in the innocence of his own mind. But Roark stood like that before a hostile crowd—and they knew suddenly that no hatred was possible to him. For the flash of an instant, they grasped the manner of his consciousness. Each asked himself: do I need anyone's approval?—does it matter?—am I tied? And for that instant, each man was free—free enough to feel benevolence for every other man in the room.

It was only a moment; the moment of silence when Roark was about to speak.

"Thousands of years ago, the first man discovered how to make fire. He was probably burned at the stake he had taught his brothers to light. He was considered an evildoer who had dealt with a demon mankind dreaded. But thereafter men had fire to keep them warm, to cook their food, to light their caves. He had left them a gift they had not conceived and he had lifted darkness off the earth. Centuries later, the first man invented the wheel. He was probably torn on the rack he had taught his brothers to build. He was considered a transgressor who ventured into forbidden territory. But thereafter, men could travel past any horizon. He had left them a gift they had not conceived and he had opened the roads of the world.

"That man, the unsubmissive and first, stands in the opening chapter of every legend mankind has recorded about its beginning. Prometheus was chained to a rock and torn by vultures—because he had stolen the fire of the gods. Adam was condemned to suffer—because he had eaten the fruit of the tree of knowledge. Whatever the legend, somewhere in the shadows of its memory mankind knew that its glory began with one and that that one paid for his courage.

"Throughout the centuries there were men who took first steps down new roads armed with nothing but their own vision. Their goals differed, but they all had this in common: that the step was first, the road new, the vision unborrowed, and the response they received—hatred. The great creators—the thinkers, the artists, the scientists, the inventors—stood alone against the men of their time. Every great new thought was opposed. Every great new invention was denounced. The first motor was considered foolish. The airplane was considered impossible. The power loom was considered vicious. Anesthesia was considered sinful. But the men of unborrowed vision went ahead. They fought, they suffered and they paid. But they won.

"No creator was prompted by a desire to serve his brothers, for his brothers rejected the gift he offered and that gift destroyed the slothful routine of their lives. His truth was his only motive. His own truth, and his own work to achieve it in his own way. A symphony, a book, an engine, a philosophy, an airplane or a building—that was his goal and his life. Not those who heard, read, operated, believed, flew or inhabited the *thing* he had created. The creation, not its users. The creation, not the benefits others derived from it. The creation which gave form to his truth. He held his truth above all *things* and against all men.

"His vision, his strength, his courage came from his own spirit. A man's spirit, however, is his self. That entity which is his consciousness. To think, to feel, to judge, to act are functions of the ego.

"The creators were not selfless. It is the whole secret of their power—that it was self-sufficient, self-motived, self-generated. A first cause, a fount of energy, a life force, a Prime Mover. The creator served nothing and no one. He lived for himself.

"And only by living for himself was he able to achieve the things which are the glory of mankind. Such is the nature of achievement.

"Man cannot survive except through his mind. He comes on earth unarmed. His brain is his only weapon. Animals obtain food by force. Man has no claws, no fangs, no horns, no great strength of muscle. He must plant his food or hunt it. To plant, he needs a process of thought. To hunt, he needs weapons, and to make weapons—a process of thought. From this simplest necessity to the highest religious abstraction, from the wheel to the skyscraper, everything we are and everything we have comes from a single attribute of man—the function of his reasoning mind.

"But the mind is an attribute of the individual. There is no such thing as a collective brain. There is no such thing as a collective thought. An agreement reached by a group of men is only a compromise or an average drawn upon many individual thoughts. It is a secondary consequence. The primary act—the process of reason—must be performed by each man alone. We can divide a meal among many men. We cannot digest it in a collective stomach. No man can use his lungs to breathe for another man. No man can use his brain to think for another. All the functions of body and spirit are private. They cannot be shared or transferred.

"We inherit the products of the thought of other men. We inherit the wheel. We make a cart. The cart becomes an automobile. The automobile becomes an airplane. But all through the process what we receive from others is only the end product of their thinking. The moving force is the creative faculty which takes this product as material, uses it and originates the next step. This creative faculty cannot be given or received,

shared or borrowed. It belongs to single, individual men. That which it creates is the property of the creator. Men learn from one another. But all learning is only the exchange of material. No man can give another the capacity to think. Yet that capacity is our only means of survival.

"Nothing is given to man on earth. Everything he needs has to be produced. And here man faces his basic alternative: he can survive in only one of two ways—by the independent work of his own mind or as a parasite fed by the minds of others. The creator originates. The parasite borrows. The creator faces nature alone. The parasite faces nature through an intermediary.

"The creator's concern is the conquest of nature. The parasite's concern is the conquest of men.

"The creator lives for his work. He needs no other men. His primary goal is within himself. The parasite lives second-hand. He needs others. Others become his prime motive.

"The basic need of the creator is independence. The reasoning mind cannot work under any form of compulsion. It cannot be curbed, sacrificed or subordinated to any consideration whatsoever. It demands total independence in function and in motive. To a creator, all relations with men are secondary.

"The basic need of the second-hander is to secure his ties with men in order to be fed. He places relations first. He declares that man exists in order to serve others. He preaches altruism.

"Altruism is the doctrine which demands that man live for others and place others above self.

"No man can live for another. He cannot share his spirit just as he cannot share his body. But the second-hander has used altruism as a weapon of exploitation and reversed the base of mankind's moral principles. Men have been taught every precept that destroys the creator. Men have been taught dependence as a virtue.

"The man who attempts to live for others is a dependent. He is a parasite in motive and makes parasites of those he serves. The relationship produces nothing but mutual corruption. It is impossible in concept. The nearest approach to it in reality—the man who lives to serve others—is the slave. If physical slavery is repulsive, how much more repulsive is the concept of servility of the spirit? The conquered slave has a vestige of honor. He has the merit of having resisted and of considering his condition evil. But the man who enslaves himself voluntarily in the name of love is the basest of creatures. He degrades the dignity of man and he degrades the conception of love. But this is the essence of altruism.

"Men have been taught that the highest virtue is not to achieve, but to give. Yet one cannot give that which has not been created. Creation comes before distribution—or there will be nothing to distribute. The need of the creator comes before

the need of any possible beneficiary. Yet we are taught to admire the second-hander who dispenses gifts he has not produced above the man who made the gifts possible. We praise an act of charity. We shrug at an act of achievement.

"Men have been taught that their first concern is to relieve the suffering of others. But suffering is a disease. Should one come upon it, one tries to give relief and assistance. To make that the highest test of virtue is to make suffering the most important part of life. Then man must wish to see others suffer—in order that he may be virtuous. Such is the nature of altruism. The creator is not concerned with disease, but with life. Yet the work of the creators has eliminated one form of disease after another, in man's body and spirit, and brought more relief from suffering than any altruist could ever conceive.

"Men bave been taught tbat it is a virtue to agree with others. But the creator is the man who disagrees. Men have been taught that it is a virtue to swim with the current. But the creator is the man who goes against the current. Men have been taught that it is a virtue to stand together. But the creator is the man who stands alone.

"Men have been taught that the ego is the synonym of evil, and selflessness the ideal of virtue. But the creator is the egotist in the absolute sense, and the selfless man is the one who does not think, feel, judge or act. These are functions of tbe self.

"Here the basic reversal is most deadly. The issue has been perverted and man has been left no alternative—and no freedom. As poles of good and evil, he was offered two conceptions: egotism and altruism. Egotism was held to mean the sacrifice of others to self. Altruism—the sacrifice of self to others. This tied man irrevocably to other men and left him nothing but a choice of pain: his own pain borne for the sake of others or pain inflicted upon others for the sake of self. When it was added that man must find joy in self-immolation, the trap was closed. Man was forced to accept masochism as his ideal—under the threat that sadism was his only alternative. This was the greatest fraud ever perpetrated on mankind.

"This was the device by which dependence and suffering were perpetuated as fundamentals of life.

"The choice is not self-sacrifice or domination. The choice is independence or dependence. The code of the creator or the code of the second-hander. This is the basic issue. It rests upon the alternative of life or death. The code of the creator is built on the needs of the reasoning mind which allows man to survive. The code of the second-hander is built on tbe needs of a mind incapable of survival. All that which proceeds from man's independent ego is good. All that which proceeds from man's dependence upon men is evil.

"The egotist in the absolute sense is not the man who sacrifices others. He is the man who stands above the need of using others in any manner. He does not function through them. He

is not concerned with them in any primary matter. Not in his aim, not in his motive, not in his thinking, not in his desires, not in the source of his energy. He does not exist for any other man—and he asks no other man to exist for him. This is the only form of brotherhood and mutual respect possible between men.

"Degrees of ability vary, but the basic principle remains the same: the degree of a man's independence, initiative and personal love for his work determines his talent as a worker and his worth as a man. Independence is the only gauge of human virtue and value. What a man is and makes of himself; not what he has or hasn't done for others. There is no substitute for personal dignity. There is no standard of personal dignity except independence.

"In all proper relationships there is no sacrifice of anyone to anyone. An architect needs clients, but he does not subordinate his work to their wishes. They need him, but they do not order a house just to give him a commission. Men exchange their work by free, mutual consent to mutual advantage when their personal interests agree and they both desire the exchange. If they do not desire it, they are not forced to deal with each other. They seek further. This is the only possible form of relationship between equals. Anything else is a relation of slave to master, or victim to executioner.

"No work is ever done collectively, by a majority decision. Every creative job is achieved under the guidance of a single individual thought. An architect requires a great many men to erect his building. But he does not ask them to vote on his design. They work together by free agreement and each is free in his proper function. An architect uses steel, glass, concrete, produced by others. But the materials remain just so much steel, glass and concrete until he touches them. What he does with them is his individual product and his individual property. This is the only pattern for proper co-operation among men.

"The first right on earth is the right of the ego. Man's first duty is to himself. His moral law is never to place his prime goal within the persons of others. His moral obligation is to do what he wishes, provided his wish does not depend *primarily* upon other men. This includes the whole sphere of his creative faculty, his thinking, his work. But it does not include the sphere of the gangster, the altruist and the dictator.

"A man thinks and works alone. A man cannot rob, exploit or rule—alone. Robbery, exploitation and ruling presuppose victims. They imply dependence. They are the province of the second-hander.

"Rulers of men are not egotists. They create nothing. They exist entirely through the persons of others. Their goal is in their subjects, in the activity of enslaving. They are as dependent as the beggar, the social worker and the bandit. The form of dependence does not matter.

"But men were taught to regard second-handers—tyrants, emperors, dictators—as exponents of egotism. By this fraud they were made to destroy the ego, themselves and others. The purpose of the fraud was to destroy the creators. Or to harness them. Which is a synonym.

"From the beginning of history, the two antagonists have stood face to face: the creator and the second-hander. When the first creator invented the wheel, the first second-hander responded. He invented altruism.

"The creator—denied, opposed, persecuted, exploited—went on, moved forward and carried all humanity along on his energy. The second-hander contributed nothing to the process except the impediments. The contest has another name: the individual against the collective.

"The 'common good' of a collective—a race, a class, a state—was the claim and justification of every tyranny ever established over men. Every major horror of history was committed in the name of an altruistic motive. Has any act of selfishness ever equaled the carnage perpetrated by disciples of altruism? Does the fault lie in men's hypocrisy or in the nature of the principle? The most dreadful butchers were the most sincere. They believed in the perfect society reached through the guillotine and the firing squad. Nobody questioned their right to murder since they were murdering for an altruistic purpose. It was accepted that man must be sacrificed for other men. Actors change, but the course of the tragedy remains the same. A humanitarian who starts with declarations of love for mankind and ends with a sea of blood. It goes on and will go on so long as men believe that an action is good if it is unselfish. That permits the altruist to act and forces his victims to bear it. The leaders of collectivist movements ask nothing for themselves. But observe the results.

"The only good which men can do to one another and the only statement of their proper relationship is—Hands off!

"Now observe the results of a society built on the principle of individualism. This, our country. The noblest country in the history of men. The country of greatest achievement, greatest prosperity, greatest freedom. This country was not based on selfless service, sacrifice, renunciation or any precept of altruism. It was based on a man's right to the pursuit of happiness. His own happiness. Not anyone else's. A private, personal, selfish motive. Look at the results. Look into your own conscience.

"It is an ancient conflict. Men have come close to the truth, but it was destroyed each time and one civilization fell after another. Civilization is the progress toward a society of privacy. The savage's whole existence is public, ruled by the laws of his tribe. Civilization is the process of setting man free from men.

"Now, in our age, collectivism, the rule of the second-hander

and second-rater, the ancient monster, has broken loose and is running amuck. It has brought men to a level of intellectual indecency never equaled on earth. It has reached a scale of horror without precedent. It has poisoned every mind. It has swallowed most of Europe. It is engulfing our country.

"I am an architect. I know what is to come by the principle on which it is built. We are approaching a world in which I cannot permit myself to live.

"Now you know why I dynamited Cortlandt.

"I designed Cortlandt. I gave it to you. I destroyed it.

"I destroyed it because I did not choose to let it exist. It was a double monster. In form and in implication. I had to blast both. The form was mutilated by two second-handers who assumed the right to improve upon that which they had not made and could not equal. They were permitted to do it by the general implication that the altruistic purpose of the building superseded all rights and that I had no claim to stand against it.

"I agreed to design Cortlandt for the purpose of seeing it erected as I designed it and for no other reason. That was the price I set for my work. I was not paid.

"I do not blame Peter Keating. He was helpless. He had a contract with his employers. It was ignored. He had a promise that the structure he offered would be built as designed. The promise was broken. The love of a man for the integrity of his work and his right to preserve it are now considered a vague intangible and an unessential. You have heard the prosecutor say that. Why was the building disfigured? For no reason. Such acts never have any reason, unless it's the vanity of some second-handers who feel they have a right to anyone's property, spiritual or material. Who permitted them to do it? No particular man among the dozens in authority. No one cared to permit it or to stop it. No one was responsible. No one can be held to account. Such is the nature of all collective action.

"I did not receive the payment I asked. But the owners of Cortlandt got what they needed from me. They wanted a scheme devised to build a structure as cheaply as possible. They found no one else who could do it to their satisfaction. I could and did. They took the benefit of my work and made me contribute it as a gift. But I am not an altruist. I do not contribute gifts of this nature.

"It is said that I have destroyed the home of the destitute. It is forgotten that but for me the destitute could not have had this particular home. Those who were concerned with the poor had to come to me, who have never been concerned, in order to help the poor. It is believed that the poverty of the future tenants gave them a right to my work. That their need constituted a claim on my life. That it was my duty to contribute anything demanded of me. This is the second-hander's credo now swallowing the world.

"I came here to say that I do not recognize anyone's right

to one minute of my life. Nor to any part of my energy. Nor to any achievement of mine. No matter who makes the claim, how large their number or how great their need.

"I wished to come here and say that I am a man who does not exist for others.

"It had to be said. The world is perishing from an orgy of self-sacrificing.

"I wished to come here and say that the integrity of a man's creative work is of greater importance than any charitable endeavor. Those of you who do not understand this are the men who're destroying the world.

"I wished to come here and state my terms. I do not care to exist on any others.

"I recognize no obligations toward men except one: to respect their freedom and to take no part in a slave society. To my country, I wish to give the ten years which I will spend in jail if my country exists no longer. I will spend them in memory and in gratitude for what my country has been. It will be my act of loyalty, my refusal to live or work in what has taken its place.

"My act of loyalty to every creator who ever lived and was made to suffer by the force responsible for the Cortlandt I dynamited. To every tortured hour of loneliness, denial, frustration, abuse he was made to spend—and to the battles he won. To every creator whose name is known—and to every creator who lived, struggled and perished unrecognized before he could achieve. To every creator who was destroyed in body or in spirit. To Henry Cameron. To Steven Mallory. To a man who doesn't want to be named, but who is sitting in this courtroom and knows that I am speaking of him."

Roark stood, his legs apart, his arms straight at his sides, his head lifted—as he stood in an unfinished building. Later, when he was seated again at the defense table, many men in the room felt as if they still saw him standing; one moment's picture that would not be replaced.

The picture remained in their minds through the long legal discussions that followed. They heard the judge state to the prosecutor that the defendant had, in effect, changed his plea: he had admitted his act, but had not pleaded guilty of the crime; an issue of temporary legal insanity was raised; it was up to the jury to decide whether the defendant knew the nature and quality of his act, or, if he did, whether he knew that the act was wrong. The prosecutor raised no objection; there was an odd silence in the room; he felt certain that he had won his case already. He made his closing address. No one remembered what he said. The judge gave his instructions to the jury. The jury rose and left the courtroom.

People moved, preparing to depart, without haste, in expectation of many hours of waiting. Wynand, at the back of the room, and Dominique, in the front, sat without moving.

A bailiff stepped to Roark's side to escort him out. Roark stood by the defense table. His eyes went to Dominique, then to Wynand. He turned and followed the bailiff.

He had reached the door when there was a sharp crack of sound, and a space of blank silence before people realized that it was a knock at the closed door of the jury room. The jury had reached a verdict.

Those who had been on their feet remained standing, frozen, until the judge returned to the bench. The jury filed into the courtroom.

"The prisoner will rise and face the jury," said the clerk of the court.

Howard Roark stepped forward and stood facing the jury. At the back of the room, Gail Wynand got up and stood also.

"Mr. Foreman, have you reached a verdict?"

"We have."

"What is your verdict?"

"Not guilty."

The first movement of Roark's head was not to look at the city in the window, at the judge or at Dominique. He looked at Wynand.

Wynand turned sharply and walked out. He was the first man to leave the courtroom.

19

ROGER ENRIGHT bought the site, the plans and the ruins of Cortlandt from the government. He ordered every twisted remnant of foundations dug out to leave a clean hole in the earth. He hired Howard Roark to rebuild the project. Placing a single contractor in charge, observing the strict economy of the plans, Enright budgeted the undertaking to set low rentals with a comfortable margin of profit for himself. No questions were to be asked about the income, occupation, children or diet of the future tenants; the project was open to anyone who wished to move in and pay the rent, whether he could afford a more expensive apartment elsewhere or not.

Late in August Gail Wynand was granted his divorce. The suit was not contested and Dominique was not present at the brief hearing. Wynand stood like a man facing a court-martial and heard the cold obscenity of legal language describing the breakfast in a house of Monadnock Valley—Mrs. Gail Wynand—Howard Roark; branding his wife as officially dishonored, granting him lawful sympathy, the status of injured innocence, and a paper that was his passport to freedom for

all the days before him, and for all the silent evenings of those years.

Ellsworth Toohey won his case before the labor board. Wynand was ordered to reinstate him in his job.

That afternoon Wynand's secretary telephoned Toohey and told him that Mr. Wynand expected him back at work tonight, before nine o'clock. Toohey smiled, dropping the receiver.

Toohey smiled, entering the Banner Building that evening. He stopped in the city room. He waved to people, shook hands, made witty remarks about some current movies, and bore an air of guileless astonishment, as if he had been absent just since yesterday and could not understand why people greeted him in the manner of a triumphal homecoming.

Then he ambled on to his office. He stopped short. He knew, while stopping, that he must enter, must not show the jolt, and that he had shown it: Wynand stood in the open door of his office.

"Good evening, Mr. Toohey," said Wynand softly. "Come in."

"Hello, Mr. Wynand," said Toohey, his voice pleasant, reassured by feeling his face muscles manage a smile and his legs walking on.

He entered and stopped uncertainly. It was his own office, unchanged, with his typewriter and a stack of fresh paper on the desk. But the door remained open and Wynand stood there silently, leaning against the jamb.

"Sit down at your desk, Mr. Toohey. Go to work. We must comply with the law."

Toohey gave a gay little shrug of acquiescence, crossed the room and sat down. He put his hands on the desk surface, palms spread solidly, then dropped them to his lap. He reached for a pencil, examined its point and dropped it.

Wynand lifted one wrist slowly to the level of his chest and held it still, the apex of a triangle made by his forearm and the long, drooping fingers of his hand; he was looking down at his wrist watch. He said:

"It is ten minutes to nine. You are back on your job, Mr. Toohey."

"And I'm happy as a kid to be back. Honestly, Mr. Wynand, I suppose I shouldn't confess it, but I missed this place like all hell."

Wynand made no movement to go. He stood, slouched as usual, his shoulder blades propped against the doorjamb, arms crossed on his chest, hands holding his elbows. A lamp with a square shade of green glass burned on the desk, but there was still daylight outside, streaks of tired brown on a lemon sky; the room held a dismal sense of evening in the illumination that seemed both premature and too feeble. The light made a puddle on the desk, but it could not shut out the brown, half-

DEPARTMENT OF THE AIR FORCE

POSITION DESCRIPTION

1. NUMBER OF IA'S	2. POSITION NUMBER
	JA-38

3. ORGANIZATION LOCATION	4. POSITION TITLE		
Hqs, Air Force Systems Command Andrews AFB Staff Judge Advocate Patents Division	Patent Attorney		
	5. CLASSIFICATION	6. ALLOCATED BY	7. DATE
	GS-13		

8. DUTIES AND RESPONSIBILITIES *(Indicate time percentages, where required)*

I. INTRODUCTION:

Functional statement for the Patents Division located in the official position description folder for the Staff Judge Advocate.

This position serves as a patent attorney in, the Patents Division with responsibility for participating in providing an efficient and effective administration of comprehensive programs in the fields of patents, inventions trademarks, copyrights, royalty payments and similar matters related and integrated with the major research, development, design and procurement interest of the Air Force in materials and equipment for use as components of and for protection of aircraft, missiles, and personnel as it relates to the primary function of the Air Force Systems Command.

II. DUTIES AND RESPONSIBILITIES:

Responsible for performing the following:

1. Policy Making: Participates with superior in advising and assisting the DCS for Material and the DCS for Development, HQ, USAF; Chief, Patents Division, HQ, USAF; the Commander, AFSC' and the Deputy Chiefs of Staff for Material, Plans, and Research and Development for Hq, AFSC, on all overall policy, legislative program, and general operational matters relating to patents, inventions, trademarks, copyrights, royalty payments and similar matters particularly pertaining to or effecting the Air Force research and development missions. Such advice and assistance relates to; formulating of needed policy and legislation; coordinating policy for Air Force with other Departments, offices, and agencies of the government; supervising, coordinating, and controlling patent programs assigned to the various organizational units of the Air Force Systems Command's patent organization; establishing and revising procedures on patent soliciting, patent interferences, patent infringement and other types of administrative patent claims, patent security, patent royalty, contract follow-up and related patent procurement matters; liaison and continuing relations with the Department of Defense, Department of Commerce, Government Patents Board; and other government agencies; providing effective representation on various Department of Defense Air Force Boards, committees and task groups dealing with patent and related matters; determining how overall patent policy, procedural, legal and administrative principles can be best applied to the international aspects of patent copyright and trade secret problems arising from or affected by international agreements for the interchange of patent rights and technical information; negotiating for and purchase of license rights under adversely owned patents, inventions, copyrights and proprietary information and exerting influence of patent policies and practices in government and in industry by lecturing to nation-wide assemblages of key scientific, procurement and legal personnel in government agencies or commercial concerns at various symposia,

9. THIS IS A COMPLETE AND ACCURATE DESCRIPTION OF THE DUTIES AND RESPONSIBILITIES OF THIS POSITION		10. REAUDIT CERTIFICATION				
SIGNATURE AND TITLE OF IMMEDIATE SUPERVISOR	DATE	DATE				
		SUPERVISOR				
		CLASSIFIER				

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2. Administrative Determinations: Make authoritative determinations on own initiative of (1) claims asserted against the Department of the Air Force, before suit is brought, for compensation or damages caused by orders of secrecy imposed upon adversely-owned patent applications in the Patent Office under the provisions of the Invention Secrecy Act (35USC 181-188) or for infringement of adversely-owned patents, or damages to the owner from disclosure of proprietary information resulting from activities of the Air Force, or for the use and manufacture of patented inventions without license of the owner or lawful right to use such inventions; (2) patent interferences; (3) conflicts between employee-inventors without recourse to formal patent interference proceedings; (4) questions involving payment of patent royalties; and (5) the respective rights of the Government and it s employees and of the Government and employees of Government contractors in and to their inventions and/or copyrightable material. Th is responsibility also extends to all administrative actions with respect to the preparation, interpretations and modification of settlement agreements, patent, copyright and technical data provisions in contracts, licenses, and assignments under inventions, and copyrights owned or controlled by the Government.

3. Patents Advisor and Technical Consultant to the Commander, Hq. AFSC: Participates with superiors in providing the Commander and his Deputy Chiers of Staff with such services and advice as may be necessary relating to patent matters. In this capacity, exercises supervision, correlation, administration and control of all activities within or on behalf of the Air Force Systems Command (including Centers); advises the commander and his scientific, technical, administrative and procurement staffs on all patent policy, patent program, and general patent administrative, oprational and technical matters pertaining to or affecting the Command; coordinates the services of Center patent officers and is responsible for the continuing development, administration and direction of the Air Force's patent program as it relates to the AFSC mission; and adapts the AFSC patent program to the informational and control requirements of the Commander, AFSC, DCS/D, Hq USAF, and the Chief, Patents Division, Office of the Judge Advocate General, Hq USAF.

4. Duties as Member of the Top Management Team of the Air Force Patent Organization: Is frequently assigned responsibility to prepare comments, suggestions and recommendations as to the effectiveness of the total patent organization for the planning, execution, and coordination of patent operations and the correlation of those operations with Air Force-wide, Department of Defense-wide, and Government-wide patent, research, development and procurement operations. Comments and opinions are requested as to the need for, and for the formulation of needed legislation relating to patents, inventions, copyrights, royalty payments and the like. Serves as an Air Force member or representative on such Department of Defense-wide Boards, as for example, the Armed Services Patent Advisory Board and the Armed Services Procurement Regulation Patent Subcommittee.

5. Independently, or with superior, makes periodic field trips to the various Divisions and Centers for purposes of furnishing staff assistance in reviewing and disposing of all problems on matters involving questions of patent, trademarks, and copyrights as generated under contract or by government employees.

6. Makes final decisions and determinations on all patent matters for the Headquarters AFSC and the subordinate Divisions and Centers. Attends conferences and meetings for superior, such as those of the Patent Subcommittee, etc., taking action and responsibility for necessary decisions.

III. CONTROLS OVER WORK:

Under the supervision of the Chief, Patents Division, operates independently and with finality on all matters for which responsible except those involving extreme

policy consideration which are coordinated with and reviewed by superior. Utilizes such guidlines available as Public Laws, Executive Orders, Acts of Congress, Armed Services Procurement Regulations, Air Force Procurement Instructions, and applicable Patent Office rules and regulations, frequently requiring refined and ingenious interpretations by the incumbent in relation to the distinctive and oft-time unique, factual, scientific and legal relationships and problems inevitably inherent in the Research & Development and Systems programs of the Air Force.

THE JOHNS HOPKINS UNIVERSITY - BALTIMORE, MARYLAND 21218

OFFICE OF PATENT MANAGEMENT

(301) 338-8137

PERSONAL

November 7, 1979

Mrs. Joan Z. Bernstein
General Counsel - Designate
Room 722A - Hubert Humphrey Building
200 Independence Avenue, S.W.
Washington, D.C. 20201

Dear Mrs. Bernstein:

This is in reference to Mr. Bremer's November 1, 1979 letter to you regarding our October 24, 1979 meeting.

I also wish to thank you for your courtesy and further endorse Mr. Bremer's comments on behalf of Norman Latker.

Johns Hopkins does not have an institutional patent agreement with DHEW and has therefore been required to retain invention rights generated with Department funding through case-by-case petitions. Over a number of years, I have become very familiar with the Department's petition procedures and Mr. Latker's efforts in explaining and aiding universities through this complex system. Further, it is well known that Mr. Latker has been equally effective in expediting these petitions through the many tiers of review within the Department. This attitude had given DHEW an aura of certainty that was unequal in any other agency of the Government and did much to establish the technology transfer focal points that now exist in the university sector.

The exceptional standing that the Department patent branch has held in the past cannot be [illegible] from the services by Mr. Latker over the last decade. I hope you will take this into consideration when deciding how his services can best be utilized in the future.

Sincerely yours,

Edwin T. Yates, Ph.D.
Patent Management Officer

ETY/fr
bcc: Norman Latker, Esq.
Howard Bremer, Esq.

WISCONSIN ALUMNI RESEARCH FOUNDATION

POST OFFICE BOX 7365 • MADISON, WIS. 53707 • TELEPHONE (608) 263-2500

November 1, 1979 263-2831

Mrs. Joan Bernstein
General Counsel
Department of Health, Education,
and Welfare
Washington, D.C. 20201

PERSONAL

Dear Mrs. Bernstein:

The time and courtesies which you extended to our university delegation on October 24 were greatly appreciated. We firmly believe that the experience and expertise of the university sector in transferring technology generated with Federal funds to the public is second to none and is critical to our common interests and goals. We were particularly gratified by your understanding of the need to resolve problems of delay in your Department's patent program, delays which we and others clearly saw as impediments to the successful translation of new technology into useful products.

It had been my intent to raise during the course of our meeting the position and status of Mr. Norman Latker but because of the course of the meeting felt it would be inappropriate. I am now presuming to raise that question as a personal matter, although I am sure my views comport with the views of many and the university community as a whole.

It is unnecessary to spell out in detail the high regard in which Mr. Latker is held by scientists, university staff and attorneys with whom he interfaced as Patent Counsel for your Department. His handling of matters within his charge was always highly professional and his conduct truly representative of that of a public servant.

The dilemma with which Mr. Latker was confronted was clearly surfaced during our meeting by Mr. Feiner. It was apparent that within the Department there was a belief that delays in excess of a year in processing

patent determinations involving further development of health-related inventions could be justified by the fact that a policy study was being conducted. With the policy under study being based upon Presidential and Congressional directives, with ample evidence being in hand which supported the highly successful transfer of technology under that policy, and with the recognition by those knowledgeable in technology transfer that time delays can be critically destructive of such transfer, I cannot agree with that conclusion. Moreover, the study Mr. Feiner referred to resulted in no published result and, in fact, Mr. Feiner indicated that no changes in policy have been made.

In such circumstances one can hardly fault Mr. Latker's lack of enthusiasm over the delays occasioned by the policy study. In fact, in my judgment, but perhaps with some naivete, Mr. Latker had an obligation to question such delays.

We in the university community had long considered your Department as the innovator in the Executive Branch in enhancing technology transfer. We would hope that posture could be regained by permitting Mr. Latker to again perform in like manner the duties to which he was assigned prior to this unfortunate incident.

Very truly yours,

Howard W. Bremer

Howard W. Bremer
Patent Counsel

HWB:rw

OTHERS ARE SAYING...

Ignoring Cancer

If the federal department of Health, Education and Welfare (HEW) really wants a breakthrough in cancer research, it's discovered a unique way of showing it.

The department, over the last two years of Joseph Califano's regime, has become a bottleneck for new discoveries which could hold the promise of early detection — and control — of cancer.

But HEW is hung up on who should retain patent rights over such discoveries — the government or the scientists who develop the pioneering techniques.

Unable to make up its mind, HEW thus prevents the clinical testing of such discoveries by companies that would ultimately manufacture and distribute the compounds.

In this limbo, scientists lose interest as their discoveries languish. And manufacturers turn to other pursuits, leaving the various products unconfirmed as to their value and in short supply if they do have merit.

Two examples have recently come to light.

Two government-funded scientists at opposite ends of the world discovered revolutionary techniques for treating cancer.

In Israel, Dr. Michael Sela found an early detection blood test for breast and digestive-tract cancer.

At the University of Arizona, Dr. Sydney Salmon discovered a simple lab test for cancer that can be conducted in test tubes rather than on patients, thus eliminating painful drugs.

HEW lawyers, apparently arguing that hospital costs will go up if the patents are privately held, won't clear the way for testing while the debate rages.

Now, it can be argued that the scientists are being selfish in pursuit of the profit motive.

It also can be argued that politics is taking precedence over science.

The one irrefutable fact is that something has become lost in the test of wills — the commitment to human life and the preservation of it through cancer-fighting chemicals.

Surely, the government's investment in these discoveries becomes lost as time drags on and more patients die and other techniques come to the fore.

So why the impasse?

Sen. Robert Dole, R-Kansas, made this very serious charge the other day: "HEW has decided to pull the plug on development of biomedical research. They have decided to withhold potential cures and revolutionary new diagnostic techniques for treating such diseases as cancer, arthritis, hepatitis and emphysema."

Is it really too difficult to put priorities where they belong — on human life?

Is it beyond human vision to devise a way whereby government could recover its investment while at the same time rewarding the scientist or the pharmaceutical company for their daring and discovery?

Certainly, to shut and lock the door on such cancer breakthroughs serve neither the cause of science or compassion or profit.

Sensing this, no doubt, and prodded by Senator Dole, Califano the other day ordered a number of potential cures freed for further testing and distribution.

That is the least that an afflicted public should expect.

Cancer poses enough frustrations and heartaches without the HEW adding one, even fractional, delay in delivering treatment to the sick.

—Morning Star, Rockford

Les Nouvelles NJV

PATENT BRANCH, OGC
DHEW
MAY 9 1975

Viewing Licensing Opportunities

Pharmaceutical industry and personal experiences are used to describe opportunities in large international company

BY FLORIAN VON OERTZEN*

I. INTRODUCTION

When discussing the licensing function one can distinguish between general rules applying to the whole field and additional conditions relating to a specific branch and even to an individual company. The following thoughts about "Taking advantage of licensing opportunities in a large international company" have been based on the situation of the pharmaceutical industry and on personal experience I had within this branch and as an employee of C. H. Boehringer Sohn.

It might therefore be useful if I explain first some of the more important characteristics of the pharmaceutical industry, adding also why licensing seems to be an important alternative to solving problems in the industry. At the end I shall demonstrate an example of a licensing contract for which I shall use and condense some of the experience we gained in the licensing field during recent years.

II. PERTINENT CHARACTERISTICS OF THE PHARMACEUTICAL INDUSTRY AND THE HEALTH MARKET

1. *"The pharmaceutical industry is par excellence a science-based industry. It has spent, in proportion to its turnover, more on research and development than any other industry, except the aircraft and electronics industries, and no other industry employs a higher proportion of qualified staff".*[1] There is a permanent discussion within and outside of the industry as to how much is really spent on research and development in proportion to turnover.

The problem is that the R&D activities are not only taken care of by the relevant departments of the research division, but that a number of other divisions also make partial contributions to the research function. Dr. Jann, President of Hoffmann la Roche in Basel, indicated recently for his company a percentage of 11 percent if only the research division is taken into account of 16 percent if one would add research and development cost hidden in other divisions and areas.

The results of the enormous research effort of the pharmaceutical industry with regard to various illnesses, life expectancy etc. cannot be dealt with here. But one does get an impression of the scope of this topic and also of its implications for the licensing function if one looks at the number of innovations and of patents granted. Reliable figures of this nature are difficult to procure, but the *"Bundesverband der Pharmazeutischen Industrie e.V."*, being the official representation of the German pharmaceutical industry, published in this connection the following data:[2]

From Know-How '74

- during the 10 years from 1961 to 1970 a total of 755 new compounds have been developed in the world and introduced to therapeutical practice.
- the German patent office granted approximately 600 patents in 1971 and 700 patents in 1972 which related to uses by the pharmaceutical industry.

Research and development in our industry is mainly dealing with remedies for the very broad spectrum of all human and animal diseases with improvement of pharmaceutical applications and with new devices for hospital care. One pharmaceutical company cannot possibly deal with all or a great number of those fields. The size of the total R&D activities of the branch and the growing specialization of the segments requires from everybody a concentration in selected areas of research and development.

To quote a few examples:

- Hoffmann la Roche are best known for their work with tranquilizers and vitamins.
- Pfizer and Beecham have been very successful in the antibiotic area.
- Schering and Syntex have a major stake in steroids.

Last, but not least, one should draw attention to the fact that the R&D of the pharmaceutical industry is loaded with growing uncertainty and risk. Of course, I realize it is not the nature of any R&D to guarantee success. Statistics of pharmaceutical R&D show, however, a trend in recent years where now only one salable compound can be expected out of 6 to 10 thousand synthesises. According to the rules of probability, an individual company faces the remarkable risk that, for instance, the competitor will have two salable compounds in his 6 to 10 thousand synthesises whilst your own efforts remain fruitless.

Let us conclude this part by saying that innovations through research and development have been and

* *Mr. Von Oertzen is associated with C. H. Boehringer Sohn, West Germany.*