*Such an interpretation appears to comply with the [illegible] of disposal of surplus property required by Section [illegible] FPA. According to section [illegible], surplus property can be disposed of "for cash, credit, or other property with or without warranty <u>and</u> upon such other terms and conditions as the Administrator deems proper." ([illegible] USC [illegible]). This broad interpretation is necessary because there will be instances in which it is in the public interest, and therefore the "best deal" for the Government to fix consideration in money plus terms rather than money alone.

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THOUGHTS RESPONSIVE TO
"TWO CULTURES IN THE LABORATORY"

I will start off agreeing with the last paragraph of "Two Cultures." Under no circumstances should an academic scientist be subjected to pressure from administrators to select product-oriented problems. We can help avoid such situations by stipulating in institutional patent agreements that the institution's patent office must be removed administratively from the scientist and must have no connection with promotion committees or other committees that deal with a scientist's career.

On the other hand, awareness of the potential of patents on the part of the scientist who is described by Hans as spending a morning in ". . . developing an instrument or method so that he can apply it to a research problem in the afternoon . . ." may be helpful to the university and to him. A notable example occurred here when Sid Udenfriend developed the fluorospectrophotometer. I don't know if the instrument would have been developed by a commercial firm without an exclusive license. I do think that it benefited investigators in that field by having the instrument become available to them.

There are many crossovers between science and technology. As Hans points out, people in academe do both. Also, many of the projects that NIH supports are not basic research, but applied. Indeed, we are currently engaged in an exercise to try to classify "basic" and "applied" by asking

...eloping an instrument or method so that he can apply it to a...

executive secretaries and study section members to put the projects they review into various classes, clinical vs. non-clinical, mechanism-oriented or treatment-oriented. We are trying to classify contractual projects similarly, including development.

Publications and patents are not antithetical. A paper can be submitted to a journal and a patent application can be filed at the same time. There is not much lost by doing both, except a little time. The patent advocates say that the patent is another method of disclosure of the results of research, and they claim that the patent, if properly administered, assures further effort in the development of an invention to practical use.

I am not so much interested in seeing that individual scientists are rewarded for inventions through patents as I am in providing additional funding for their institutions and, even more important, that the products of research are exploited for the benefit of the general public, who after all pay for the support of research.

The advocates of the patent system state that failure to patent inventions results in failure to have useful products or methods developed to the point of application, because investment capital is not available for development when there is no assurance that there will be a return on the investment. Private capital flows where there is some protection of the investment by a patent or a license. Otherwise, when there is no such protection, competitors may come in and exploit the development when it is achieved. This type of situation, it is claimed, results in potentially useful inventions sitting on the shelves.

When asked to give examples of inventions that were not exploited because they were not patented and fell into the public domain, the advocates of patents say that they cannot prove the negative. They would rather give examples of the development that followed the issuance of patents under the Federal patent policy that went into effect in the Kennedy era. A list of patents that led to development is attached. Here again, it is a judgmental appraisal of costs of development and market potential when we try to decide if the work would have been done without a license.

The perception that I have is that antipathy to patents is a phenomenon of the biomedical research community. Certainly chemists and physicists in universities have been alert to patents for years, particularly the chemists. It is a matter of the way the biomedical research culture regards itself. However, I see no harm in making biomedical research investigators aware of the patent route to development.

As I stated at the outset, the principal danger, that investigators may be pressed into an orientation towards patents, can be averted by various means. I am not so sure, either, that the better investigators can be pushed that way. They are the better investigators because of their curiosity and their intuition. When, either as a result of an intuitive approach or a serendipitous observation, they make a discovery that can lead to a beneficial product if it is developed, they can benefit their instituions and society as a whole.

investigators aware of the patent route to development

TWO CULTURES IN THE LABORATORY

The public at-large has shown increasing interest in what goes on in the laboratories dedicated to research and development in our nation, and this is fostered by an increasing attention to these matters in the public press and on television. The public, however, is sometimes confused about what actually transpires, and particularly about the purposes and intents of the people responsible for the action. This confusion, it appears to me, is in part due to the ill-advised use of certain terms, and sometimes it is the scientist himself who is responsible for the confusing usage. It is my purpose in what follows to try to find some useful order in what currently approaches chaos.

There are two quite distinct cultures in this country. One of these is housed largely in the laboratories of our universities and medical schools. The other is the predominant activity of the laboratories of the industrial sector. In the academic environment there is opportunity for science to prosper. "Science" derives from the Latin word for knowledge. It treats largely of ideas and stands in contrast to technology, which is emphasized in many industrial laboratories. "Technology" stems from a Greek root meaning art or craft. It deals largely with things--materials, instruments, machines, and sometimes methods. Science and technology are both among the creative activities of the human mind and the human hand. They are extraordinarily valuable activities. They are interdependent and they interdigitate very closely, but they are not the

There are two quite distinct cultures in this country. One of these

same. The frequent linkage of the two words by the conjunction "and" does not in any sense imply identity, any more than it does for "bacon and eggs." It is generally relatively easy to tell the bacon from the eggs. It is also relatively easy usually to distinguish the science from the technology. Science progresses through the performance of research, while technology proceeds by the conduct of development. Again, as with bacon and eggs, although research and development (R & D) are often spoken of in one breath and often appear as a single budgetary item, they are not identical. In almost every instance, the person working in the laboratory will know perfectly well whether he is doing research or doing development. It should be noted that the very same person may alternate his activities between research and development. Thus, he may spend the morning developing an instrument or a method in order that he can apply it to a research problem in the afternoon devoted to an understanding of a fundamental mechanism.

The goals of the two activities are also distinct. Research, if successful, leads to discovery; and discovery, in turn, leads to publication. Development, on the other hand, leads to invention; and invention, if deemed meritorious, leads to patents. The rewards of publication are manifold and include ego-gratification, a possibility of academic promotion, and an increase in likelihood of success in the competition for research support. In the rare instance it may also lead to the capture of a prize. Whereas the acquisition of patents may also have many gratifications, the one which clearly predominates is money. These matters are summarized in Table 1.

problem in the afternoon devoted to an understanding of a fundamental

Whereas these two cultures are distinct and different in their origins and in their purposes, they relate to each other in many ways. The advance of science is critically dependent upon many technological developments, such as the invention of a novel analytical instrument or the development of a useful chemical synthesis. Conversely, the development of technology is critically dependent upon the knowledge which is generated by scientific research. Certainly practically every major technological development in the past can trace its origins back to scientific research which was fundamental to the developmental process.

It should, of course, not be supposed that research is the peculiar domain of academia, and development the exclusive pasture of industry. This line has frequently been crossed and in both directions. The stress, however, is perfectly clear. Whereas publication is the highly respected product--indeed, the currency--of academic research, patents are an important expectation of industrial development.

It is my belief that this dichotomy has proven valuable and is, in general, a good thing. Both channels must proceed if the totality of purposes is to be achieved. A quenching of scientific research could soon lead to the exhaustion of undeveloped knowledge, while a failure of technological development would certainly markedly slow down the progress of science.

Whereas science and scientists may have a slightly tarnished image at this time and in this country, the United States continues to have a love affair with technology. We love our automobiles, our airplanes, our calculators, and our kitchen appliances. It is notable that as our children progress through the school system and are repeatedly exposed to courses in American history, they learn a good deal about Thomas Alva Edison, Samuel F. B. Morse, Alexander Graham Bell, and Eli Whitney. But do they ever hear of Joseph Henry, Josiah Willard Gibbs, A. A. Michelson, or Robert A. Millikan? In most general history courses, science as such receives short shrift despite the enormous contribution which scientific research has made to our present way of life. Recently, technology has come into prominence in such widely used phrases as "technology transfer" and "technology assessment." Curiously, we do not hear much about either the assessment or the transfer of science. Even in the field of medicine, it would appear that it is technology rather than science which must be transferred from the laboratory centers to the physicians in the hustings. This suggests that we are expected to treat our patients with new pills and new procedures but not with new knowledge.

The stress on technology in the absence of an offsetting stress on science is not without hazard. Technology leading to patents is certainly fiscally more immediately rewarding than is scientific research. During the affluent period when scientific research has been very generously supported and academic centers were not in financial distress, scientific research has of course flourished. As academic centers find it increasingly difficult to balance their budgets, as universities and medical schools are forced to cut programs, as Federal and other support of scientific research fails to keep pace with inflation, a new pressure will surely develop in the academic laboratories. One can imagine that the university officer whose responsibility it is to balance the budget may feel constrained to put pressure upon the scientists who are conducting research in the university laboratories to urge upon them to select product-oriented problems which may lead to remunerative patents. Thus, the financial officer of the university will behave very much as the director of development in an industrial situation must behave. Such pressure could, in fact, upset the present apparently satisfactory balance between the two cultures which we have described. The occasional development of a patentable discovery in the course of a research program has of course occurred and will continue to occur. Notable examples are the oft-quoted discoveries made by scientists at the University of Wisconsin, leading to the establishment and subsequent success of the Wisconsin Alumni Research Foundation. This, however, is quite another matter from the exertion of administrative pressure upon academic scientists to dedicate themselves toward patentable invention. Technological development will always continue to take place in the cellar of the individual inventor, in our great industrial laboratories, and from time to time in academic institutions. Scientific research, however, is so heavily concentrated in these academic institutions that if they should become inhospitable to this activity it would find no other place to go.

This, however, is quite another matter from the exertion of administrative

Table 1

The Two Cultures

Academia		Industry
↓		↓
Science	.......(and)...	Technology
↓		↓
Research	......(and)...	Development
↓		↓
Discovery		Invention
↓		↓
Publication		Patents
↓		↓
Gratifications*		Money

*See text

By engaging in the patent field, a university achieves two aims: the practical application of new principles and the bolstering of its funds by profits arising out of such activities. Technion, after many years of case-to-case handling of inventions made by its staff, had by 1962 gathered sufficient experience to draw up well-defined patent regulations of its own which were designed to assure both its own rights as employer and provider of laboratory and other facilities, and those of its inventive staff.

The regulations did not, however, stop short at that point but embodied principles that were thought to encourage staff members to look upon patentable inventions, as distinct from publishable discoveries and findings, as part of their recognized output. This was the thought behind the undertaking on the part of the institution to provide all the funds necessary for obtaining and marketing patents as well as for developing inventions wherever this was financially feasible. The only stipulation was that if any income should derive from the sale of patents, the actual out-of-pocket expenses incurred by Technion in regard to the patents concerned should be deducted from such royalties, after which the net proceeds would be divided equally between Technion on the one hand and the inventor or inventors on the other. Special provisions apply to inventions made by staff members outside their own official fields of interest or disciplines.

The wisdom of Technion's providing the entire funds needed for obtaining patents without making the inventor share at least a nominal portion has sometimes been questioned, but a discussion of this point is outside the scope of this article. On the other hand, it has never been doubted that the generosity embodied in the equal share principle of net income distribution should prove a valuable incentive to the creative minds among the staff.

University Patent Problems

(1) Any university—and Technion is no exception—has to battle with some fundamental principles that are connected with its very nature. One of these is the extreme diversity of inventions, which potentially cover the whole field of human endeavor. This is accentuated at Technion, as it is the only technical university in the State of Israel and, therefore, cannot concentrate on a certain number of fields but must provide all the engineering and scientific knowledge required by a country striving to do many things at once.

(2) Another problem, characteristic of the atmosphere of academic freedom, is the reluctance of scientists to hold back publication of their results until patents are safely lodged. Patenting is a lengthy procedure involving academic and administrative decision-making, the preparation of patent specifications in addition to the descriptions of the invention required by the decision-making bodies, and the uncertainty of ultimate tangible benefits.

(3) A third problem is the lack of development funds which hampers the marketability of inventions—"mere scraps of paper" as one member of Technion's advisory body has unkindly termed the bright but uncommercialized ideas of the academics. Clients for inventions are notoriously reluctant to invest in anything that has not yet proved its worth at least on a pilot-plant scale.

(4) A fourth set of problems characteristic of smaller countries concerns the responsibility of the institution toward the economy of the country it serves and by which it is supported: should patents be licensed to foreign firms for utilization in foreign countries; how much should be insisted upon as having to be left as the domain of the home country in the case of a world-wide license; should a local firm of necessarily limited means be preferred to a foreign firm of vast resources and huge markets.

(5) Finally, there is the nature of the majority of inventions made by academic personnel, namely the fact that many of them are designed to overcome obstacles or improve procedures peculiar to their occupations, and sometimes their preoccupations. These may be perfectly patentable by themselves, but of only limited practical application in the outside world. The circle of prospective clients is thus often confined to the suppliers of sophisticated apparatus, a field not necessarily productive of the scale of remunerativeness hoped for by the inventor.

A number of case histories will serve to illustrate the points made and will, it is hoped, lead to a set of principles that might be applied in approaching solutions to the problems incurred.

(Two Failures)

Some False Starts

A. *The Case of the Small Semiconductor*

Two physicists had developed a new and very cheap method of making a semiconductor type of component which had certain improved properties compared with those made by "conventional" methods. The term conventional has, of course, to be taken with a grain of salt, since all these techniques are fairly new. Now the product of the process, according to the inventors, was practically indistinguishable from those made with the older methods, so that any infringement of the technique would have been almost, if not quite, impossible to discern. It was, therefore, judged unwise to file a patent application and an attempt was made to sell the process as a "trade secret" on an exclusive basis. It was offered to two local firms and to about a dozen foreign ones which had been taken from one of the recognized trade registers. With each offer was enclosed a sample of the invented article, made at considerable cost under laboratory conditions, an investment felt to be justified. In mass production, the price would become a tiny fraction of that.

Both local firms declined the offer, since the semiconductor was economical only in huge quantities, which was clearly beyond their capability to sell. Moreover, they had not until then been engaged in the manufacture of components and were not prepared to embark on a venture into that field on the strength of one item only, a reason more often than not militating against the local sale of inventions in small countries.

What was more serious, all the foreign firms, too, rejected the offer, which had been written in the form of individual letters duplicated by an automatic typewriter and contained scientific data and comparisons with other similar semiconductors without, however, disclosing the nature of the manufacturing process beyond stating that it was cheap. Most of the firms had tested the enclosed sample and had found, so they said, that it was not materially better than their own products. The attempt at marketing was, accordingly, abandoned.

It is hard to assess the reasons for the failure. Some firms are as a matter of principle unwilling to accept inventions that are not patented; others will have no truck with any inventors outside their own staff. The actual properties of the semiconductor may indeed not have been so much better than their own products to justify its introduction into their lines—at a considerable cost, beyond doubt. Here the inventors themselves may have been too sanguine in the assessment of their brainchild which, looked at by the cold eye of the purse-conscious businessman, was perhaps interesting from a scientific point of view but of no great money-making potential.

B. *A Safety Device for Electric Motors*

Based on a newly discovered electric principle involving a study of the magnetic field inside an electric motor, a professor of Electrical Engineering with the aid of a graduate student had built and perfected a simple device that could shut off the current supply to an electric motor in case of a partial power failure. Most devices respond only to total power failure, but partial ones can be just as dangerous: If the power fails, the motor stops and, without a protective device, would start again, but unprotected by the usual precautions. If the power fails partially—if, say, one phase drops out in a three-phase system—the motor also stops, but since two phases are still supplying current, the wiring of the motor will burn out almost immediately. So much for the technical background.

Again firms at home and abroad were contacted; again the automatic typewriter wrote identical individual letters; but again the response was almost wholly negative. Only one firm asked for more particulars, which were supplied; but no further interest was shown. The others either did not reply at all or else declined the offer. In this case, as in so many others concerning university inventions, the device was interesting; it was even relatively well developed, but its profit potential was small. It seems to be an established fact that safety devices cannot sell apparatus. Motor cars are made attractive by their power, their speed, their elegant styling—rarely by the somewhat pedestrian appeal to the driver's desire to stay alive. Unless a law prescribes the introduction of such devices they will rarely be taken up. This is also true for many other devices with a "negative," preventive effect. As was seen in the earlier example of the semiconductor, manufacturers will even hesitate to introduce a new and cheaper method of making an article in their own accepted line of manufacture, simply because they can only in the rarest of cases be quite sure that the promised saving will rapidly reimburse them for the investment involved in retooling for the new process.

SUCCESSFUL EXAMPLES

While failures undoubtedly supply valuable data on which to base future policies, they can only show what should not be done: what kind of inventions, in our special case, would probably never sell. Successful or promising cases, too, have their lessons to teach, although in the last analysis each case has its own individuality, and reasoning must be helped on by a measure of good luck to be really correct. Here, then, are some successes and near successes.

A Case of Medical Engineering

A physician at a government hospital submitted a certain therapeutic problem to an engineer, serving as an assistant professor at the same time, suggesting his particular way of solving the problem. The engineer devised apparatus capable of carrying out the treatment desired by the physician, and together they thus made an invention which, since it arose out of a sponsored research project, could be tried out in action and developed to a point at which it became attractive to manufacturers.

Two of these were approached: one a local manufacturer of electronic equipment who had made an international name for himself as the purveyor of some specialized medical gear; the other the foreign supplier of an intricate part for the apparatus which at that time could not be built in Israel. The foreign manufacturer expressed his immediate interest in the apparatus, which would open up a new field for his product, while the other parts of the equipment could either be made by him or obtained relatively cheaply on a jobbing basis from firms specializing in those lines. The local manufacturer proved considerably less enthusiastic because of his difficulties in obtaining sufficient development capital. Although the device had been refined to a great extent, it was as yet far from being foolproof and capable of being safely handled by physicians or nurses. Nevertheless, the foreign firm was kept waiting and negotiations with the local manufacturer continued at a forced pace since it was thought desirable that the latter increase the number of items in his catalog. When the agreement for exploitation by him was finally signed and the foreign manufacturer notified of the fact, the latter at once offered his services as distributor, pointing to his considerable connections and widespread sales organization. At the time of this writing, the offer is still being studied and industrial development of the product is continuing.

The chain of events would appear to suggest a definite pattern for a line of action. The general terms of reference for decision-making should in this case be that local manufacture provides jobs for skilled and semi-skilled persons, that the largely foreign market earns much needed foreign currency, and that the expected royalties earn the university and the inventors the rewards needed, not least of all for encouraging others.

A New Transformer

A research team at the Faculty of Electrical Engineering came up with a special type of transformer with some very useful and surprising characteristics. Put in a nutshell, the invention was a relatively unsophisticated piece of equipment with highly sophisticated results: on the face of it the perfect example of a device that could be manufactured by a moderately equipped firm making electrical goods for use both at home and abroad.

Accordingly, a number of patents were at once filed in several industrial countries in addition to Israel, and a local firm specializing in this particular line was approached. An option agreement was signed, but no license resulted. The reasons for this may be sought in the limited home market for the device and its comparatively large size and heaviness which would have made export technically difficult. A contributory cause may have been that the local firm, catering chiefly to the local market, had no foreign sales organization and no connections with any of the existing distributors. To establish such a connection, let alone set up an independent organization for just one product, seemed inadvisable.

However, a brief article on the uses of the invention was inserted in the English-language quarterly of the university, which is distributed to friends and well-wishers throughout the world, bringing news of developments at the institution as well as articles on scientific subjects of general interest. Nothing was heard for a long time—a year and more. The paragraph in the quarterly would have been forgotten had not a letter from distant Australia revived interest. A major government project seemed to indicate the need for a whole series of transformers with the very qualities exhibited by the Technion invention. A model was required and the local firm approached once more for help in building it. The request was turned down, mainly because the stipulated time limit could not be adhered to. In the meantime, however, the Society of Friends of Technion in a foreign country had succeeded in interesting two or three manufacturers there in the device and one of them had taken an option for one year.

Events now began to happen at a lively pace. By telegram and overseas telephone a quadripartite connection between Technion, the Society of Friends of Technion, and the two firms was established. One of the inventors was dispatched to the foreign firm holding the option, and after less than a week of hectic consultation and work a dependable and detailed offer was rushed to the Australian manufacturer, who was thus able to submit his tender to the government in time. Nothing came of this particular venture, but the other firm became convinced of the commercial possibilities of the invention, and a license agreement was entered into in due course.

A number of lessons may be learned from this story. The widest possible distribution should be given to news of patented inventions, although it is debatable whether this should be done—as it was in the present case—within the framework of a major publication containing scientific and technical articles for general consumption, and dealing with work going on or completed at the university; or whether, alternately, it should be in the form of a bulletin devoted exclusively to the invention. Both forms—and others that may be thought of, such as a regularly amended catalog of patents held—presuppose the existence of an effective mailing list requiring many years' work on the part of the public relations department.

The second lesson taught by this case—and by others too numerous to mention here—is the usefulness of some kind of permanent representative or agency in the major industrial countries of the world that can take care of the affairs of the inventing body, guide its efforts in finding suitable clients, and negotiate agreements and watch over their execution. Commercial attachés are obvious candidates.

The third and probably most important lesson is the recognition that the inventor is the best sales agent for an invention once a contact has been made and interest aroused. A university is in a particularly convenient position to "dispatch" an inventor for such a purpose. Academic personnel attend conferences, are entitled to sabbatical leave, take part in seminars and summer schools, and in general are of considerable mobility—or should be. Once the ground has been prepared commercially, the inventor's presence to smooth out technical problems is a valuable aid in "clinching the deal." It may, however, not be remiss to include a warning with this item of advice: the inventor should restrict himself to matters technical, since his peculiar relationship to the invention makes him a difficult and in many cases unwanted partner in commercial negotiation. In the case of Technion, this fact is expressly stated in the Patents Regulations: no deal is finalized without the inventor's approval; but while he may be present at negotiations, it is not he who conducts them. The scrupulous observance of this division of competences was to no small extent instrumental in the successful conclusion of the license agreement.

A Chemical Invention

A final example, which is a case where local industry was left entirely out of the consideration, will round off this recital of typical case histories. A chemist had discovered a new and surprising use of a substance that had been known for some time but had served merely as a stepping stone for the manufacture of another, more complicated, substance. The invention was simplicity itself, and the substance could easily have been made locally by one or the other manufacturer in the field. Due to its highly specialized use, however, there would be practically no demand for it in Israel, but it should have great practical possibilities in certain other countries. None of the firms in Israel had the sales organization required for building a local industry entirely on exports—always a difficult proposition—so that it was even judged unnecessary to file an Israel patent application.

A number of foreign countries known to be active in the field were approached and two showed interest. Negotiation by correspondence proved a lengthy and not very effective procedure, and in the end an attorney in the country concerned was appointed to continue the talks. Progress was made and additional foreign patent applications were filed on the recommendation of one of the negotiating firms, care having been taken that this was done within the "Convention Year." The final fillip, however, was given when the inventor himself, having decided to spend his sabbatical leave in the country where the negotiations were most promising, could be consulted on an almost daily basis as to the finer technical points involved in the manufacture and use of the substance.

Inventors recruited from university personnel have the great advantage of being, in most cases, extremely skilled experts in the field of their invention. This fact, coupled with the practice referred to above of strictly relieving the inventor of commercial bargaining, should make for added attractiveness to a manufacturer dealing with a university, despite the limiting factor that university inventions are often of a somewhat recondite and specialized nature. A side effect of such contacts that should never be disregarded is the possibility of obtaining, either in addition to a license for the invention or as a substitute for it, the financing of a sponsored research project by the manufacturer who has become impressed by the technical competence of the inventor even if the particular invention that set off the negotiations was of little or no commercial value.

Conclusions

Certain basic concepts to be taken into consideration by a university wishing to sell its inventions will be seen to emerge from the above. Some of these maxims would appear to have general validity;

others are more appropriate for smaller countries with limited home markets, nascent industries, undeveloped export facilities, and other restraining influences.

(1) When choosing between local or foreign exploitation, due weight should be given to the requirements of the local economy as well as its capabilities—labor force, available raw materials, marketing opportunities and facilities, the provision of risk capital for development and manufacture. Wherever possible, local industry should be given preference, subject to the above considerations and others as appropriate.

(2) Adequate publicity is a *sine qua non* condition. Some inventions may be of interest, where their manufacture is concerned, to a restricted circle with which the inventor as an expert in the field is fully acquainted, so that direct "personalized" offers may be made; other inventions, like the transformer mentioned in one of the case histories, may be suitable for production by so many plants in the field that in order to reach them all, letters containing an offer could not possibly be typed but would have to be printed and would suffer the fate of so much printed matter. The publication of a suitable journal attractively styled is a useful vehicle for this type of invention. Alternatively, or in addition, such international commercial publications as the various "Products Directories," "What is New In . . .," et cetera, should also not be neglected.

(3) Internal publicity, broadcasting the results of successful negotiations, is an important incentive for other staff members to start thinking not only in terms of scientific publication, but also of making and patenting inventions. A university, where research is a way of life, ought to be a cornucopia of new and bright ideas.

(4) Making and patenting inventions should be made financially attractive and should also be used to assure a certain mobility to the staff—for negotiations, consultations, and the other activities connected with the sale of inventions.

It is as yet a moot point whether or not the patenting activities of a university result in a net financial gain to the institution (as distinct from the individual successful inventor), but the encouragement given to the staff to further their creative activities is an intangible benefit that no scientific body can do without. And, who knows, one day may see the birth of the one great invention that will, at the very least, pay for all those others that merely swell the catalogs.