vailing in Galileo's time] even today as many of us would like to flatter ourselves." Human authority still dominates a large part of our intellectual life.

There are two parts to Einstein's statement, that Galileo waged a war against all kinds of dogma based on human authority, and that he accepted experience and careful reflection as the only criteria of truth. It is to the latter part that we must direct our attention. If we do so the former follows immediately, but "experience and careful reflection" require work—hard unspectacular work. Lazy people prefer to avoid this; they prefer to buy their mental inventory second hand. There is always a strong tendency for humanity at large to invite dogmas based on authority as the easy way of life, and there are always plenty of dogmatists who seek and enjoy the *cathedra* from which their words are accepted without question.

Let me pose a few questions whose answers may indicate where we stand today in the light of Galileo's thinking.

(i) Do we, in our schools and colleges, foster the spirit of inquiry, of skepticism, of adventurous thinking, of acquiring experience and reflecting on it? Or do we place a premium on docility, giving major recognition to the ability of the student to return verbatim in examinations that which he has been fed? Do we watch games or play them?

(ii) Do we regard with satisfaction the increasing deference being paid to scientific "authorities" in matters extending over the whole range of society's activities? Do we take satisfaction in the growing hierarchy of scientists and in the credence given to the opinions of committees of "top-flight" scientists and engineers?

(iii) Are we really disturbed by the increasing concentration of authority over scientific and technical matters in higher levels of national government?

(iv) Are we content with the economic and social theories we have inherited? Are we attempting to synthesize our knowledge of science and technology into a consistent pattern with our use of their products in promoting the welfare of humanity? Are we dominated by dogma based on human authority in these areas?

(v) We place too much emphasis on science in our education; we must return to teaching the humanities. But do we really reflect on what this means? Are we merely attempting to escape the rigorous discipline required by the approach to truth through experience and reflection and to substitute the approach through the doctrines of schoolmen?

(vi) Do we really believe that science is the synthesis of human experience, gathered by all sincere individuals who practice Galileo's methods, or do we look on it as a compromise of human opinions based on the dialectic skill or social and political status of those who hold the opinions?

Galileo's concepts of nature, the universe, and the position of man in the universe strongly influenced the thought of Isaac Newton, giving him a foundation on which to build the master structure. The philosopher John Locke, a friend of Newton's, saw the philosophical implications of the New Science and expressed them clearly. Among the students of Locke's writings was Thomas Jefferson, and the Lockean philosophy is strongly reflected in the Declaration of Independence, the charter of a new social order far removed from Florence and Padua. On the occasion of the 400th anniversary of his birth, we who enjoy this new society have, therefore, special reason to cherish the memory of the gentleman of Florence.

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Savants, Sandwiches, and Space Suits

Universities engaged in research and development must find ways to protect their intellectual "property."

Joe H. Munster, Jr., and Justin C. Smith

A year ago a senior medical researcher stated that when he left his present post all he expected to leave behind was his reprints. That was a year ago. Today the law might take a less charitable view of his right to do so. Sponsors of supported research, both public and private, are taking an increasingly keen interest in what they are receiving in return for their support. They are seriously concerned with the protection of what they regard as their "property." That property, as recent cases indicate, is not the same thing as the end product. It is the researcher's knowledge. This is not necessarily arcane scientific knowledge —it may be knowledge about something as plebeian and commonplace as the method of operating a hamburger stand. The individual possessing the knowledge may not even be a researcher, as the term is generally used.

Time marches on. The image of the researcher, and particularly that of the academic researcher, has changed. There was a time when the idea of the research scholar implied white hair, absent-mindedness, mussed and mismatched clothes, and an interest in nothing but the ivory-towered solitude of serene contemplation, with no intrusions from such places as the business world. Now the research scholar is a smartly dressed individual working in a stainless steel laboratory and usually not only well acquainted with what is going on in trade but also keenly interested in current developments in the business community.

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One indication of this change is the controversy generated by a recent article discussing a late Ohio court decision, *B. F. Goodrich Co. v. Wholgemuth*. It is interesting that this article appeared not in a professional journal, but in the *New Yorker*. The article was entitled "Annals of Business, One Free Bite," and the essential question in the case was whether a man's knowledge can be fettered to his employer or whether one company can, by hiring an employee of a competitor, gain access to the competitor's knowledge and skill. The case has decided implications for those of the academic community engaged in certain aspects of research work.

The article alerts the researcher to an area of the law which, for lack of a better label, has come to be known as "injuries to relations"—that is, injuries to business relations. It is a rapidly expanding legal area in which protection is sought for property interests in data and "know-how." It is a development of technological advancement and of the replacement of the inventor toiling in his garret by the scientist working with other researchers in the laboratories of corporations or universities.

At one time the principal assets of a corporation might have been limited to its family name, its physical plant, a patent or two on some machine, and its existence as a going concern, that is, its good-will, and few businesses engaged in research programs of any size. Many of our present-day giant corporations came into existence because of some invention or discovery made by the founders and protected by patent. With the expiration of original patents these corporations found that, to keep ahead of or even in step with competitors, it was necessary to develop improvements or to come up with a new and better product. This called for some sort of research program, and today many large corporations maintain research departments, staffed with Ph.D.'s, which are often the envy of the academic community. The importance of these corporate research facilities is indicated by the emphasis in the annual reports of many growth stock corporations on the size and promise of their own research and development departments, or, in some instances, on the proximity of their research institutes to well-known universities.

All of this merely serves to indicate that the differences between the historical backgrounds of industrial firms and of academic institutions have frequently led our educators to dismiss the impact which developments in the business community may have on colleges and universities.

The case of *B. F. Goodrich v. Wholgemuth* has attracted attention because, although it involved only a corporation and an industrial researcher, it may affect the freedom of scholars to move from one institution to another, a freedom which is cherished by the academic profession. In November 1962, Wholgemuth, a graduate of the University of Michigan with a bachelor of science in chemical engineering, was manager of the space suit engineering department of the Goodrich Company. At that time he was approached by an employment agency concerning employment with a competitor of Goodrich. Wholgemuth accepted the proposition and was accordingly employed by the International Latex Corporation. The latter corporation had shortly before received a government research and development contract for a space suit to be utilized in connection with the Apollo program. Latex had won this contract in competition with Goodrich, a fact which was known to Wholgemuth. The record of proceedings indicates that, at the time of submitting his resignation to Goodrich, Wholgemuth was queried as to whether or not he intended to apply his knowledge of proprietary data gained through his employment with Goodrich in his new position at Latex. The record further indicates that Wholgemuth had extensive knowledge of Goodrich's manufacturing processes in the design and fabrication of space suits. The implication appeared clear, at least to Goodrich, that Wholgemuth was being employed by Latex because of the knowledge gained by him during his employment at Goodrich. It was contended by counsel for the plaintiff, Goodrich, that in leaving Goodrich Wholgemuth would be taking to International Latex information concerning highly confidential processes and methods—that is, know-how—which properly belonged not to him but to the Goodrich Company. As Wholgemuth had come to Goodrich directly upon graduation from college, this argument was particularly persuasive. However, the employment contract between Goodrich and Wholgemuth was merely an agreement whereby Wholgemuth promised to "keep confidential all information, records and documents of the company of which I may have knowledge because of my employment." (It should be noted here that similar agreements are not uncommon in university employment, particularly where research and development projects are involved, and that they represent perhaps a minimum type of agreement which educational institutions strive to obtain from individuals working in such projects.)

The result of Wholgemuth's resignation from Goodrich was that he was served with an order to appear before a local court on the question of whether or not he should be temporarily enjoined from taking certain confidential trade information with him to Latex and utilizing it in his work there. Plaintiff Goodrich requested a permanent injunction to prevent Wholgemuth from "performing any work for any corporation . . . other than plaintiff, relating to the design, manufacture, and/or sale of high altitude pressure suits, space suits and/or similar protective garments." After the customary preliminary jockeying in the trial court the usual appeal followed.

Judge Arthur W. Doyle, speaking for the appellate court, stated that "there exists a present real threat of disclosure, even without actual disclosure," and Wholgemuth was enjoined from disclosing to his new employer any of the processes and information claimed as trade secrets by the Goodrich Company. Judge Doyle did, however, reiterate long standing law in this area when he stated, "We have no doubt that Wholgemuth has the right to take employment in a competitive business, and to use his knowledge (other than trade secrets) and experience for the benefit of the new employer." And so Wholgemuth may work for Latex but cannot utilize any of the trade secrets he may have helped develop. One wonders if Goodrich, like a divorced husband, will be granted visitation rights to determine if its brain children are being abused.

What are the implications of this decision for the academic researcher and the institution for which he works? Consider yesteryear, when a research professor from one institution left there to continue his teaching, his professorship, and his research work at another university. His former employer might regret the loss of an outstanding scholar but it could always point with pride at what a fine training ground it had been. All this sort of thing occurred, of course, in the days when institutions of higher learning

had not even established a recognizable patent policy to guide their faculties in reaching decisions concerning disposition of patentable discoveries made during the progress of university sponsored research. Indeed, as late as ten years ago the majority of our universities and colleges had no patent policy at all—it was the responsibility of the individual faculty member to patent or not to patent. Even though the Wisconsin Alumni Research Foundation, formed in the 1920's to handle patents on discoveries arising out of research, has been and is frequently considered to be a model of patent policy expression and operation, there are many opponents to the holding of patents by universities. The feeling seems to be that institutions of higher learning are operated to advance the intellectual level of mankind, not to make a "monopoly" profit.

It is true that in the past certain universities and colleges have taken steps to protect their names, much as a business house might protect a copyright. Notre Dame, Radcliffe, Vassar, Cornell, and Stanford have all sought injunctive relief to prevent unauthorized use of their names for identifying characteristics for commercial gain. But institutional protection of institution-generated ideas, discoveries, or techniques is a modern development.

Fortunately or unfortunately, many universities and colleges are now in an uneasy and sometimes uncomfortable partnership with business, industry, and the government in the field of research —not only in partnership but, at the same time, in competition; and this is where Wholgemuth comes in. Let us suppose that, instead of working for Goodrich, Wholgemuth had been a faculty member of some college, engaged as director of a research project on space suits, the college having a research contract with Goodrich. Would the same rules apply as in the case under discussion? Would Goodrich have the same right to enjoin him from using any trade secrets developed under the research program Goodrich had paid for if Wholgemuth left the college faculty for a similar position with another college which had a research contract on space suits with International Latex? Would the college itself be entitled to injunctive protection if the research had been sponsored by it rather than by an industrial contract? What would be the situation and what protection could the government command if the research program were sponsored by the government, and would it make any difference whether the sponsorship were by contract or by grant?

What Are Proprietary Data?

The ramifications are endless and become particularly perplexing if the college has a research agreement with the federal government. Every such government procurement contract contains, where appropriate, a standard clause concerning proprietary data. It reads,

> "Proprietary data" means data providing information concerning the details of a contractor's secrets of manufacture, such as may be contained in but not limited to his manufacturing methods or processes, treatment and chemical composition of materials, plant layout and tooling, to the extent that such information is not disclosed by inspection or analysis of the product itself and to the extent that the contractor has protected such information from unrestricted use by others.

Even with this definition the term may have different meanings to different people. One extreme is that it refers to any information which it is desirable, for commercial purposes, to protect from use by others. The other extreme is that the term is synonymous with "trade secrets." But what is a trade secret? That the latter term can be just as all-inclusive as the government standard clause is suggested by a recent Illinois case, *McDonald's System Inc. v. Sandy's Inc.*, which indicates that the layout and operation of a drive-in sandwich shop may constitute a trade secret which will be protected by injunctive relief. The government's definition certainly should include trade secrets, as it is practically all-inclusive. The definition does not help very much.

A "secret" may not be generally known in the trade but may be quite standard laboratory practice, whether the laboratory be industrial or academic. It may likewise be the "secret" of several companies, each happily under the impression that no one else has discovered the particular process. Commercial research and development contractors with the various government bureaus have frequently had difficulty in determining just what they themselves considered to be proprietary data. Certainly, the attempt on the part of industry to prevent the loss of trade secrets and proprietary data would appear to have as its underlying motive a desire to maintain some measure of advantage over competitors. If we limit our consideration of this matter to the question of competition, we may well ask with whom is a college competing? If we contend that where academic institutions engage in research there is no competition and that the universities and colleges are not "in trade," the conclusion is inevitable that there are no trade secrets and that there is nothing to protect.

This line of argument appears to be in the nature of a red herring. Actually an educational institution may engage in two different types of research: (i) academic research integrated with and part of the educational teaching process, generally financed by the institution itself or by some educational foundation, and (ii) "contracted-in" research, that is, research engaged in by the institution on the basis of a contract or grant either from government or from industry. In the first type there is no competition, and the traditional freedom of movement of ideas and researchers should remain unhampered. When engaged in research under contract, however, a university is in competition with every other institution doing similar work, whether for grants and contracts for pure research, or merely for recognition.

Here the research faculty is selling a service in the same manner and for the same thing (money) as would a commercial research laboratory. Is there any reason why the ordinary rules of law relating to business enterprise should not apply to educational institutions when they enter upon a business enterprise? The academic researcher on a contracted-in program buys his equipment, lab aprons, and supplies from the same suppliers as the non-academic researcher. True, the latter may not get a 20 percent "educational discount" but, assuming the same salary, the two researchers pay identical taxes, and in some instances the work product of each will go to and be paid for by the same industry, perhaps even by the same company.

Assuming that we can be sure of the meaning of the terms proprietary data and trade secrets, we must now consider the position of an educational institution with regard to proprietary data when it has a research and development contract with the federal government. This is a contracted-in situa-

tion, and, under the contractual obligation set forth in the definition quoted above, the government obviously is entitled to such data even if they have been developed under a previous research contract with private industry, unless we can consider that the particular data have already been *sold*. But, in the absence of specific provisions in the agreement between the university and the industrial client, can it be said that the client is purchasing any more than the end product as distinguished from the underlying proprietary data? In any event, would an injunction by a private corporation in such a situation prevent the university from turning over to the government the "trade secrets" it developed under contract with the corporation?

Implication for Universities

Aside from the fact that injunctive relief was granted in the Goodrich-Wholgemuth case, the major significance of that decision lies in what was not decided. Nowhere in the decision is there any expression, by dicta or otherwise, that the ruling of the court does not apply to the academic community as well as to the business community, of which, unwittingly or not, the academic community has become a part. If, in fact, the law of the case does apply to the academic community (and there appears no reason to doubt it), it is necessary for that community to devise means of protecting itself. The research scholar, if he is to protect his traditional academic mobility, requires some assistance lest he find that mobility substantially lessened or perhaps, in some instances, abolished.

It is apparent, however, from this decision and others, that the protection of property rights in ideas and know-how has strong support. It is important, therefore, that universities and colleges give serious thought to analyzing their current position and to establishing some way of protecting their own interests, their own property rights in ideas and know-how. It should be obvious that there is nothing unique about the employment of Wholgemuth which would distinguish it from the activities of hundreds of young research associates in our universities and colleges.

The historical position of universities, as we pointed out, has been to permit innovators and scholars to patent and copyright their own work and discoveries. The fact that a particular item might be patented and marketed commercially at a profit did not necessarily affect the institution, it has traditionally been claimed, in view of the fact that the faculty member undoubtedly would contribute one or more of the items to his department. It was also much simpler to leave the matter to the individual researcher. It relieved the administration of the necessity of making the decisions. And besides, the individual researcher was considered the most concerned. He had not only his reputation to protect, but his future productivity as well. Who ever hears of the second scientist to discover insulin? Failing this, the employer, that is, the university, had by tradition a "shop right" in an innovation or discovery made by the employee on company time. This has traditionally been the case, particularly where the employer did not wish to challenge the employee's right to the patent or copyright. Also, in some areas, such as medicine, professional tradition regarded the taking of patents on items which would improve the "state of the profession" with misgivings. Students of medicine will recall the suppression of the invention of forceps. This "scandal" may have been the shaping force behind this academic-professional outlook, and there may be a sort of commitment on the part of medical researchers to dedicate their discoveries to the public domain, utilizing the device of the patent or copyright merely to prevent irresponsible producers from taking undue advantage. This was, and may still be, academic tradition too, but it may not be at all compatible with the entry of today's academic institutions into the market place.

That entry into the market place and the formation of a shaky partnership between industry and the academic community occurred during and following World War II. At that time a few farsighted faculty members who had made significant discoveries relinquished their rights to the profits thereof to research foundations connected with their institutions. The idea behind this arrangement was that the foundation could develop those discoveries commercially and use the resulting profit to further other and possibly more far-reaching research. Other faculty members, possibly even more farsighted from the standpoint of the profit motive, shed their academic robes and exploited their patents for their own benefit. Here again the Wholgemuth case casts its shadow. Under the ruling therein, can faculty members exploit know-how gained under a university project for their personal profit? Is not that know-how a property right of the institution?

Where a device, process, or design has been created or developed, two problems immediately arise regardless of how or through what agency that development came into being. The initial decision concerns the desirability of patenting or copyrighting. Once it has been decided to seek the protection of a patent, it is necessary to decide upon the best method of exploiting this protection. This decision must be made by the individual researcher, the industrial complex, and the academic community alike. It is relatively rare today for the individual researcher, working alone and unsubsidized, to come up with any earth-shaking discoveries. The greater number of patented or protected items are the result of coordinated research in great laboratories. True, the patent is issued to an individual, but it is almost invariably followed by an assignment to the subsidizing industry.

We have traveled from the inventor's garret to the industrial research laboratory to the university research project. Formerly universities handled research assignments from industry because industry was not equipped, either with equipment or with personnel, to handle the assignments. Today industrial laboratories are frequently better staffed and better equipped than their academic counterparts, and the latter may even be the beneficiaries of cast-off research installations and equipment no longer of use to the industry for any purpose other than a tax write-off. This shift in position does not indicate at all that industry intends the universities and colleges to use that largess to compete with its benefactor or to assist a business competitor, any more than industrial benefactors intend to release their know-how. Industry will use all the weapons at its command, including the legal weapons employed in the Wholgemuth case, to prevent this type of competition.

Industry is well aware of the advantages of research based in universities. It keeps track of government-sponsorship of academic research hoping to be able to take advantage of the know-how developed in connection with such

research. It is not unusual for a university or college involved in governmental research (and unless this research is of a classified nature it is a matter of public record and easy to identify) to find itself approached by industry to conduct "applied studies" paralleling the basic research supported by federal funds. Not infrequently the research may be quite similar to or identical with that of already extant contract commitments. Wholgemuth again?

Plethora of Patent Policies

Mention has already been made that perplexities and trade secrets go hand in hand where the institution is dealing with the government. The perplexities become even more onerous where patentable items result from the research. There is a plethora of government patent policies. It was indicated in a recent publication that there are twelve federal agencies authorized to enter into contracts for research and development work, that is, work which might result in patents. Annual expenditures of each of these agencies for such work exceed $100,000. Half of these agencies follow what is known as the "license" policy with regard to patents, and half follow the so-called "title" policy. (The most active agency in the patent field is probably the Department of Defense. In the five fiscal years from 1955 to 1959 this department acquired 7844 patent licenses and 1832 patent titles.)

Under the "license" policy the government receives an irrevocable, nonexclusive, nontransferable, royalty-free license to any inventions conceived in the course of the performance of research and development work under contract. The "title" policy operation is such that the government receives full title to any such invention. In certain agencies, such as the Atomic Energy Commission and the National Aeronautics and Space Agency, patents on inventions arising out of research and development contracts must by law be issued to the government unless the administrator specifically waives the government's right. If the discovery or invention "is useful solely in the utilization of special nuclear material or atomic energy in an atomic weapon," no patent shall be issued; this is true whether the invention is conceived under government, industrial, or academic sponsorship or is arrived at independently. Except when an invention relates to atomic energy, the taking of a patent by a government agency may not prevent the discoverer or inventor from securing foreign patent rights. The problem with these patents is, of course, whether or not the resulting patent has been conceived or achieved as a result of pre-existing know-how belonging to someone else.

Whether or not a patent results, the government has a broad interest in know-how. As it was put by Beach:

> Contractors with the Government are discovering to their consternation that their customer has a broad, acquisitive interest in know-how. In nearly all instances the Government's interest is detrimental to the contractor because its objective is to broadcast the know-how, thus impairing or destroying the property right. Sometimes indeed the Government seeks know-how for the purpose of releasing it to the owner's existing or potential competitors to assist them in manufacturing products of the owner's design.

It would seem that under the specific wording of government research and development contracts a Wholgemuth situation could never arise, as the government would have full right, under its contractual agreement, to broadcast the know-how. This might be entirely correct if we can assume in advance that *all* of the know-how the government is to receive under that contract is the property of the recipient of the contract. From the decision in Goodrich v. Wholgemuth it would seem to follow that, unless the recipient of a contract actually owns the property right to his knowledge himself, that is, did not develop it under a previous contract with another to whom it can be said to belong, injunctive process can be invoked against the recipient's disclosure of proprietary data to the government, with whom he is now under contract. There are no guideposts. There have been, aside from the Wholgemuth case, no pertinent court decisions in this area thus far. The research scholar thus finds himself without guidance in determining just who owns his knowledge.

Although the patent policies of government agencies are conflicting, we might expect academic institution policies to be models of preciseness, and more or less uniform. Unfortunately such is not the case, and the research scholar again finds himself in the middle of a maze of differing policy. The patent policies of the universities and colleges vary so widely that there seem to be no two which are identical. In effect, every time a scholar changes patrons, assuming in view of the Wholgemuth case that he can safely do so, he must be careful lest, in complying with previous policy, he violates present policy. (And one thought genius had its difficulties in the Middle Ages!) As we might guess, university patent policy is frequently at variance with government patent policy, or at variance with at least *one* government patent policy.

In academic circles the criteria for acceptance of contracts for research projects seem to be as muddled as the patent policy. One criterion followed by a major university is that if it will produce a doctoral dissertation or so, well and good, it will be accepted. At another institution the primary consideration is said to be whether the research project will enable the institution to build up the number of "names" on its faculty. In a third, it is a question of 11-month employment of the faculty, and, in a fourth, the matter revolves around the 12-month utilization of facilities. Here we have a recognizable profit motive—recognizable because, for example, it is rumored that at least one institution has increased its service charges—heat, light, water, mimeographing, repairs, janitorial service, and so on—beyond commercial rates for the simple reason that the fees paid by research projects alone constitute a respectable profit on those services.

Whatever the motive of the institution in accepting a research commitment, the end product, so far as the purchaser is concerned, is inquiry into a specific area, resulting in the solution of some specific problem. Moreover, amplification of existing knowledge may be more important to the sponsor than the development of new knowledge. The purchaser of research and development work, be it industry or government, may under our existing legal framework demand to be the first to benefit from its purchase and to have some priority in the control of the commercial distribution of its discoveries. It is the protection of this right of priority that gave rise to the Goodrich complaint.

Protecting University "Property"

Where does all this speculation leave the educational institution in regard to protection of its own property inter-

ests, not only in patentable items developed in its own self-sponsored programs, but in the know-how which, in the Wholgemuth case, is held to be a "property?" It is evident that institutions of higher learning, having entered into commercial research, are in no position to leave the protection of its marketable products to individual faculty members, nor should they neglect intellectual property rights which, to judge from the litigation generated in private industry, are either valuable on their own merit or are potentially valuable in connection with future patentable inventions. Some sort of administrative action should be taken by the universities and colleges as institutions to protect their rights to both of these kinds of "property."

This action may require a revision of employment contracts with faculty or improved contractual arrangements with purchasers of research, or both. Certainly the establishment of a firm policy for the protection of intellectual properties is a necessity. Firm patent and copyright policy is also necessary, as are internal procedures which will insure evidence of priority of discovery in the event that litigation should be a part of that policy. In short, if our educational institutions are to operate a business, even though it be the business of research, they should adopt appropriate methods for it.

These methods may or may not involve the institution in actions such as *Goodrich v. Wholgemuth*, but the implications and ramifications of this case are too great to be disregarded. The final word on freedom of employment versus the keeping of trade secrets has not yet been heard. When other cases in this area are decided, we may have a better idea of the extent of possible protection of property interest in ideas. Until that time, caution is required.

News and Comment

Post-Sputnik: Relations between Science, Government Now Passing into More Settled, Mature Stage

Nearly 7 years have passed since Sputnik caused Washington and science to become acutely aware of each other, and now, after a good deal of excitement, misunderstanding, and extravagant fears and prophesies, a number of important patterns in the relationship seem to have become fairly well established and are likely to endure for a long time.

First of all, though some university budget officers still conduct exercises on what to do if the federal money stops—just as the Navy, prepared for anything, still runs an occasional drill on repelling boarders—no informed person in the government or the universities thinks the money is going to stop. The amount and scope of federal assistance for research and education gets bigger year by year, and there is every reason to assume that, unless a political or economic catastrophe occurs, the now-established pattern of federal financial support will prevail. Over, let us say, the next 5 years, there may be a few jigs and jogs in the curve, but there is nothing in present executive and congressional attitudes toward research to indicate any inclination toward reductons. On the other hand, there seems to be considerable support in the making for increasing the present rate of growth, which began to level off last year under general budgetary pressures.

Closely involved with federal support is the question of the strings that are tied to it. Here again it appears that fearfulness has interfered with clear vision. Last year, when the National Institutes of Health established tighter accountability requirements for grants, many researchers reacted as though they expected the next step would be for NIH to prescribe their attire, diet, choice of mate, and religious training for their children. Several researchers were reported to have turned their grants back to NIH in protest. But now that the scientific community has lived with the new accountability regulations for a year or so, it appears that they do not differ very much from the regulations that they supplanted, and that there was no justification for the predictions of scientific calamity that would ensue from researchers' having to fill out a few more reports.

In many cases, onerous or not, the present accountability requirements probably represent the outer limit of paperwork for a long time to come. The cries of pain they evoked were of questionable validity, but they did serve the useful purpose of notifying Congress that scientists don't like to make too many financial reports, and they also served to increase the granting agencies' sensitivity to the likes and dislikes of their clients. Those in quest of money may sometimes doubt that any such sensitivity exists, but the people in the agencies like to be well thought of by the scientific community, and there is a psychological feedback when important elements of the scientific community feel aggrieved by a granting agency.

Thus, it can be said with reasonable certainty that the present patterns of increasing support and accountability will be maintained. There is considerably less certainty, however, about just what additional role Congress may carve out for itself in its relations with matters that come under the heading of research and development. During the past year the Elliott and Daddario committees in the House have been studying federal support of R & D with unprecedented intensity, but so far these committees have failed to turn up any data or conclusions that are at variance with the orthodox thinking of the scientific community. Conceivably, they might have obtained a different view of science and government if they had dipped down a layer or two and had solicited the views of persons other than university presidents and administrators, members of the National Academy of Sciences, and top-level government science administrators.

It might, for example, have proved interesting had the committees obtained the views of some pre- and postdoctoral fellows on how their scientific training has fared under federal support systems. (Those who would be fearful