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University Responsibilities and Government Money

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Increasing concern over the implications of competition in weapons of annihilation is stimulating action to rectify our shortage of engineers and scientists. On 3 April 1956, the President issued a statement on the subject and appointed a commission to deal with the matter. Many well-informed persons emphasize the important role of scientists who are competent in basic research in the increase of knowledge that may be indispensable, not only to our security, but to our economy and welfare as well.

In this situation our nation's future will be as good as we choose to make it. The better our intelligent, well-planned attack on the problem, the greater will be the additions to significant knowledge essential to progress. A determined and sustained effort in basic research is imperative. "Knowledge is power" fits the situation precisely, and basic research is the key.

A realistic appraisal of the importance of the subject is indicated (*1*). It is no departure from realism to recognize that practical application of knowledge is not the only justification for seeking it. In a provocative essay Alfred Stern (*2*) shows, by remarks of Epictetus and Herodotus, that the original meaning of philosophy is contemplation for the sake of contemplation, a search for knowledge in order to *know* and not in order to *act*; and he quotes the opening statement in Aristotle's *Metaphysics,* "All men by nature desire to know." Motivated by intellectual curiosity, the attempt to penetrate the unknown applies to the whole body of knowledge, of which science is a part. It is in the pattern of our culture for society to encourage and support specially gifted minds in their eternal quest. Research in science under the conditions of our time is a large and important part of the search, both because of the need to understand more fully our physical environment and because of its over-all social implications.

Unlimited Funds Not an Answer

With such realism as we can muster, we must say that the outpouring of unlimited funds for research in science is neither necessary nor sufficient to assure maximum returns. These are determined by the quality of the work and less directly by the quantity of money employed in its furtherance. The limitation to the production of new and significant knowledge is the competence and number of research scholars.

The major concentration of these relatively few gifted persons is in the colleges and universities where postgraduate studies are pursued. If we seek a maximum of significant contributions to science, we must look to the institutions of higher education as their principal source and, by some rational process, assure their support. We must make sure also that there is a steady increase in the number of capable research scientists by inducing able young persons to choose scholarly careers. It would be visionary to suppose that all of them could or would become academic scholars, in view of the limited number of tenure positions in universities. These posts should be held by those of highest competence. But there are many scientists of unusual ability who are not drawn to the academic life, and who find satisfying careers in industrial and government laboratories. All of them are the product of institutions of higher education.

Government Money Mostly for Applied Research

Since World War II, the flow of government funds into our colleges and universities has been steadily growing, mostly for the procurement of research services with specific objectives—that is, for the procurement of applied research and development. Contracts for such work in large volume have been promoted by the defense agencies and the Atomic Energy Commission. The Office of Naval Research, the Atomic Energy Commission, the National Institutes of Health, and other agencies have also supported basic research, largely under contracts or other instruments which, to the extent to which it was legally possible, were so drawn that they were in effect grants-in-aid.

The Office of Naval Research tided over a threatened hiatus in the progress of basic research in colleges and universities by providing funds during the period when the legislative labor was bringing forth a new agency of the Federal Government to be responsible, among other things, for research and education in science. When the National Science Foundation emerged in 1950, it had wide latitude under its act, so that it could make grants for research without "practical" objectives, thereby to assist universities and colleges in meeting their responsibility to create new knowledge by supporting the scholars on their faculties. Thus, from the several agencies mentioned, the support for basic research has been rapidly increasing but in substantially smaller volume than that for applied research and development from all agencies.

A pattern becomes discernible in the flow of government funds to colleges and universities for research and development. It seems pertinent to explore something of its background. It is desirable to obtain a clear view of the responsibility of the government and the universities, respectively, in their support of basic research. It is equally important to discover, if possible, the effects of govern-

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ment financing of all kinds of research and development projects, particularly the effects on universities of contracts with government agencies under which the institutions are called upon to perform stated services within a specified time.

Scholarly Research the Tradition

In this exploration, several interesting and relevant facts come into view. Prior to World War II, most research was done as an individual undertaking, usually by a scholar imbued with the spirit of inquiry, with whom graduate students and younger colleagues had close association. A university so comprised effectively disseminated knowledge through teaching and created knowledge through research. Both activities remain the traditional responsibility of the university. May we not assume that this model of a university continues to be a desirable one, notwithstanding that some of its scholarly resources may have to be directed into team research?

Somehow the scholars in such a community have always managed, even without funds earmarked for a project, to produce knowledge, to become renowned for scholarship, to attract graduate students from distant places, and to contribute substantially to the prestige of their institution. Somehow the university found ways and means of supporting their work. Private gifts and grants were sought and gladly accepted for its furtherance. No one doubted that such contributions helped materially in advancing knowledge. Government contracts had not yet entered the picture.

During the war, most of the scientists were drawn into military development work in science, engineering, and medicine, many by the military departments and the Manhattan Engineer District, and many more by the Office of Scientific Research and Development. Their work was on urgent projects and crash programs, not basic research. In these they soon learned the effectiveness of the "research team" with large sums of money at its disposal. The OSRD initiated the no-gain-no-loss contract with universities, under which all costs were paid, both direct and indirect. This was proper, since the contract called for specific services, some of which could not appreciably contribute to the educational aims of the institution and would certainly not have been selected by the scientists had they had complete freedom of choice. Moreover, it would have been contrary to any rules or expectations to have the university help the government to pay for the job. It was a case of rendering national service in time of great emergency.

Postwar Change in Pattern

With the war finished, the scientists were eager to resume their normal activities and did so as quickly as they could. The OSRD contracts and those of the military agencies had established many liaison arrangements between administrators and scientists in the institutions, on the one hand, and the agencies, on the other. The latter had continuing responsibility for the development of weapons, and defense and weapons systems, which made it desirable for them to continue their associations with the institutions. This was one way of easing the burdens on their own laboratories, and it was the simple, perhaps all-too-obvious, way of getting the scientists back quickly on military developments in the event of future war.

Accordingly, the government agencies continued contracts for many projects with the institutions and initiated new ones. However, there were many scientists who had had their fill of such work. They wanted no more secret projects, carried on behind locked doors, with results that they could not publish. Nor did they want to devote their time to finding practical applications of science; they wanted basic research. But they had become accustomed to large funds, easily acquired. Many now felt unable to pick up where they had left off, except with sums of money a few magnitudes greater than they had ever before had for their own work. And they felt the need of paid assistants, because the military jobs furnished them paid assistants. Many were convinced that team research was the new order, with management and organization set up on industrial lines, and that they should, as "principal investigator," manage the teams and the funds.

In their feeling of need for financial aid and their desire to initiate team work, they did not discriminate between the military developments on which they had worked and their own prewar basic research. The new pattern of large operations had been extended, in their minds, to include their own work. They would be greatly handicapped unless they had a great deal of money and many assistants. In many instances their university administrations were easily persuaded to adopt the same view. Institutions participating in war work had greatly, and in unaccustomed ways, expanded their operations but apparently found this to their liking and were loath to see reduction in activities and budgets.

It is not to be argued that more funds for basic research are not needed or that the team approach is not the way in which some basic problems must be tackled. We have impressive demonstrations of its merit in both the physical and the life sciences. However, the "ivory laboratory" with its tower for seclusion and contemplation still has an important place in the scheme of basic research. The most profound of new ideas are more likely to issue from the gifted individual with time and opportunity to think than from the large team. Indeed, without time and opportunity for contemplation, profound discoveries may not be made at all. The small grant-in-aid for the gifted individual still has great merit, but this does not preclude or prejudice the large grant for the large apparatus with its large team. Both kinds of grant are needed. If facilities and personnel required exceed the means of an institution or of an associated group, it is proper under existing conditions that the government assume whatever costs the institutions cannot afford, for research must go on. Nor—until something better can be done about it—does there seem to be an alternative to enlarging the flow of money from government to the college and university. If teaching and research are to continue as they must, the institutions need the money, and their need becomes more pressing each year, with more students.

Fiscal Dilemma

One who is sensitive to the financial needs of education, and is sympathetic with the presidents of universities and colleges in their very difficult quest for more operating funds, is inclined to take the view that "money is where you find it," and that any fair means of getting it must be adopted. The most obvious source appears to be government; hence, any legal device or method for getting money from this source should be used. One can find little fault with this position. Closer scrutiny, however, suggests that a question may be raised about it.

One may with good reason feel uneasy about an aspect of grants-in-aid from the government, or, for that matter, from any source, that appears not quite in keeping with the spirit and dignity of scholarly research. This is the assertion by some institutions that they cannot support the research of their faculties, even with grants-in-aid, unless the gift is accompanied by a supplementary gift to cover full overhead accountable to the research. Before government money was available, no one seems ever to have worried about overhead on the basic research of individual faculty members. It was part of normal running expenses. Their laboratories had been built, equipped, and provided with the usual services of light, heat, electricity, water, gas, and whatnot. It is doubtful too that reserves for depreciation and obsolescence were ever carried on the books. Now, if government or other donor

makes a grant to pay for research to be done in such a laboratory, the donor is expected also to pay the rent and other items comprising indirect costs, with alleged serious consequences if it is not done. Such a position seems to some to be not in harmony with the forthright statement of fundamental principles in the Hancher Report of the American Council on Education (*3*) that all accredited institutions of higher learning subscribe with varying emphases to three primary and essential aims, the first of which is "the extension of the boundaries of knowledge." An "essential aim" would seem to imply acceptance of responsibility for its accomplishment.

It is helpful in this discussion to keep in mind the essential difference between work done at government solicitation, comprising largely services procured under a contract, and the kind of research that a scholar prefers to do. Almost certainly no one would quarrel with payment of full costs, direct and indirect, for services procured under contract to accomplish a stated task. But when a gift is offered, in the form of a grant to assist in the research support of a faculty member, it would seem that its acceptance on the one hand, or its rejection, on the other, should settle the matter. When an amount of money is tendered to help an institution to carry out a responsibility, there is an implication of ill grace in "bargaining at arm's length" and saying to the grantor, "We appreciate your offer, but it isn't generous enough."

When an institution takes this position, there is a strong suggestion that it does not fully recognize or unreservedly acknowledge its responsibility for "extension of the boundaries of knowledge." We do not overlook the fact that it is national policy that the Federal Government promote and support basic research. This, however, ought not to result in disavowal by universities of their recognized responsibility to support their research function, just as they support their teaching function. The government it not "buying" knowledge through basic research; it is assisting the institution in meeting its traditional responsibility of increasing knowledge.

Government Money: Government Control

When an institution shifts increasing responsibility toward the Federal Government to pay for its research, it moves into hazardous territory—hazardous to its freedom. If there were substantial increases in subsidy, including all indirect costs, so that no outlay whatever would come from the university's regular budget to pay for a given research, this would constitute a step toward full subsidization of all the institution's research. How could intrusion or domination by government then be avoided? Even now, while government money pays for only a part of all research that faculty members want to do, there exists a measure of government control which, although not calculated, is becoming manifest in various ways and, through continuing and increasing practice, might easily become established policy.

To assure against misunderstanding, it should be made clear that my sympathies and interests have always been with the institutions of higher learning, especially with respect to their problems of balancing income and outgo. They have no choice but to exploit with forthright integrity every possibility of obtaining operating funds. The insistence by some of them upon ever-increasing overhead allowances on grants for basic research is symptomatic of deeper trouble than can be cured or even much alleviated by an artifice of bookkeeping. It is like taking aspirin to cure a deep-seated organic disease.

One possible escape from the unfortunate but inevitable difficulties in which the question of overhead on grants is imbedded comes to mind. It is not easy to prognosticate the direction and extent of a research undertaking, but the rate at which it proceeds is determined by the investigator's drive and by his duties and preoccupations; and the rate at which funds are needed can be approximately predicted. Thus a granting agency in consultation with a scientist can learn his plans and determine the approximate annual cost and the cost of equipment. Having reviewed the plan in the light of available funds and other pertinent factors, the agency would offer a sum to the scientist's institution to provide for financing the work for a given period.

It would also tender a supplementary grant, amounting to some stated fraction of the principal grant, in recognition of the fact that the institution has expenses that must be met, which in part arise out of its responsibility for supporting research scholars on its staff. For example, the supplementary grant might amount to 20 or 25 percent of salary items in the plan for the research and 10 percent of the cost of equipment. The primary grant would be used as intended, in its entirety, for the support of a particular piece of research. The supplementary grant would become part of the institution's "own funds," for which no accounting would be required.

Problems and Pitfalls

Inability to balance budgets easily takes on a further serious aspect in the financial relations between government and a university that develop in the widely used contract for procurement of technical services. When a university sees fit to assume the responsibilities imposed by such a contract, all disbursements by the university, both direct and indirect, assignable to the contract, should be covered by the contract. They should, in fact, be adequately covered, including any margin of uncertainty about what constitutes "cost." Here a subtle danger should be recognized.

Although such contracts are intended to be no-gain-no-loss, some universities have derived substantial benefit from them. They have in some cases become the financial mainstay of institutions that extended themselves, beyond their traditional functions, for the handling of such contracts. Since the portion of overhead funds not disbursed in the performance of the contract is uncommitted money, such funds can be and are used for purposes other than those shown in the tabulation of what constitutes overhead. Thus the task of obtaining general operating funds is made somewhat less arduous. This becomes a strong incentive to accept and even to seek contracts, with diminished critical appraisal of whether the work to be done contributes to the advancement of the institution in performing its primary obligations.

A cynic might suggest that integrity has suffered. He might surmise that at some institutions business considerations strongly influence, if they do not control, educational policy. Indeed, he might point out that even research scholars have fallen in with the idea of getting easy money from the government. And there are instances where an institution has put salaries on an incentive basis, the incentive being a salary boost contingent on the researcher's success in landing a government contract. If there has indeed been subversion of integrity, some of the money-dispensing agencies must share the blame, for there is an impression—perhaps with reason—that it is easier to get $50,000 or $100,000 than $5000 or $10,000.

Another danger—not always easily discernible—lies in the opportunity for a career-building staff member of great enterprise but perhaps lesser competence in science than that of his colleagues to use the successful promotion of government contracts as a promotional device for himself. Even a grant-in-aid may not be exempt from such designs.

Such misgivings as one may have in these matters may, to a degree, be resolved by referring again to the "Fundamental principles" of the Hancher Report. Here it is stated that, in addition to the research and teaching functions, universities have a public service function, to perform services other than teaching and research. In tax-supported

institutions, such as state universities, this is obligatory to a limited extent, whereas in private institutions it is voluntarily assumed. In either case, if the decision is to accept a contract, there is ground for criticism only if the work goes far beyond the traditional functions of institutions of learning, or if the institution is not obviously well qualified to undertake the assignment. When a contract is of such scope and size that a greatly increased staff has to be hired for management and operation, and if other than the financial interests of the institution are thereby not clearly served, the wisdom of accepting the contract is properly questionable.

The discussion in several preceding paragraphs relates to some of the consequences of the chronic lack of operating funds that is characteristic of higher education. If institutions had adequate resources for normal operation, they would be under no pressure to decide whether or not to engage in activities that are probably not of the kind in which universities should have to be engaged.

Some Searching Questions

A contract that puts an added burden of performance of unusual or unaccustomed functions on a university may have detrimental effects on the performance of its regular functions. This is a serious matter of which many administrations are aware. In this connection, some questions should be asked about other aspects of possible effects of contracts on the normal operations of the university or college.

Are the over-all excellence of teaching and the level of scholarly output increased or diminished?

How is the prescribed work related to the educational functions? Does it have unfavorable effects on departments not involved in the contract work, such as the classics and humanities? Is research in good balance in all fields of learning? Does the performance of the services require intellectual effort that presents a challenge to the best minds, or does it comprise essentially pedestrian invention and design, with production of a prototype device as evidence of performance? Could the work be done as well or better by some other organization or agency?

Does the contract require the employment of scientists and engineers at salaries competitive with those of industry, but lacking faculty appointment or status? Does it entail serious problems of administration by requiring two categories of employees of substantially equal competence but different status in salary, rank, and tenure?

Have faculty members with strong inclinations toward basic research been shunted into managerial or supervisory jobs? How have their research and teaching been affected? Have their normal duties been assigned to others of equal competence?

Have contracts lured graduate students from preferred intellectual pursuits and turned them into technicians employed for stated services? Have the contracts adversely affected their free choice of research problems? Have contracts contributed to the fullest scholarly development of which the students are capable?

Have standards for the awarding of advanced degrees been lowered so that work done by a student under the contract might be acceptable as his dissertation?

Has contract work had to be classified so that results, and particularly thesis work under a contract, could not be freely published?

Many other questions such as these could be asked. A searching inquiry of this kind will probably never be made, and this is regrettable (*4*). But observation of what is going on and examples of cases that occasionally appear give little ground for optimism. There can be little doubt that the course and quality of higher education, especially in the postgraduate areas of science and engineering, are being substantially influenced by large government funds. The observant, interested citizen must judge whether the results are beneficial or detrimental. A widespread view prevails that in the main they are detrimental; that the uncommitted funds derivable from contracts are an unduly powerful incentive to seek contracts; that the faculties of institutions have little voice in determining to what extent changes in scholarship requirements for their own academic community may be allowable because of the presence of contract activities; that the public benefit from the funds allocated to contracts is unknown and hard to measure but in some cases probably very small.

Possible Answers

If such detrimental effects exist, there is call for positive suggestions for improvement. Let the scholarly research in universities and colleges be supported to the greatest possible extent by gifts and grants which become the institution's "own money," derived from many private and some public sources. Let the research that requires large equipment and personnel be supported by grants and contracts under which the government pays all costs except those that the institutions can assume.

Let contracts proffered by a government agency be carefully scrutinized and judged in terms of contributions to the scholarship of an institution as well as to its finances. Let careful discretion be exercised in the acceptance of contracts for services, to make sure that there is no loss of freedom in educational and research policies or administration.

With the increasing pressure for federal aid to education the outlook is disquieting. There are implications of growing government control, a situation that can hardly be avoided with a rising flow of government funds into educational institutions. The threat is there. Countermeasures are difficult to devise and more difficult to apply, yet they must be found.

A suggestion in this direction has appeared and is being further explored and developed (*5*). Institutions must be provided with adequate, uncommitted funds, free from any possibility of control, coming in steadily year after year, commensurate with current needs. A simple change in the federal income tax laws can bring it about. It can produce a continuing and increasing supply of funds from millions of private donors, in addition to the already substantial gifts from corporations.

Once such a solution or a better one is in operation, it will relieve the presidents of institutions of the onerous burden of fund-raising, thus enabling them to devote time and effort to charting desirable courses for their institutions. The president may then become, as by tradition he is, the intellectual leader of a community of scholars. Then, as never before, can the institution be on its way, with complete self-determination and with confidence in its future, in its immeasurably important task of inspiring and developing keen minds to scholarship. Then only can the university or college aspire to be the cultural community through which the national character becomes truly revealed, and the foundations for the nation's welfare become firmly established.

References and Notes

1. The views expressed in this article are strictly my own. They are not to be construed as reflecting in any manner the official position of the National Science Foundation. Indeed, they are at variance with one aspect of foundation policy; but I feel certain that there is a substantial body of opinion which I am here trying to express and which in my view should be stated.
2. A. Stern, *Am. Scientist* 44, 281 (1956).
3. Report of the Committee on Institutional Research, American Council of Education (1954).
4. The National Science Board has a Committee on Government-University Relationships to advise the foundation with respect to policies of government agencies in the support of research at universities and colleges.
5. P. E. Klopsteg, *Science* **121**, 781 (1955).