Grantsmanship and Stewardship: A Public View

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CONFLICTS ARISING out of Federal grants management, the subject of this meeting, go to the heart of some of the thorniest and most portentous problems of public policy. In addition to the long-standing, but far-from-settled, issues of Federal-State-local government relations, management of Federal grants involves the newly emerging relationship of the Federal Government to higher education, a relationship so important and so complex that it has been called "the new federalism." It involves the relationship of government to science and of government to health, the relationship of public and private activities—a perennial issue in American society and an area where we have demonstrated a talent for pragmatic and nondoctrinaire compromise. It involves the relationship of the administrative process to substantive purpose and the relationship of the specialized expert to the generalist, who is responsible, at least in theory, for both policy-making and general administration.

Since the total subject is so all encompassing, we have chosen to confine ourselves to one significant segment, management of Federal grants for research in the health field. This in no way implies disregard for the vast field of grants-in-aid for other health activities. On the contrary, one of our major theses is that many of the problems of research grants management have been magnified precisely because the instrument of research has been overextended by expecting it to carry too great a portion of the Government's overall responsibility for the health of the people. Had we balanced the vast expenditures that have gone for medical research since World War II with more funds for medical education and for facilitating access to the storehouse of medical knowledge that already exists, the problems in all three areas—research, education, and patient care—might have been considerably lessened.

Here we concentrate, however, on medical and health-related research, especially the programs of the National Institutes of Health, which account for nearly two-thirds of total Federal expenditures in this field (*1*) and for three-fourths of sponsored research in U.S. medical schools. NIH programs, procedures, and problems set the tone for all medical research. They also shed light on the broad general issues. On the recipient side, we focus our discussion on the medical schools, nearly half of whose total budgets are now underwritten by Federal programs.

The statistics documenting the postwar explosion in medical research are familiar but bear reemphasis. According to NIH officials, total national expenditures for this purpose are expected to reach $1.9 billion in fiscal 1965. Within this overall growth, the role of the Federal Government has expanded far beyond that of any other source. In 1947 it accounted for less than one-third of the total. For 1965 its estimated $1.3 billion (*2*) will represent more than two-thirds of the total. NIH expenditures alone will come to an estimated $850 million in 1965.

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Another indication of the dramatic expansion in Federal medical research is its growth relative to all Federal research and development. When one compares expenditures for medical research with total research and development expenditures, the proportion going for medical research almost doubled between fiscal 1947 and 1965, rising from less than 4 percent to more than 8 percent. The significance of this relative increase is underlined by the fact that total research and development expenditures rose during this period from less than $700 million to more than $16 billion. If the comparison is limited to Federal support for research alone, eliminating the development component, the proportion going for health rises to about 20 percent.

From 1947 to 1963 Federal support of medical research increased at an average annual rate of 26 percent. The year of maximum increase was 1962, a 33 percent rise over 1961. The following year there was a rise of only 19 percent. The increase in 1965 is estimated at 10–11 percent, and a comparable rise is anticipated for 1966. Unless there is some unexpected development, it appears clear that we are now moving into a period of decelerating increases. This does not mean that the absolute amounts will decline, but simply that the rate of increase will be considerably reduced.

With such rapid growth, it is not surprising that problems and controversies should have grown along with the programs and achievements. Everyone who has followed the investigations, reports, and debates of the past few years knows how highly charged the issues are. At first glance, it may appear that there is virtually no meeting ground between the opposing camps, often oversimply and misleadingly represented as those primarily concerned with adequate administrative controls to assure efficiency and those primarily concerned with full freedom to maximize scientific output.

Certainly in the 1962 hearings (*3*) and report (*4*) of the Fountain Committee the issues seemed to be drawn about that starkly. Those who have had the responsibility of administering programs under these circumstances are entitled to sympathy. And yet, the fact that they have been administered and, on the whole, well, indicates the American genius for pragmatic accommodation and suggests that the conflicts are not nearly so clear cut as these hearings may have suggested.

To isolate the real issues of conflict, it would be useful first to identify briefly the large and significant areas of agreement among the various interested parties:

1. The propriety and legal authority for Federal financial assistance to medical schools and other nonprofit institutions engaged in medical research is fully established in public approval, in law, and in precedent.

2. The increasing costs of medical research and its large role in the national welfare have made it both desirable and inescapable that the broad taxing power of the Federal Government be employed to assist the medical schools and other nonprofit institutions to carry out this mission.

3. Such essential assistance must be, and can be, carried on in an atmosphere of complete academic freedom and in a manner to strengthen, rather than weaken, the recipient institutions.

4. Large-scale Federal support of research in medical schools has brought about a creative new relationship between the Federal Government and medical education which has, thus far, helped to enhance academic medicine.

5. This creative new partnership has already resulted in dramatic progress in medical research with breath-taking implications for the conquest of disease. The National Academy of Sciences provides this eloquent summary of recent progress in biomedical research (*5a*):

> Biology has moved into a spectacular new biochemical and biophysical era marked by fruitful concentrated attacks on its simplest and most fundamental phenomena. The genetic material was shown to be nucleic acid. The structure of DNA was discovered, and this led quickly to understanding in molecular terms the reproduction, mutation, and action of the gene, and later to deciphering the genetic code. These are among the greatest scientific advances of all time. They shed a brilliant new light on age-old questions of the origin and nature of life. They have led to new insights into the nature and action of viruses, major agents of disease. Extension of all these revolutionary findings to man is initiating what will surely prove to be a period of great progress in understanding human genetics, physiology, and pathology.

6. Thanks primarily to the intimate relationship between medical research and personal health, widespread public support for the Fed-

eral programs appears certain to continue, and congressional appropriations will undoubtedly remain at a high level.

7. Despite the striking achievements, in part because of them, there is agreement that numerous problems and difficulties exist with respect to the new governmental-medical school relationship. Some are related primarily to the great speed with which the programs were launched, but others are inherent in the sheer magnitude of the funds or in the special circumstances of governmental-medical relations.

8. As research manpower shortages and other inhibiting factors become more pressing, the Federal programs will probably increase at a decelerating rate, in accordance with the trend since 1962. This deceleration will serve to underscore the urgent necessity for rigorous analysis of, and attacks on, these problems by all interested parties if the future of the programs and the new government-medical school partnership is not to be jeopardized. This will be particularly true if, as some experts anticipate, the proportion of research conducted on an extramural basis—now approximately three-fourths of the total—declines vis-à-vis the intramural programs.

These are the major areas of agreement. We now try to identify some of the principal problems and issues. Obviously, our discussion will have to be suggestive rather than exhaustive.

Grants Versus Contracts

During the first few years of the research programs, the grant won the overwhelming approval of the scientific community as the preferable instrument for federally financed university research. This was a preference partly philosophical, partly practical. Its original attributes of simplicity, minimal reporting burdens, and prepayment were all assumed to contribute to greater freedom on the part of the investigator.

Both the President's Science Advisory Committee and the National Institutes of Health have taken the categorical position that the grant is preferable to the contract. The National Science Foundation uses it extensively. Not everyone agrees with this position. Indeed, the popularity of the grant appears to be in rather precipitous decline. Some important Federal agencies, including the Office of Naval Research and the Atomic Energy Commission, have never used grants even for basic research.

Raymond J. Woodrow, director of research administration, Princeton University, has developed a persuasive case for the advantages of the contract over the grant (*6*). He emphasizes the following points: increasing rules and regulations now attached to Federal grants, such as those contained in the Public Health Service Grants Manual, make the grant at least as restrictive as the contract; contracts permit more realistic payment for indirect costs; the very term "grant" is misleading and conducive to abuse in that it suggests to the grantee an outright gift or subsidy. Furthermore, Woodrow takes the position that a government research grant is, in fact, a contract in the true legal sense.

The view appears to be increasing that the distinction between the grant and the contract is not really conceptual nor related to the basic purpose of the program but is primarily a bookkeeping convenience or historical accident. The 1964 report of the House of Representatives Select Committee on Government Research concludes (*7a*):

> In their present use, the committee has not been able to find distinguishing characteristics between these two instruments based upon either the subject matter of the research to be done or the type of research to be supported. It would appear that virtually every type of research is currently being supported by both contracts and grants.

A less sweeping comment appears in the National Academy of Sciences 1964 report on Federal support of basic research (*5b*):

> The advantages of grants generally outweigh those of fixed price contracts for basic research. However, research contracts have been developed into legal instruments that place few restrictions on the principal investigator beyond those imposed by grant arrangements under present regulations.

As a practical matter, the current debate over grant versus contract largely boils down to a debate over payment for indirect costs and increasing administrative restrictions. We agree with those who say that the grant no longer has any special advantages to offer in these respects; indeed, it is more restrictive with respect to indirect costs.

However, we still prefer the concept of the grant for support of basic research. There is value in its symbolism to many people, both grantors and grantees, including the implication for greater and more independent responsibility on the part of the recipient institution or individual.

The grant-in-aid, as an instrument for stimulating and assisting independent action by recipient bodies, has a long and respected history in American government and in private philanthropy. The Federal grant-in-aid is an important part of the machinery of federalism. Its use in the educational field goes back to the original land grants for education in the 1780's and to the Morrill Acts of the Civil War period. Throughout many fields of public endeavor, including the closely related areas of public health and hospital construction, the grant stands for public policy that seeks to reconcile Federal financing with local initiative and responsibility. Surely this is the goal to be sought in medical research as well. But this purpose will not be served simply by giving lip service to the principle if, in practice, there is a combination of inadequate responsibility on the part of grantees and over-restriction on the part of grantors.

Indirect Costs

The problem of reimbursement for indirect costs is partly one of accounting, partly philosophical. It is being debated with increasing intensity as the proportion of total institutional expenditures represented by Federal funds—nearly 50 percent on the average for medical schools—continues to rise.

The technical problems are many and complex. They include the definition of direct and indirect costs and the difficulty of allocating various types of expenses, such as administrative services, depreciation, and employee fringe benefits, to one or the other category. They involve the widely varying accounting practices followed in different recipient institutions. Fortunately, there is some evidence of increasing standardization in accounting nomenclature and procedures. A potentially important influence in this direction is the Bureau of the Budget's Circular A–21, now in process of revision.

Equally important contributors to accounting complexity are the often inconsistent Federal regulations as to methods of computation and payment, the most obvious being the difference between the congressionally-fixed limit on grants and the negotiable percentages usually permitted on contracts.

Related to these technical problems is the philosophical controversy over "cost sharing." This principle, taken over from private foundations and based on the assumption that it symbolizes a mutuality of interests and of responsibility on the part of grantor and grantee, was originally accepted without question by most medical schools. As with the grant itself, however, the attitude of many institutions has altered, and cost sharing is coming under increasing attack, even by some governmental bodies, such as the House of Representatives Select Committee on Government Research (*7b*).

The most telling arguments against cost sharing are the practical ones: the difficulty of establishing logical and equitable standards by which the Government can differentiate between research where cost sharing should be required and research where it should not; the difficulty of finding other sources of institutional funds to share the costs; the administrative difficulties for an institution that has to maintain two or more sets of fiscal controls under two or more types of reimbursement arrangements; and additional pressures for overconcentration of funds in a few of the wealthier institutions. Economist William Bowen makes this additional point (*8*):

> An arbitrary limitation on indirect cost payments increases the relative costs to universities of putting money into administration and thereby establishes a financial incentive for universities to neglect this aspect of their responsibilities.

Those who still support cost sharing believe that the universities and medical schools that opt for full reimbursement will be surrendering an important element of their independence. Opponents, on the other hand, insist that it is not enough to be brave; one must be in a position to be brave effectively, and this requires financial strength.

It has been pointed out, probably correctly, that the attitude of institutions toward full re-

imbursement generally varies directly with the dollar volume of research carried on. It varies from "it doesn't matter" to "grant limitations are OK" to "overhead is a real cost" as one progresses from small-volume to medium-volume to large-volume research operations.

Traditionally it has been common to associate cost sharing with the grant principle. But a more sophisticated view now claims this is superficial, that, on the contrary, the best way to save the grant as a primary instrument of Federal research policy is to divorce it from cost sharing and permit grantors and grantees to work out reimbursement arrangements in accordance with the Bureau of the Budget's Circular A–21, thus permitting institutions that prefer grants to accept them without subjecting them to a financial penalty.

The roadblock to such a flexible approach lies not in the National Institutes of Health, but in Congress, especially in the House Appropriations Subcommittee which, in all other respects, has been more than generous with medical research funds. Hopefully, this situation will soon be remedied. But merely raising the ceiling from 20 to 25 or even to 30 percent is not the answer.

[Since the original presentation of this paper a long step toward correction of this situation was taken by the House Appropriation Subcommittee in its 1966 appropriations legislation (sec. 203). The Government appears to be shifting to a general policy under which full costs (direct plus indirect costs) will be determined, and the Government will pay 90–95 percent of the total bill.]

Project Versus Institutional Grants

The project grant is a unique product of recent governmental experience taken over from private foundations. It has been popular with granting agencies, grantee institutions, and the scientific community. Its advantages are manifold and well known, including emphasis on individual excellence, selection by peer judgment through the scientists' advisory system, avoidance of a fixed formula for distribution of funds among institutions, minimization of political pressures, both national and institutional, and complete bypassing of the church-state issue.

The disadvantages are, largely, the obverse of the above. It is alleged that the project grant militates against the young investigator, who may not be known to the advisory groups, and against the less distinguished institutions. According to one critic, "Peer judgment is an elegant way of maintaining the academic status quo."

Primary reliance on study sections, panels, boards, and councils set up by Federal agencies may have resulted in bypassing, to some extent, the institutional deans, research committees, and department heads representing the normal framework of academic administration and thus may have impeded more rapid development of institutional responsibility. As part of the same picture, the project system may have intensified the already highly developed individualism of the medical scientist and his resistance to any coordinating authority, even in his own school or institution.

Whatever the relative merits of the two sets of arguments, the project system has dominated the American scene from the outset. Starting a few years ago, however, increasing concern with the need to complement the project system with a mechanism that would provide greater latitude of decision and greater responsibility to the recipient institutions led to development of a new type of grant, known as the "institutional" or "general research support" grant. Under a general authorization permitting up to 15 percent of total funds to be spent in this form, NIH appropriations for its support grants have doubled in the past 3 years to a current level of about $45 million, or 5 percent of total expenditures.

During the recent past, both types of grants have been increasing. While the general support grant has been growing at a faster rate, the level is still far too small to threaten the older project system. Nevertheless, as the predicted decelerating curve in total expenditures becomes more noticeable and both institutional and individual appetites continue to grow, competition between the two types will probably become keener.

Hopefully, both will be continued. The faults of one are the virtues of the other. Interestingly, in Great Britain, where the institutional grant has been dominant, the Franks

Commission, taking testimony on the organization of research and higher education, has recorded strong support for a project type system. This testimony suggests that a mix is desirable—a mix that we have approached from the project side and the British, from the institutional side.

To achieve an optimum balance, given our present tremendous emphasis on the project system, we suggest special attention to the institutional grant. In the words of Dr. Donald F. Hornig, director, Office of Science and Technology, Executive Office of the President (*9*):

> The government-university partnership is changing and the focus is shifting from specific items of research to a more general support of the scientific area in which the interdependence of research, education, and the university as an integral institution is increasingly recognized. I think this is an important development. While fostering the creative initiative and independence of individual faculty members, it seems to me that the university must also be more than an anarchic collection of talented individuals and students. It needs a soul of its own so that the whole is greater than the sum of its parts.

Hornig's words obviously apply equally to medical schools. The extent to which the development of institutional grants achieves this purpose, however, will depend on the ability of the less distinguished schools to improve their capacity for research performance and on the ability of nearly all schools to strengthen their own mechanisms for formulation of research policy and for research administration.

[Professor Robert Gilpin of Princeton University (in a letter to the authors dated May 14, 1965) has called our attention to ". . . an analogous situation which contributed to the decline of French science in the latter part of the 19th century. The centralization of the French university system by Napoleon, which contributed to the excellence of French science in the early 19th century, at the same time destroyed the individual universities as effective decision-making institutions. Also, in contrast to Germany, there was little institutional rivalry in France which would have stimulated the universities to recognize new fields of research. As a consequence the universities had neither the will nor the capacity of overriding the natural inclination of scientists to pursue established lines of research rather than to open new areas. I wonder whether the project grant system might not have the same weakness?"]

Institutional Research Administration

On all the issues just discussed—grants versus contracts, cost sharing, and project versus general support grants—we have favored the position that seems most likely to lead to the long-run strengthening of the medical schools. None of the dichotomies are clear cut. In some cases, the immediate advantage may appear in conflict with the long-run advantage. But a general theme appears throughout the entire discussion. On the one hand, businesslike unambiguous contracts with the quid pro quo clearly spelled out and with responsibility focused on well-established individual investigators, regardless of their institutional or geographic location, may well provide the formula for the most effective Federal research programs in terms of the rapid development of scientific knowledge and the speediest possible application of that knowledge to the battle against disease.

On the other hand, the less specific grant and a large delegation of responsibility to grantee institutions would appear the better recipe for long-run strengthening of these institutions. Even if this analysis is correct, however, the question arises as to whether public policy will tolerate for long any situation that fails to produce less than optimal results in a relatively short time. The closer we come to actual breakthroughs in any of the vital biomedical research areas, such as cancer, the more feverish will be public pressure for quick results regardless of the price in terms of the welfare of medical schools, medical education, or other less immediate considerations.

In the face of this predictably increasing pressure, the schools that survive as first-rate educational institutions may be those that have not only the courage and the financial wherewithal, but also a mechanism for saying No to inappropriate or unbalanced proposals, regardless of whether these proposals come from the Government or from one of their own scientists or faculty members.

At present, many schools do not have such mechanisms. This is not a lack unique to medical schools, but it is more serious than in other

educational institutions, partly because the schools are more dependent on Federal funds than education in general, partly because the pressures for large-scale exploitation of research findings in the medical field are so great, and partly because the medical schools are so frequently understaffed at the administrative or managerial level.

In his 1962 testimony to the Fountain Committee, Dr. James A. Shannon, NIH director, cited a new medical school with "one of the really big and interesting programs" and "a group of young vigorous scientists who are doing an outstanding job." However, Shannon said that ". . . in discussing with the dean the problems of his administrative management, it turned out that he is the only person administratively responsible for the running of the school and his total assistance adds up to two secretaries (*3*b)." Shannon made clear his willingness to help the schools finance expanded and more sophisticated administrative services. Indeed, the Public Health Service is currently conducting a significant experimental pilot project in delegation of administrative authority to seven institutions.

But the success of this project and the eventual delegation of greater administrative discretion to all grantee institutions depends primarily on the ability of these institutions to develop and to demonstrate efficient research management. Money is not the principal problem. Medical schools, despite their financial difficulties, are not poverty stricken. They do not operate on subsistence budgets. Their faculty salaries are higher than those in other branches of American education. Lack of administrative facilities and leadership is not primarily a matter of money but of academic tradition and, especially, the traditions of academic medicine, including the extreme individualism of the medical profession and the autonomy of faculty members, many of whom are unpaid or employed part time.

Many institutions have no special administrative machinery for handling research grants and contracts. Where the machinery exists, it may be little more than a clerical office for processing grant applications and writing checks. Research committees, while probably more common, may operate in the most perfunctory manner or even on a log-rolling basis. The idea of a research director or dean saying No to a project grant that seems likely to have NIH approval or of calling an investigator on the mat for inadequate attention to a research commitment or for improper travel on Federal funds is highly repugnant to all concerned. Questions of academic freedom would almost certainly be raised.

At this point we wish only to emphasize the necessity for more sophisticated and higher-level research administration if the creative new partnership between the Federal Government and the medical schools is not to slide into a general nationalization of science and medical education.

[Dr. Irvin H. Leopold, director, department of ophthalmology, Mount Sinai Hospital, New York City, and one of the nation's leading medical investigators, (in a letter to the authors dated January 12, 1965) makes the following practical observation regarding administrative personnel: "Individuals who have had experience in administering grants at NIH, who have worked as secretaries of various study sections or training grant committees, have turned out to be the most helpful in administration in institutions to which they have migrated."]

What is the minimal organizational framework that will permit a school to be master of its own destiny in the exciting but difficult years that lie ahead? This is not the place to attempt a catalog of administrative details. In general, however, it seems that any such institution must be prepared to assume responsibility for the following:

1. Clear definition and statement of its own research goals and their relationship to its other missions, such as graduate and undergraduate education, patient care, and community service.

2. Adequate institutional arrangements at the top policy-making level to assure periodic reassessment and reformulation of these goals and to assure that the accepted goals are actually carried out. In most cases this arrangement will take the form of a research committee, but it must be a committee that combines sufficient expertise, institutional power, and staff facilities to be meaningful.

3. Adequate institutional arrangements at the administrative level to implement the accepted goals and policies, providing, among other

things, procedures and staff for meaningful review of project grant applications (both originals and renewals), for development of institutional grant applications, and for processing of periodic reports; responsible handling and accounting of all financial matters pertaining to sponsored research; and the fixing of terms of employment of research personnel on an institution-wide basis.

Development of such an administrative framework within the various grantee institutions could go a long way toward correcting the kind of abuses to which the Fountain Committee pointed. More importantly, it would help strengthen the educational institutions not only vis-à-vis Government but also to meet their own general goals. In the words of the director of the Syracuse University Research Institute (*10*):

> Without administrative controls, a program [of sponsored research] can develop in an amoeba-like fashion, rendering long-range institutional goals almost impossible to attain. . . . Regardless of centralized or nominally decentralized general plans of research administration, a single review and approval check point, at a level high enough to provide the overall view, is the best insurance against disruption of university functions and shattering of its objectives by the fiscal and physical burdens of sponsored research.

Academic Freedom

The principle of academic freedom, rightly cherished by academicians throughout the world, was hammered out of the sufferings of the Socrates, the Galileos, the Thomas Mores, and countless other scientists and scholars who paid with their lives, their jobs, or their fortunes for the privilege of advancing human knowledge. It is recognized today throughout most of the free world as a protection for the scholar or scientist against arbitrary dismissal or other disciplinary action resulting from his scholarly activities, particularly the publication of findings that may be at variance with generally accepted values.

Academic freedom was not conceived and cannot be defended as a cloak for irresponsibility, fiscal or otherwise. Indeed, the existence of academic freedom depends upon academic responsibility in the use of freedom. Misuse of the principle can only end by discrediting the principle itself and thus contribute to weakening the position of the scholar and scientist in a world that is still often unsympathetic.

There are occasional cases growing out of the massive Federal research programs that really involve academic freedom. In a few instances, Federal agencies have objected to publication of specific findings. The problem in work on classified research is inherently complicated. But, by and large, such difficulties have been held to a remarkable minimum.

Too often the battle cry of academic freedom has been raised over questions that have nothing to do with scholarship or scientific findings, questions such as accounting for funds or work time. These are real problems that require thoughtful consideration and perhaps negotiation. But that is far from the equivalent of saying they represent a threat to academic freedom.

The overall implications for academic freedom of the Federal research program have been brilliantly analyzed by Dr. Charles V. Kidd, former associate director of NIH and now technical assistant, Office of Science and Technology, Executive Office of the President (*11*). Kidd firmly rejects any allegation of general restriction on academic freedom, declaring, on the contrary:

> Outside research funds, including Federal funds, have extended the freedom of both individual investigators and the universities. . . . The money has invigorated science, made possible the exploration of ideas that would otherwise have remained unexplored, and opened whole fields of inquiry that would have lain fallow in the absence of funds. . . . The general and widely held judgment is that scientists would be less able to do what they wish under circumstances congenial to them if large amounts of money were not available for research.

Kidd does not discount the real problems, but these, he insists, are different from, and more subtle than, those usually argued. One of the most important is the sometimes divisive effect of outside research on the recipient institution: "The outside agencies affect the distribution of power within universities whether they wish to do so or not, simply by the fact that they give money to someone." He concludes:

> A university which has avoided, or overcome, the potentially divisive effects of outside research funds has established the most significant prerequisite to

maintenance of freedom. The attainment of a consensus, widely shared among the faculty and administrative officers of a university, as to [its] central purposes . . . the boundaries of its functions, and the standards of excellence expected of faculty and students, is the prime condition for receipt of outside research funds upon terms set by the university. And by setting the terms of acceptance the university remains free.

For example, in pleading for greater institutional responsibility, Kidd points out:

It may seem paradoxical to assert that the imposition upon faculty members of rules and requirements relating to the use of money is a contribution to the freedom of science. But this is in fact true because if universities do not establish the conditions insuring that Federal funds are handled prudently, they will be, over the long run, subjected to outside controls.

A related issue, of particular relevance to the medical schools is the overly restricted definition of Federal responsibility. Kidd states:

As long as the Federal agencies cannot support all university functions, strain will exist because some universities will tend to stretch the use of Federal funds to finance functions not legally supportable. The agencies and Congress will tend to resist the extension of special purpose Federal programs to meet the general needs of universities. The issue of freedom of the universities and the freedom of scientific inquiry is certain to persist in this environment.

And he concludes:

The major contribution from the side of government would be further evolution of means for taking into account in a more satisfactory manner the educational, as well as the research, needs of the Nation and hence the full needs of universities.

Medical Research and Education

Medical research and medical education are inextricably interrelated. Each is essential to the other. Contributions of Federal research programs to medical education have been dramatic. Faculties have been strengthened, curriculums enriched, promising graduate students supported, and facilities and specialized resources supplied. With the flow of Federal funds for research and research training clearly tied to demonstrated competence, the incentive for qualitative improvement has been compelling. The results are evident in a new generation of more broadly and rigorously trained faculty and medical students, better able to serve the health needs of the nation.

Despite this impressive record, however, it is now generally acknowledged that the relationship between research and education no longer remains in that subtle but essential balance necessary to continued progress. One dramatic illustration of the growing imbalance is the lopsided rate of growth between the highly specialized research programs and the skilled manpower competent to carry them out. Referring to Federal support for research in general, not just medical research, the House Select Committee on Government Research recently pointed out that, while the annual growth in Federal research and development has averaged 15 percent, the number of persons capable of performing R&D increases by only 7 percent (*12*). The disparity is considerably greater in the medical research field.

Such comparisons cannot, of course, be taken literally; there are too many inconsistencies. They do not allow for the increasing productivity of the scientists, nor for the tremendous increase in the cost of specialized equipment.

It would be an interesting exercise in sophisticated statistical analysis and perhaps a useful tool of future policy formulation if we could determine just what rate of financial support is most likely to produce optimum development of research manpower. But even without benefit of statistical precision, there is increasing agreement, on the part of the interested agencies, the scientific community, and the medical profession, that medical education and the application of research findings to medical practice are falling behind.

Some say that the research programs should be cut back; no doubt this is one of the reasons for the current and probable future deceleration in research expenditures. However, we would maintain that the primary problem is not too much attention to medical research but too little attention to medical education.

Fortunately, and belatedly, a beginning has been made to remedy this situation. The trend toward institutional grants, already noted, is a move in this direction. So is the increasing NIH support of individual faculty members with teaching responsibilities. Even more important is the passage of the Health Professions Educational Assistance Act of 1963. But all of these are severely hedged by restrictions. The

NIH general support grants still amount to only 5 percent of total NIH expenditures. The Educational Assistance Act limits Federal support to construction and an inadequate student loan program. But it will accomplish little to expand the physical plant for education of health personnel if the high costs of that education fall entirely on the inadequate resources of institutions and individual students. If there is to be real hope of achieving the educational objectives that presumably underlay congressional approval of this new law, problems of operating support must also be faced.

The political difficulties in the expansion of Federal aid to medical education are well known. They will not be overcome overnight. The importance of moving in this direction, however, is hard to exaggerate. It is relevant not only to the future of the medical schools and the health of the American people but also to the viability of the research programs themselves and to the ability of administrators to manage them effectively.

Hopefully, the political deterrents to forthright support of medical education will continue to decline while the continuing triumphs of medical research will proclaim to the nation at large the desirability of further strengthening this creative partnership between the Federal Government and academic medicine.

REFERENCES

(*1*) U.S. Public Health Service: Resources for medical research. Report No. 5, 1964, p. 21.

(*2*) U.S. Bureau of the Budget: Budget of the United States Government for the fiscal year ending June 30, 1965. Federal research, development, and related programs, special analysis H (estimate for total expenditures for health and health-related research). U.S. Government Printing Office, Washington, D.C., January 1964, p. 418.

(*3*) U.S. House of Representatives, Subcommittee of Committee on Government Operations: Administration of grants by the National Institutes of Health. 87th Cong. (2d Sess.) U.S. Government Printing Office, Washington, D.C., March 1962, (*a*) passim, (*b*) p. 37.

(*4*) U.S. House of Representatives, Committee on Government Operations: Administration of grants by the National Institutes of Health. House Report No. 1958. 87th Cong. (2d Sess.) U.S. Government Printing Office, Washington, D.C., June 1962.

(*5*) National Academy of Sciences: Federal support of basic research in institutions of higher learning. Washington, D.C., 1964, (*a*) pp. 12–13; (*b*) p. 3.

(*6*) Woodrow, R. J.: Grants vs. contracts. Industr Res 6: 48–57, April 1964.

(*7*) U.S. House of Representatives, Select Committee on Government Research: Administration of research and development grants. 88th Cong. (2d Sess.) U.S. Government Printing Office, Washington, D.C., July 31, 1964, (*a*) p. 60, (*b*) pp. 62–63.

(*8*) Bowen, W. G.: The Federal Government and Princeton University. Princeton University, Princeton, N.J., 1962, p. 318.

(*9*) Hornig, D. F.: The Federal Government and the universities. Bull Assoc Princeton Graduate Alumnae, Princeton, N.J., October 1964.

(*10*) Wheadon, W. C.: Organizing university research. Industr Res 6: 46–47, April 1964.

(*11*) Kidd, C. V.: Implications of research funds for academic freedom. *In* Academic freedom: a symposium. Law & Contem Prob (Duke University, School of Law), summer 1963, pp. 613–625.

(*12*) U.S. House of Representatives, Select Committee on Government Research: Federal research and development programs. First progress report. 88th Cong. (2d Sess.) U.S. Government Printing Office, Washington, D.C., February 1964, p. 12.