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EARMARKED APPROPRIATIONS: THE DEBATE OVER THE METHOD OF FEDERAL FUNDING

Donald N. Langenberg*

In the fall of 1986, concerned that the situation was becoming dangerously unstable, the Association of American Universities and five other higher education associations formed the Working Committee on Principles, Policies, and Procedures in the Award of Federal Funds for University Research Facilities and Research Projects and charged it

to review the present dilemma and to suggest ways in which university and government leaders might be brought into agreement on how funding decisions on university science and engineering facilities and projects can be based on informed judgments of intellectual quality while recognizing other legitimate interests.

The report that follows is the product of the Committee’s deliberations.

The associations which sponsored the Committee and to which its report was addressed are at this date still considering the recommendations of the report. The Association of American Universities has adopted a resolution reaffirming its position supporting the use of scientific merit for research funding decisions and opposing earmarked funding, and agreeing to a moratorium on earmarked funding while the Association supports the creation of federally-funded research facilities programs. The American Association of State Colleges and Universities and the National Association of Independent Colleges and Universities have adopted or considered similar statements of support for federal facilities programs and related efforts.

The Congress has in the current session introduced and considered several bills or amendments authorizing federal facilities

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programs, but no final action has yet taken place. There is evidence that all this activity has not suppressed earmarked funding, but a final tally for this session is not yet available.

What is certain is that the academic research facilities problem has not been solved, and that the nature and size of the federal role in solving it remains an active and unresolved issue. One hopes that it can be resolved before lack of adequate physical facilities further erodes the nation's academic research capability.
Report of

The Working Committee
on
Principles, Policies, and Procedures
in the
Award of Federal Funds for University Research Facilities
and
Research Projects

For Consideration by the Memberships of

Association of American Universities
American Council on Education
American Association of State Colleges and Universities
National Association of Independent Colleges and Universities
National Association of State Universities and Land-Grant Colleges
Council of Graduate Schools in the United States

This report presents the views of this Committee only. It does not necessarily reflect the views or policies of the sponsoring associations, their member institutions or staffs.

March 1987
I. THE COMMITTEE AND ITS CHARGE

In the fall of 1986, this Committee was formed on the initiative of the Association of American Universities to respond to the recent proliferation of direct Congressional appropriations for academic research facilities. The Committee was asked to review the present dilemma and to suggest ways in which university and government leaders might be brought into agreement on how funding decisions on university science and engineering facilities and projects can be based on informed judgments of intellectual quality while recognizing other legitimate interests.

The AAU was joined in its sponsorship of the Committee by the American Council on Education, the American Association of State Colleges and Universities, the National Association of Independent Colleges and Universities, the National Association of State Universities and Land-Grant Colleges, and the Council of Graduate Schools in the United States.

We wish to express our appreciation to all who assisted the Committee. We are especially grateful to the Congressional staff members who met with us. We also must thank Dr. Mary E. Clutter, Senior Science Advisor, National Science Foundation, for a helpful discussion of the Foundation's competitive review and award system. While the Committee worked, Mr. Howard Gobstein moved from the General Accounting Office to the University of Michigan. We are grateful to the General Accounting Office for permitting Mr. Gobstein to be a member of this Committee.

II. BACKGROUND

Organized, merit-based, competitive programs for research facilities funding ended when several Federal agencies terminated their facilities programs in the mid-1960s. Over the last several years, however, an increasing number of colleges and universities have sought and many have received direct Congressional appropriations for academic facilities, in most cases research facilities.¹

During the past few years it has become increasingly apparent that the nation’s research universities have fallen behind in their ability to provide the physical facilities necessary for research at the frontiers of science. Though the sources and magnitude of this problem remain subjects of debate, the pressures felt by university leaders are clearly mounting. Several years ago there appeared the first examples of an unconventional response to these pressures—direct Congressional appropriations of federal funds for the construction of university research facilities. These earmarked or “pork barrel” appropriations triggered quick negative responses from many individual and institutional representatives of the academic research community. The representatives asserted that the academic community’s traditional reliance on scientific merit as the dominant criterion determining the award of federal funds in support of research was at risk. Scientific merit has commonly been judged by the scientific community itself using “peer review” systems.

There appears to be no matter of law in question here. No one questions the authority of the Congress to engage in the time-honored practice of appropriating federal funds for specific projects of special interest to individual members and their constituents. There is, however, a matter of principle at issue. Should the investment of federal funds in support of academic research be controlled by political considerations or by judgments of relative scientific merit provided by the academic scientific community itself?

The debate has continued, and sharpened. It has divided both the Congress and the scientific community, between and within themselves. And the use of earmarked appropriations has increased steadily. By the 1987 fiscal year, it is estimated that their level had reached approximately $145 million.¹ When appropriated, these funds had not been planned, requested, or budgeted by any Executive branch agency. The recipient institutions had not been selected through any sort of competitive process based on review of the comparative or independent merits

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1. During the 98th Congress, earmarks for a few university research facilities in the Department of Energy kindled a new round of controversy over earmarking. During the 99th Congress, concern intensified when nine university projects totalling $56 million were earmarked in the Department of Defense. The intense debates in the Congress over the DoD projects and the accompanying disagreements in the academic community illuminated the fundamental issues involved, and they gave impetus to this Committee.
of their requests. Funds obtained in this way are popularly called "set-aside," "earmarked," or pejoratively, "pork-barrel" funds; in this report we shall refer to them as "earmarked" funds.

The increasing incidence of direct Congressional appropriation of earmarked funds for academic facilities has aroused strong concerns and fears in the science and engineering research communities, in colleges and universities, and in the Congress. This is so for several reasons. Perhaps the most important is that the practice of Congressionally directed funding is widely seen to be in direct conflict with a fundamental principle of the research enterprise, subscribed to by researchers worldwide. This principle holds that research and the new knowledge it yields should be judged by individuals professionally competent to do so and supported on the basis of its intrinsic scientific merit; characteristics of the researcher or his/her institution, such as national origin, race, gender, institutional type, geographical location, or political views, ought to be irrelevant. The emotional tenacity with which this principle is upheld by the scientific community comes in part from a strongly held belief that it is essential to that community's search for scientific truth and in part from abhorrence of known consequences of its violation; the scientific community has several times in this century witnessed governments making invidious ideological distinctions in science. The present controversy, though not rooted in such unacceptable discrimination, is nevertheless fueled in part by deep concerns that once research decisions enter the political arena, their basis becomes clouded and suspect. "Political" science too easily becomes mediocre science.

What is the nature of the merit of a research program or result, and how should that merit be determined? Most academic researchers place strongest emphasis on "intrinsic scientific merit" or "contribution to the advance of the field." This is not the place for an essay on the meaning of such phrases; suffice it to say that each science and engineering discipline has a well-established concept of "intrinsic merit." There is general agreement that such merit can best be judged by qualified practitioners of the discipline in question, i.e., by professional "peers."

Merit-based, competitive concepts also have been applied to many Federal research-related programs undertaken to address specific needs of certain groups or individuals, for example, of developing institutions, young investigators, women and minorities, and the least research intensive of the fifty states. All such programs award funds in open competitions judged by individu-
als competent to evaluate proposals according to stated merit-based criteria.

Peer review predates massive post-World War II Federal funding for research. When Federal support for university research began to increase during the 1940s, the academic research community, working with its counterparts in the Federal agencies which supported academic research, turned to its traditional peer review mechanism for judging the merit of a scientific result or idea and adapted it to the purpose of making allocations of Federal funds for the support of research. This system, as implemented in various ways by such agencies as the Office of Naval Research (ONR), the National Science Foundation (NSF), and the National Institutes of Health (NIH), has been a major contributor to the postwar preeminence of American science.

Today, our national research community includes not only academic scientists and engineers but also scientists and engineers employed by nonprofit research laboratories, national laboratories, Federal laboratories, and industry. The traditions of peer review are strongly rooted in all elements of this community. Anything which appears to most of its members to weaken the government’s strict reliance on the peer review system is seen by them as a threat to the integrity and international competitiveness of the American research enterprise. This belief accounts for the recent policy statements issued by associations representing colleges and universities, by science and engineering professional societies, and even by Federal research agencies. All generally reaffirm their commitment to the established principles and processes of peer review for the award of Federal funds in support of research in academic institutions.

Despite these communal expressions of principle, more and more individual colleges and universities, in the absence of organized, merit-based competitive research facilities programs, have been seeking Congressional earmarked funds for facilities, usually research facilities. Chief executive officers of research institutions widely believe that lack of adequate research facilities is the single most serious hindrance to that community’s continued pursuit of new scientific and technological knowledge. In this regard many institutions see their situations as desperate, and some have chosen to seek help directly from the Congress, regardless of proclamations of principle by them and their peers.

While the motivations of each institution seeking earmarked funding for a research facility project may differ from those of others, certain common themes appear in their arguments in support of their several causes. First, of course, is the assertion
that they need the money, and that it will be well spent. It would probably be difficult to discover a single American academic research institution which could not honestly make such a claim. Then, it is often argued that the absence of adequate laboratory facilities is the principal impediment to the institution's efforts to compete for Federal research support funding. The help of Congress is sought to place the institution on a "level playing field."

Another concern is the fairness of the present peer review system. This system has not produced a uniform distribution of Federal research funds among universities or states. There is a relatively small number of "haves" and a larger number of "have-nots" who would rather be "haves." An institution in the latter category may argue that it is entitled to Congressional redress of inequities produced by an imperfect peer review system. Others, of course, argue that there is no reason to expect funds to be uniformly distributed when merit is not, i.e., that the system is working just as it should. (A recent report by the General Accounting Office, "University Funding: Patterns of Distribution of Federal Research Funds to Universities," February 1987, lends support to the latter view.) Many institutions argue that a new research facility will strengthen their capacity to contribute to local economic development and the creation of new jobs.

Finally, others argue that absent competitive Federal research facilities programs with accompanying merit review processes, it is incorrect to say such processes are being bypassed; they simply do not exist. Others, in our opinion a majority, believe that even in the absence of funded research facilities programs, the merit-based principles that guided previous Federal research facilities programs, and that still guide the present research project system, remain valid and should be observed and protected for the common good of the university research enterprise.

Views of these arguments and the underlying issues differ widely among Members of the Congress, among and within the Executive branch agencies, as well as within the research community. The facilities problem is widely seen in the academic community as very serious, and most believe that the 95-percent decline in Federal support for academic plant and equipment since the middle 1960s (source: National Science Foundation) has contributed to the needs. The Report of the White House Science Council Panel on the Health of U.S. Colleges and Universities, February 1986, chaired by Mr. David Packard, strongly indicates the need for Federal programs to improve academic research facilities. But at least one Federal agency, the National
Science Foundation, has concluded that it is of insufficient magnitude to claim high priority among possible applications of Federal research funds. Despite the previous history of Federal research facility support programs and substantial continuing indirect support, the proper role of the Federal government in support of university facilities, as compared with the roles of state governments or private sources, remains an open question.

The peer review system seems frequently to be an object of suspicion among some who find it hard to believe that the system is not rife with the pursuit of narrow self-interest. It has been the subject of repeated, indeed nearly continuous, study for decades. Despite the absence of evidence that the system is seriously flawed or that there exists a fairer, more equitable means of accomplishing the same purpose, it continues to come under attack from both within and without the academic community.

The peer review system was designed primarily to judge "scientific merit." Some Members of the Congress have asked pointedly just who are these "peers" to whom they are supposed to cede their authority to judge what is in the best interests of the Nation. To the extent that other types of merit are granted some validity, e.g., gender/race merit, technological merit, economic development merit, geographical distribution merit, or just plain "political" merit, the conventional peer review system may not be well suited to judge them. For their part, many members of the research community believe strongly that only intrinsic scientific merit should affect funding decisions, and that NSF, for example, does and should use only that criterion. In fact, NSF and other agencies have for years explicitly recognized the appropriateness of using other criteria in some cases. The siting of large scientific facilities such as some accelerators, and past Federal programs which supported the construction of academic research facilities in aid of the development of "second-tier" institutions, provide well-known examples of their application. The recognition of the existence of several types of merit other than scientific merit, together with the aversion of some to the word "peer," which, unfortunately, focuses attention on who makes merit judgments rather than on what is being judged, may have led to NSF's recent official replacement of the term "peer review" by the term "merit review." While we shall hereafter follow NSF's semantic lead in this report, like NSF we continue to believe in the use of peers to make judgments of scientific merit.

2. See, for example, the NSF award criteria reproduced in the Appendix.
It has become increasingly obvious to many observers of and participants in the national research enterprise that the upsurge in earmarked appropriations for university research facilities has placed undesirable and, perhaps, dangerous stress on the fabric of relationships whose smooth functioning is essential to the continued viability of the Nation's research enterprise. Driven by need, faculty press university administrations to seek earmarked appropriations. Some do so, often by contracting for the services of Washington lobbyists. Their leaders counter criticism by declaiming against the elitism of the "haves" and the evils of the "old-boy" peer review system and by pointing to the central importance of their institutions in creating a better future for their locales. Members and leaders of higher education associations worry about apparent dissension in their ranks and erosion of the clarity and effectiveness of their public positions on the issue. When they meet with Members of the Congress they encounter growing irritation, even hostility, with their posture. Long-time Congressional friends of academic research and its institutions see inconsistency in the community's clamor for research facilities while officially opposing the Congress's attempts to provide them to at least some institutions by the direct means long used by Congress in many other areas. They also see inconsistency, and perhaps even hypocrisy, in the academic community's issuance of high-minded statements of principle while many of its members rush to the pork barrel.

The research community's friends in the Congress engage in debate with their colleagues about the pros and cons of evading the peer review system. They are confronted with reminders that it is they, the Members of the Congress, who are the elected representatives of the people, not mysteriously identified "peers," and that American traditions of legislative earmarking antedate the traditions of the research university. Some battles of principle have been won, but in the war over practice the principles, we fear, may be losing ground. This places stress on the relationship between the Congress and the research community they have tried to champion. Simultaneously, the prospect of a proliferation of earmarking requests raises concerns about whether the Congress can adequately review and ration funds for an increasing number of such requests. A proliferation of funded earmarked projects also may come at the expense of research operations and weaken the chances for programs that could provide general research facility support.

The situation is deteriorating. The level of civility in the debate is falling, ideology is pitted against pragmatism, and confu-
sion is spreading. This is the disturbing background against which the creation and charging of this Working Committee on Principles, Policies, and Procedures in the Award of Federal Funds for University Research Facilities and Research Projects is to be viewed.

This report is intended, in the words of its charge, "to suggest ways in which university and government leaders might be brought into agreement. . . ." Accordingly, it is directed to the chief executive officers of its sponsoring organizations, who are encouraged to use it in any way they see fit as they consider how they and their organizations can help bring about the desired agreement.

The report presents the views of the Committee only. It does not necessarily reflect the views or policies of the sponsoring associations, their members, or their staffs.

III. CONCLUSIONS

The Committee met several times during the fall and winter to discuss the issues involved, to review what is known of the facts and viewpoints on the several sides of the issue, and to consider possible conclusions and recommendations. The Committee achieved consensus on the following conclusions.

1. The disagreements developing within the academic research community, within the Congress, and between the two, centered on recent, increased use of direct, earmarked appropriations for university research facilities, have the potential to cause serious and lasting damage to the Nation's research enterprise.

The present division of opinion within the academic community is between those who believe that award of Federal funds for any form of support of research should continue to be based on traditional competitive procedures using expert judgment of scientific and technical merit, and those who, in the absence of authorized and funded competitive research facilities programs, favor reliance on direct Congressional funding in the case of research facilities. A part of the academic community, we believe an expanding one, believes that the times are now different, that the rules by which research resources are sought and allocated are being, or ought to be, altered. They assert that a direct, competitive, political game must now be played in order to secure needed funding for academic research facilities. Many Members of Congress, receptive to arguments that traditional merit review processes benefit only a narrow segment of the academic community, seem willing to respond positively to such constituent requests. This is likely to remain so, especially as the competi-
tion intensifies among academic institutions for financial support of research facilities and there is no Executive branch program that is specifically available to address research facilities needs.

If these ideas become generally accepted, they have the power to cause fundamental changes and damage to the research enterprise. Collaboration and open communication among individuals and institutions will be weakened as relationships are strained. The necessary bonds of community will be weakened as institutions pursue self-interest at the expense of the entire enterprise. The sense of academic community itself will be undermined. The productivity and effectiveness of research and education programs may be compromised.

Though focused at the moment on research facilities, there is nothing in the preference for the "political game" which would prevent its harmful application to conventional research project support. The situation poses fresh challenges to the credibility and stability of science policy and its funding mechanisms and processes. New challenges also are posed to the intellectual integrity of the academic research community. But problems always are opportunities; the situation also presents new possibilities to further strengthen the system. These ideas and growing beliefs, therefore, merit serious reflection and discussion by all concerned parties. It is essential that their implications be confronted directly and addressed as quickly as possible.

2. Confusion, disagreement, and misunderstanding exist within the government, within the research community, and between the two, over their appropriate, respective roles in the allocation of public funds in support of research.

The research community is large, diverse, and complex. It comprises faculty and students of research institutions; members of national scientific and engineering societies and organizations; and researchers in industrial laboratories, national laboratories, and government laboratories. The role of members of this diverse community in the allocation of public research funds has become twofold over the past four decades. The community has assumed, and has been largely delegated by the mission agencies created by the Congress, the responsibility for judging the "intrinsic scientific or technical merit" of science and engineering research projects and programs of all kinds and scales, from small to large. Its authority and competence in this role have rarely been challenged by the Congress or Executive agencies, never seriously. The research community has also been given a significant role in proposing, advising on, and guiding policy rel-
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relevant to the conduct and funding of research. Here, however, it is usually recognized that the research community may propose, but the Congress and the Executive agencies dispose. It has generally been possible to maintain effective working relationships among the partners in this enterprise, though conflicts do arise.

There are some within the research community who believe that the Federal government’s only proper function is to provide ample funds for use by the research community in ways of its own choosing. This “Put the money on the stump and run!” school of thought is persistent but rarely influential.

Since the end of substantial federally financed programs for facilities in universities in the mid-1960s, the Executive branch agencies have generally taken the position that the Federal government should have no role in providing “bricks and mortar” for universities. In contrast, the Congress has demonstrated by its earmarked appropriations for such facilities that it believes otherwise.

It is sometimes difficult for members of the research community to appreciate that the legal role of the Congress is whatever the Congress chooses it to be, within Constitutional constraints. Chiefly and historically, this role has been that of establishing broad national science policy, ensuring its support, and monitoring its success or failure. Congress has delegated most project award decisions to the relevant Federal agencies. Recently, however, some Members of Congress have exercised their legitimate authority to earmark funds for academic research facilities projects that have not been requested, planned, or budgeted by an administering research agency. In response to pressing needs expressed by constituent institutions, Members of Congress may continue to earmark funds; they may even expand the practice. Some suggest that the Congress erect a permanent statutory bar to the practice of earmarking. Even if Congressional leaders were inclined to erect such a bar, it is unlikely to succeed. Any such barrier is easily circumvented. However, both the Congress and the academic community have an interest in ensuring that the practice of earmarking does not escalate to the point that it erodes or becomes a substitute for the broad policy decisions taken by the Congress in the development of the highest quality national science policy and programs.

As the research enterprise has grown, the Congress has exercised its power to earmark funds for particular academic research facilities with impressive if diminishing restraint. Many House and Senate Members, supported by senior staff, continue steadfastly to resist a proliferation of earmarked projects. They
do so for many of the same reasons cited by a majority of the academic and scientific communities. Over the years, Congress has delegated most funding decisions to those in the research agencies qualified to make the necessary scientific and technical judgments. If the Congress now were to exercise more actively its prerogatives, its own award decisions certainly would bring it into conflict more frequently and more publicly with the broader research community and with established agency competitive, merit-based award processes.

The Committee believes that the research community must seek to understand better the essential responsibilities, institutional imperatives, and prerogatives of the Congress in these matters. For its part, the Congress needs to be better informed about, and to sustain its traditional support for, merit-based, open, competitive processes for the award of Federal funds for academic research facilities and research programs. As each strives to meet its responsibilities, each must recognize that neither the academic community, through its associations and societies, nor the Congress can effectively enforce uniform behavior of their individual members in this regard. Each must depend on cooperation and mutual understanding of agreed-upon principles. The obvious need for renewed attention to these factors is compelling and urgent.

3. Despite decades of use by the research community and of study by almost everyone else, the competitive, merit-based review and award processes of the Federal agencies are neither well understood nor universally supported by the research community, university researchers and administrators, Members of Congress, their staffs, and others.

This finding will strike some as surprising, others as only-to-be-expected, and others as interesting but irrelevant. The Committee believes it is both significant and most important to any understanding of the issue it has been charged to address. A widespread lack of faith in the merit review system accounts, in large part, for the increasing number of defections from merit principles and their accompanying public justification. Widespread misunderstandings of the fundamental purposes and values of the merit review system and distrust of its processes help to explain Congress's readiness to jettison it in favor of satisfying the demands of individual constituent institutions. A system intended to maximize the return on the public investment in academic research is widely perceived as a spoils system controlled by elitist, scientific "old boys." However often and skillfully attempts have been made to create general, informed trust in the
system, it is clear that they have failed. This failure is an important element of the problem at hand. It must be confronted and dealt with.

4. The reality and scale of the academic research facility crisis remains unproven to many who must play key roles in any Federal effort to alleviate it.

Though there is clear and mounting evidence of the existence of a serious research facility deficit on a scale of several billion dollars in the Nation's research universities, and though this appears to be an important cause of the upsurge in Congressional earmarks for facilities, the research agencies of the Federal government remain officially unpersuaded of the needs and of their role in responding to them. In the absence of agency initiatives, Congress appears to be willing to earmark funds for facilities at a level of a few tens of millions of dollars per year, but not to establish in reluctant agencies adequately funded research facilities programs to address the crisis systematically. None of the Executive branch research funding agencies, and neither the Office of Science and Technology Policy nor the Office of Management and Budget, has yet seen fit to pursue the establishment of such a program, even in a time when several agencies are achieving double-digit budget increases in the presence of single-digit inflation. Agencies appear to be actively resisting a leadership role in developing organized, coordinated, competitive, research facilities programs. Some acknowledge, at least informally, apprehensions about a potential destabilization of research programs, a loss of administrative control to the Congress and to irresistible pressures to award facilities funds on other than a merit basis.

The universities, partly because they also fear a diversion of research program funds to facilities, have been lukewarm at best in their advocacy of facilities programs. Some institutions, often citing contributions to state and regional economic development, have achieved impressive successes with state and private funding sources. If this status quo of ambivalence on the part of all parties is to continue being deemed the proper status, then we must at least recognize its role in exacerbating the earmark problem and deal with it in that context.

IV. RECOMMENDATIONS

The Committee recognizes that the power to take actions which would directly resolve the earmark problem lies elsewhere than in the associations which are its sponsors. However, the Committee believes the roots of the problem are largely a failure of communication, a lack of understanding, and resulting dis-
trust felt broadly across the entire system, including the Congress, the agencies, and many institutions. Our sponsoring associations all have as their principal functions the facilitation of communication and understanding. We therefore recommend that they undertake a coordinated campaign to bring the Congress and the Executive agencies together with the universities to resolve the earmark problem using consultation, education, and advocacy. We offer the following recommendations for such an effort:

1. *The associations should explore with their members, and then with Congress, the possibility of modifying the earmarked funding process to meet mutually agreed-upon objectives.*

The Committee believes that the best solution for the earmark problem would be the establishment of competitive, merit-based, research facilities programs as recommended below. Absent such programs, university requests for earmarked appropriations seem likely to continue, probably to grow, with consequent potential for diverting support from merit-reviewed research programs in the research agencies. If this is inevitable, the committee believes it would be prudent for its sponsoring associations to explore arrangements that would make the Congressional earmark process more reflective of both national needs and the concerns of the research community for merit. The Committee’s recommendations would require behavior changes on the part of both the Congress and the universities.

A. *For the Congress*

The Committee recommends that the leaders of the higher education associations invite the heads of leading science and engineering societies and organizations to join in consultations with key leaders in the House and Senate specifically to explore the feasibility and desirability of introducing into the Congressional earmark process a way of evaluating the merits of any proposed projects, prior to their funding.

If, as the Committee anticipates may occur, the Congress is deluged with university requests for earmarked funding, its Members may well find valuable some means of screening these requests and comparing their merits. It will become increasingly difficult for the Congress to justify continually increasing earmarked appropriations for ever-longer lists of facilities in their states and districts, or, if increases are not feasible, to decide among the claimants. One might expect that the Congress

3. A dissenting statement to this recommendation by Arthur M. Sussman is appended.
would appreciate the need for optimizing the value of merit in its investment of public funds.

If we acknowledge the existence of several types of relevant merit (see below), the Committee believes that an attempt should be made to persuade the Congress that some reasonable level of scientific merit should become a necessary (but not necessarily sufficient) condition for earmarked funding. Neither new agencies nor complicated new review systems would be needed to judge scientific merit. Existing research agencies could be asked by the Appropriations committees to review groups of proposals prior to committee action. If deemed necessary, a special interagency committee could be formed to coordinate the process, perhaps under the aegis of the Office of Technology Assessment, the General Accounting Office, or the Office of Science and Technology Policy. The Congress could then devise some system for judging other forms of merit, either as a part of the scientific review process or separately. Whatever process is developed, it should be as open a process as possible. To evaluate the effectiveness of the system, the Congress periodically should request the General Accounting Office to review the process and the outcome of earmarked projects.

It will be argued that any conceivable arrangement of the kind suggested here would have the effect of legitimizing an activity that many believe inherently destructive, without providing genuine assessments of scientific merit. That is not our intention. We urge that no arrangement of the kind recommended here be entered into if it provides only the form of merit review without its substance.

B. For the Universities

The Committee recommends that the associations reexamine their policy positions and statements in light of the Committee’s conclusions and recommendations. Specifically, the Committee suggests that the associations’ policy statements should:

(1) Continue emphatically to emphasize merit as the fundamental criterion for all Federal support of research, as a means of maximizing the societal value of the outcomes of research.

(2) Recognize explicitly, however, that the societal value of the outcomes of research may comprise several factors, each of which perhaps should be judged in a different manner by different judges according to different criteria. A precedent is provided by NSF’s long-standing award criteria (Appendix). For example, it should not be impossible for the associations and their members to agree that some single-investigator research projects are most appropriately judged solely in terms of “intrinsic scien-
tific merit,” whereas others with more apparent technological consequences might more appropriately be judged with consideration to the significance of the relevant technology. Nor should it be impossible to agree that as consideration shifts from single-investigator projects to instrumentation to modest facilities to megafacilities (accelerators, telescopes, and space probes), non-scientific factors may appropriately come into play and be judged in part by persons other than scientists and engineers. The associations may wish to consider developing an explicit statement about the various cases, along the lines suggested by the NSF criteria.

(3) The associations should reaffirm their confidence in the assessment of scientific merit by “peers” as conventionally defined, but refocus their policy statements in terms of merit review rather than peer review, consistent with the ideas of the previous section.

(4) The associations should continue to oppose actively earmark proposals introduced by Members of Congress which would divert funds from regularly authorized and appropriated competitive research programs of the six major funding agencies and the two National Endowments.

2. The associations should intensify their efforts to achieve a multipoint plan for Federal participation in solving the academic research facility problem.

The Committee believes that if there existed a set of fair, equitable, and financially adequate mechanisms through which the Federal government could join with state, local, and private agencies in addressing the academic research facilities problem, the earmark problem would wane. The Committee therefore recommends that the associations invite the broader science and engineering research community to join with them in support of a comprehensive plan to address the unmet facilities needs of universities and colleges. In particular, support should be sought from industry, science and engineering professional societies, and Congressional groups that are currently formulating programs to foster national competitiveness. The plan should seek an equally comprehensive response from the Federal government, and should include the following elements:

A. Competitive Research Facilities Program

(1) A special effort should be made to persuade the 100th Congress to initiate new competitive research facilities programs. There are several acceptable options. First, as recommended by the White House Science Council, a single, large matching-grant program might be created within the National
Federal Funding of Research, thereby centralizing responsibility and program management in one agency. An alternative single-agency approach would be to establish a new organization independent of the six major research agencies, specifically designated to administer national research facilities modernization programs. If one program were adequately funded and properly coordinated with all the research agencies, either option could do the job successfully.

The Committee, however, prefers a third option: creating research facilities programs in each of the six major Federal research-funding agencies, i.e., NSF, NIH, USDA, NASA, DoD, and DoE. This approach offers the important advantage of keeping research facilities programs closely linked to each agency's mission and research programs.

However it is organized, the new facilities program should be two-tiered, with programs organized separately to meet the needs of two sets of institutions. One subprogram should be designed to address the needs of established research universities. The second subprogram should focus on research-oriented, developing institutions. Separate award criteria should be developed appropriate to each group and separate competitions should be held.

The universities will have to resolve an important question before they can embark on this campaign. That is whether or not to insist that any funding for a Federal facilities program be incremental, or add-on, funding. Leaving aside the question of how one can ascertain with any certainty whether an appropriated dollar is incremental or not, the committee notes that insistence on incremental funding is tantamount to an assertion that all research projects and programs of the sort currently funded are more important than any research facility candidate. If that is the message the universities choose to carry to the Congress, then they will need to be prepared for Congressional skepticism about their seriousness. The Committee recommends that the research community relinquish its insistence on incremental funding for any facilities program and instead argue for reasonable floors and ceilings in agency budgets for facilities programs, generally along the lines proposed in H.R. 2328 introduced in the 99th Congress. Alternatively, the proposal might argue for a substantial share of any agency R&D budget increase exceeding inflation.

(2) The Congress should be persuaded to authorize and fund at adequate levels competitive academic facilities programs authorized in the Department of Education by Title VII of the
Higher Education Act. The Committee recognizes the pressing needs of many institutions, especially smaller institutions, for the facilities funds authorized by Title VII of the Higher Education Act. These needs are beyond the scope of the charge to this Committee, but the decision of some institutions to seek earmarked funds for these purposes is noteworthy. As presently funded, Title VII is an inadequate response to the pressing needs for academic facilities. If Title VII, which authorizes such sums as necessary for these purposes, were funded at an adequate level, it could play an important role in assisting institutions, especially less-research-intensive institutions, in meeting their facilities needs. We urge the associations to continue to seek adequate appropriations for Title VII.

B. Modernization of the Use Allowance and Depreciation Provision of OMB Circular A-21

The research community should seek adoption and implementation of the recommendation on this subject made by the White House Science Council Panel on The Health of U.S. Colleges and Universities, chaired by Mr. David Packard, in its 1986 report. OMB Circular A-21 should be modified to provide a more realistic use allowance for research equipment predicated on a useful life of 5 to 10 years, depending on the type of equipment (the present provision is based on a useful life of 15 years) and use of research buildings predicated on a useful life of 20 years (the present provision assumes a 50-year life).

C. Restoration of Tax-Exempt Bonding Authority

An early effort should be made to seek restoration of unlimited tax exempt bonding authority for private academic facilities. A recent report by the National Science Foundation of the research facilities needs of universities shows that the loss of this means of facilities financing promises long-term adverse consequences for many independent institutions. Unless the authority is restored, the pressures to seek direct legislative funding for facilities no doubt will increase substantially. Public university leaders should be prominent in this effort, in aid both of communal solidarity and of their own institutional interests.

3. The associations should undertake programs to foster improved understanding of the competitive, merit-based review system as it presently operates in the major Federal research-funding agencies.

The higher education associations, professional science and engineering societies, and national science organizations should together undertake a special effort, with the support of the major research agencies, to inform researchers, university and col-
lege administrators, trustees, Members of Congress and their staffs, state governments, industry, and media about the present merit-based review and competitive award processes of Federal research agencies. Bias, misinformation, and misunderstandings about the present system need to be corrected, and opportunities to further strengthen competitive merit-based processes ought to be identified.

The research enterprise will grow more complex and costly as it responds to new opportunities and needs. As it does, considerations of scientific and technical merit will remain essential to funding decisions, but increasingly they will be insufficient criteria for the award of funds for larger research programs and for research facilities. Additional factors must and will be taken into account in award decisions. The competitive award process will become more complex and probably more controversial. Improved understanding of the system and support for it from all participants will be needed to sustain competitive awards systems and to ensure their equitable and efficient operation.

An educational effort is needed to inform better all interested parties about agency award criteria and competitive award processes. All interested organizations should be invited, encouraged, and assisted as necessary to consider the subject during their regular membership meetings; additional opportunities to engage their members in this topic should be created. Congressional Authorization and Appropriations committees should be encouraged to hold special oversight hearings and seminars for Members and staff. Recent reports of the National Science Foundation, the Department of Defense, and the General Accounting Office concerning award procedures should contribute to the educational program.

As part of this effort the academic research community also should promote the vigorous monitoring of the fairness of the awards processes employed by Federal research agencies.

The heads of research agencies should be asked to state as a matter of agency policy that any funds appropriated for research facilities programs will be awarded in open competition, according to specified criteria, on the basis of merit, with scientific and technical merit recognized as a necessary (if not sufficient) precondition for the award of academic research facilities funds.

4. The associations should undertake to inform the research community about the risks to competitive merit-based review posed by Congressional earmarked appropriations.

The associations' educational programs also should seek to heighten the awareness of the members of higher education as-
associations and professional science and engineering societies about the potential risks to the competitive research system that are associated with a further escalation of Congressional earmarking for academic research facilities and its potential extension to research project funding. The effort should seek specific reasons for the view of some in the community that present awards processes incorporate a degree of bias. Institutional and individual self-restraint based on trust of the system, although difficult, will remain the primary protection for merit-based competitive processes, and it also will be an effective control on the practice of earmarking.

5. The associations should, after appropriate internal and interassociation consultations, and after preliminary discussions with appropriate Congressional and Executive agency leaders and staff, consider organizing a small working conference to explore further the issues raised in this report and agree upon a plan of action.

The proposed conference should comprise 40 to 60 invited participants, including Members of Congress and selected senior staff, Federal research agency representatives, higher education leaders, and representatives of national science and engineering professional societies. Discussion papers elaborating elements of a plan of action should be prepared and circulated to participants in advance. The objective of the conference should not be more talk but an agreed-upon plan of action that includes at least the following:

—elements of needed federal facilities-related legislation,
—proposed modification of OMB Circular A-21, and
—a working plan for higher education associations and science and engineering societies to educate their members in all aspects of agency merit review systems.

* * *

This Committee in meeting its charge has learned a good deal about the issue at hand and feels that it is of such importance as to require expeditious action. The Committee urges its sponsoring organizations to act promptly. The members of the Committee stand ready to participate in the process in any way appropriate.
DISSENTING STATEMENT BY ARTHUR M. SUSSMAN

I take issue with the first, and I believe key, recommendation of this report that, absent a facilities program, it is "prudent" for the higher education associations to work "to modify the earmarking process" by introducing into that process "a way of evaluating the merits of any proposed projects prior to their funding."

Additionally, I cannot join in the advice offered that associations should "oppose actively" only those earmarking proposals which would divert funds from regularly authorized and appropriated competitive research programs.

These recommendations, even in the context of a report which strongly supports peer review and the establishment of a competitive merit-based facilities program, signal a willingness to accept earmarking or "pork barrel funding" for, at least, research facilities.

It is this willingness to accept a process which I believe, even if "modified," will continue to be divisive and detrimental to the long-range interests of higher education that I dissent from.

Earmarking has been harmful to the fundamental principle of the research enterprise. Additionally, as the report concludes, it has been divisive to the relationships within the academic community, within Congress, and between the two.

The Committee would seek to persuade Congress that "some reasonable level of scientific merit should become a necessary (but not necessarily sufficient) condition for earmarked funding." It is not clear that most of the earmarked facilities to date have lacked "some reasonable level of scientific merit." What then will be achieved is not the conversion of earmarking into a competitive and fair process, but the legitimization of a system of political handouts for dispensing limited federal research monies.

This acquiescence in the development of a parallel Congressional research funding system for facilities will invariably lead to its extension into project funding. What persuasive arguments would distinguish the facilities from the project funding?

The introduction of some scientific merit review into earmarking will not diminish the divisiveness within the higher education community. The sanctioning of the process will increase the rush to the same lobbyists who have engineered the present situation. Political influence will remain the final determinant of
funding. This will fuel the growing perception of higher education as another special interest group.

The need for research facility and instrumentation funding is real. The possibility of immediate relief to some institutions should not be endorsed at the expense of longer run interests of the entire community.

The emphasis should be on the achievement of a fair facilities and instrumentation program which would recognize the needs of types of different institutions.

While working with Congress and industry to achieve such a program, the higher education associations should continue their principled opposition to earmarking. Its elimination, not its modification, is in the long range interests of science and higher education.

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The general criteria used by NSF in the selection of research projects are as follows:

The National Science Board on August 21, 1981 agreed to the following criteria for the selection of research projects by the National Science Foundation:

In order to provide for the fair and equitable selection of the most meritorious research projects for support, the Foundation has established criteria for their review and evaluation. These criteria are intended to be applied to all research proposals in a balanced and judicious manner, in accordance with the objectives and content of each proposal. Four criteria for the selection of research projects by the National Science Foundation are listed below, together with the elements that constitute each criterion.

1. Research performance competence—This criterion relates to the capability of the investigator(s), the technical soundness of the proposed approach, and the adequacy of the institutional resources available.

2. Intrinsic merit of the research—This criterion is used to assess the likelihood that the research will lead to new discoveries or fundamental advances within its field of science or engineering, or have substantial impact on progress in that field or in other scientific and engineering fields.

3. Utility or relevance of the research—This criterion is used to assess the likelihood that the research can contribute to the achievement of a goal that is extrinsic or in
addition to that of the research field itself, and thereby serve as the basis of the research field itself, and thereby serve as the basis for new or improved technology or assist in the solution of societal problems.

4. Effect of the research on the infrastructure of science and engineering—This criterion relates to the potential of the proposed research to contribute to better understanding or improvement of the quality, distribution, or effectiveness of the Nation's scientific and engineering research, education, and manpower base.

Criteria (1), (2), and (3) constitute an integral set that are applied in a balanced way to all research proposals in accordance with the objectives and content of each proposal. Criterion (1), performance competence, is essential to the evaluation of the quality of every research proposal. The relative weight given Criteria (2) and (3) depends on the nature of the proposed research: Criterion (2), intrinsic merit, is emphasized in the evaluation of basic research proposals, while criterion (3), utility or relevance, is emphasized in the evaluation of applied research proposals. Criterion (3) also relates to major goal oriented activities that the Foundation carries out such as those directed at improving the knowledge base underlying science and technology policy, furthering international cooperation in science and engineering, and addressing areas of national need. Criterion (4), effect on the infrastructure of science and engineering, permits the evaluation of research proposals in terms of their potential for improving the scientific and engineering enterprise and its educational activities in ways other than those encompassed by the first three criteria. Included under this criterion are questions relating to scientific and engineering personnel, including participation of women and minorities; the distribution of resources with respect to institutions and geographical area; stimulation of quality activities in important but underdeveloped fields; and the utilization of interdisciplinary approaches to research in appropriate areas.

Any specific criteria that apply to individual programs, while falling within the general criteria presented in this section, are contained in relevant program announcements or solicitations.